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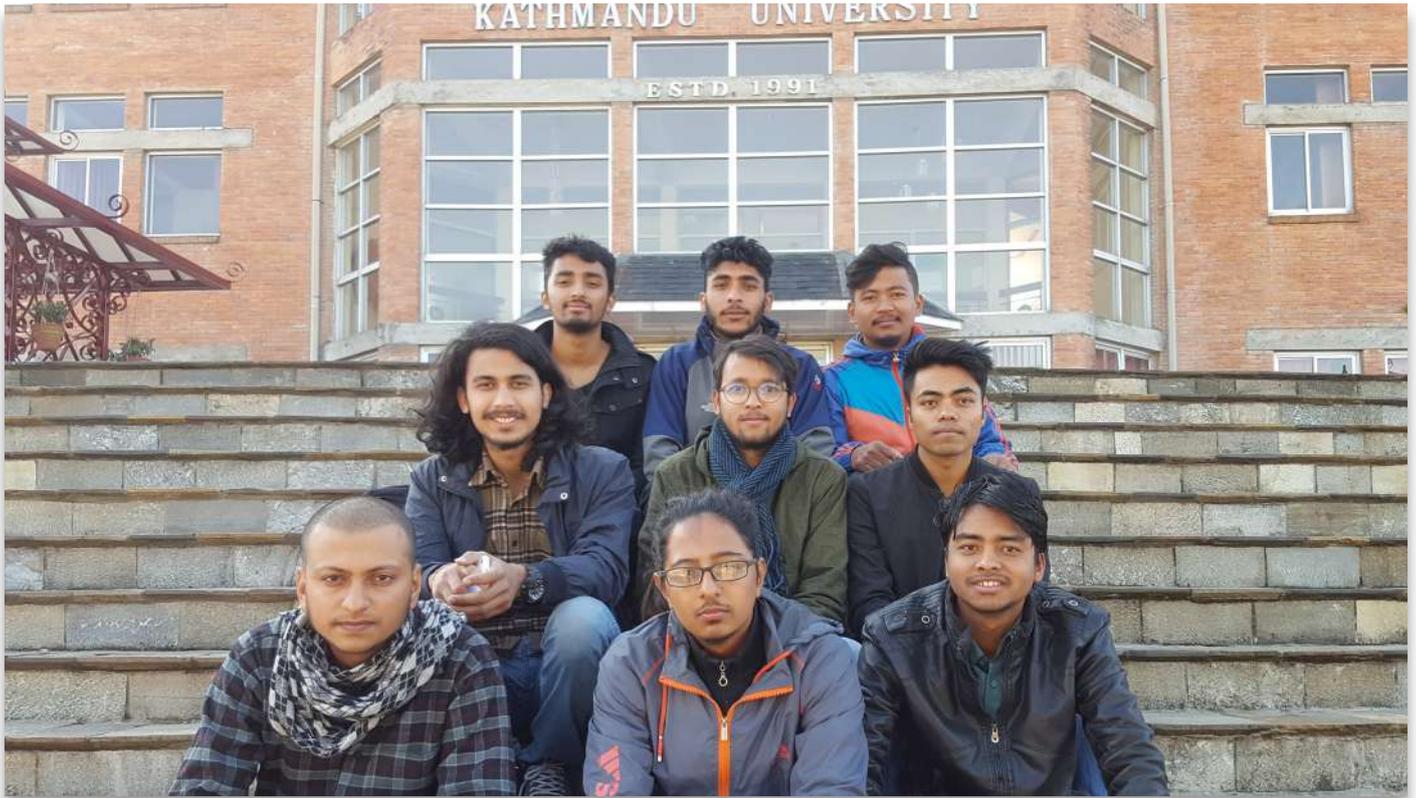
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MESSAGE FROM DEAN, SOE

The annual event of Kathmandu University Computer Club (KUCC), IT-MEET, is one of the bench-mark event of Kathmandu University Dhulikhel Campus. It attracts the widest range of participants from all sectors, from very young school students to highly-acclaimed IT professionals in the country. Indeed, our life in the modern world is unthinkable without IT and IT sector demands highly qualified professionals for meeting the service and the innovation demands of the society.

Students of Kathmandu University are very active in utilizing any opportunity to make our community be aware of latest happenings the field of their study. It requires a high level of passion and students in the Department of Computer Science and Engineering definitely have it. It will definitely be realized by the public at the time of IT-MEET 2018 and through the IT-EXPRESS Magazine.

I am therefore eagerly looking forward to the event, IT-MEET 2018, and to get the annual magazine IT-EXPRESS 2018. I would like to request for cooperation from all sectors concerned in making the event successful and contributing to the publication of the magazine at the highest possible quality. It will be great encouragement to our students and would be motivating them to be the best professionals in future.

Sincierely

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MESSAGE FROM HEAD, DoCSE

To begin with, we must understand what IT Express really means to our KU-DOCSE community. It is a platform for students to share knowledge and experiences, showcase their talents and skills. IT Express began with the aim to give exposure to student's projects and to help them express themselves to a wider audience, which consequently would also develop their writing skills.

Technical work was of course as important as technical communication for the pioneers to inspire others like them. Since the magazine is by and from the students it definitely is for the students too, however not limited to them. The magazine, like our community, accepts any tech-curious reader.

IT Express and IT MEET are two inseperable parts of our community. IT MEET
is a mega event, which brings project exhibitions, talk-programs and seminars together and IT Express is considered to be one of the core entities of the IT MEET.

I have high expectations from the magazine's team. I tend to regard my students as the ambassador of out department and I feel that they should grab as many experiences and skills as possible, be it through the course or from platforms like these.

High expectations, however, don't mean to pressurize any of the students because we all are learning throughout this process of life so instead of expectations, let us talk of motivation. We need highly motivated participants in the making as well as the reading parties.

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Sundar Lama
President
Student Welfare Council (SWC)

MESSAGE FROM THE SWC PRESIDENT

Welcome to Kathmandu University Computer Club (KUCC), IT Express 2018 Kathmandu University Computer Club (KUCC) is a student wing of the Department of Computer Science and Engineering with the vision of "Empowering ICT". IT EXPRESS is an annual magazine published by KUCC with the help of DoCSE (Department of Computer Science and Engineering).

I would like to start off by giving a huge thanks to the many people who have contributed in development of this editorial, particularly KUCC. Knowledge should be shared like a light to candles; the more you share, the more enlightened you will be. There is a power whirling inside everyone, it just needs an ignition and exposure. Knowledge adds weariness to the skin and it is a formidable armor. This magazine shares knowledge on ongoing IT trends and other useful information. So going through it empowers people from every walks of life especially IT students and enthusiast. Not to know is bad; not to wish to know is worse. Live to learn and thrive to apply the knowledge; that is the ultimate virtue.

Sumiksha Bhatta
President
Kathmandu University Computer Club
(KUCC)

MESSAGE FROM THE KUCC PRESIDENT

"The science of today is the technology of tomorrow."- Edward Teller

The new technologies and inventions that will change the world tomorrow, are small rough ideas today. And these ideas are cultivated through the knowledge of science and its application. This knowledge is what Kathmandu University implants in its every student. And with this knowledge, they dare to dream and fulfill their dreams.

KUCC being the departmental club of DoCSE, organizes many events through which the knowledge and skills of the students are sharpened and also tries to provide an opportunity for them to explore their potentials and strengthen their self-confidence.

IT Express is an annual magazine of DoCSE initiated by KUCC. It is a platform for the students to pour down their ideas and showcase their knowledge and achievements.

I am very thankful to the faculty members of DoCSE in this venture of the students. Also, I highly appreciate the hard work and dedication of the editorial team of IT Express 2018, for coming up with yet new and innovative edition of our departmental magazine.

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2018

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"A single leaf working alone provides no shade."

Its human nature to seek for pleasure. Tree full of leaves, providing shade can be compared to one of such. The IT express being a tree and its readers as the bypassers, we bring you the best form of relaxation that there is for the worshippers of technology.

As no fruitful tree grows without constant care and supervision. Likewise, IT express is a result of constant effort shown by the whole team. Helping the tiny bits grow into this ocean of worthwhile reads, sure took a lot of dedication. However the real people responsible to bring this magazine into existence were the writers. They contributed with their amazing piece of mastery which is beyond priceless.

IT Express 2018, is the succesor of what our seniors had been doing. Hereby continuing the legacy we present you the 2018 edition which we believe is unique in its own way. We leave that to the readers to find out. We hope you enjoy reading..

We are welcome to any feedbacks you have. Feel free to contact at itexpress@gmail.com .

An electronic copy of this magazine is also available at http://ku.edu.np/kucc/ .

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STUDENT ARTICLES

NEWS AND EVENTS

GitHub Workshop
June 4, 2017

KUOSC organized a GitHub workshop on June 4, 2017. The main objective of the workshop was to make the participants familiar about GitHub, how to use it and manage tools for projects. The key speakers were Shubham Joshi and Kiran Kumar Chaudhary.

Workshop on HTML5, CSS3 and JavaScript
July 19, 2017

Workshop on HTML5, CSS3 and JavaScript was organized by KUCC Web community in collaboration with KUCC Js and KUCC IEC(Innovation and Entrepreneurship Community). Kiran Kumar Chaudary and Suman Dhakal were the event coordinators. The objective of the event was to make the participants able to built a simple interactive web application and have a brief idea about HTML, CSS and JavaScript. The key speakers were Kiran Kumar Chaudary, Suman Dhakal, Yudeep Rajbhandari and Amrit Twanabasu.

Competitive Programming Practice Session
July 19, 2017

KU Competitive Programming Community organized the first practice session for competitive programming. Tricks about competitive programming were taught. Event coordinator Mahesh Kafle was the key speaker. Incorporating 8 people, the event was successfully organized.

Annual General Meeting for KUCC board 2016-17
23rd july

AGM was held for KUCC board 2016-17. Dr. Manish Pokharel, Head of Department and other faculty members also attended the formal program. The board of 2016-17 presented about the events during their tenure. They were handed over with Token of Love as a farewell gesture. The tenure of KUCC board 2017-18 had formally started.

JavaScript Workshop
July 26, 2017

JS Community in collaboration with IEC organized, on July 26, 2017, a JavaScript Basics and Angular JS workshop. Aimed at beginners, the purpose of the workshop was to make the students familiar with the basic syntax and workings of JavaScript. The workshop also touched on the concept of MVC model using Angular JS.

Volunteers Training for elibrary Project
July 29, 2017

Training of Trainee is a one day workshop provided to the new volunteers who will be recruited as Volunteers for Help Nepal Network's eLibrary Project. Help Nepal Network have established eLibrary in different districts of Nepal. With its motto of 'One eLibrary Per District' around 35 districts have eLibrary installed. For the installation, volunteers need to have abundancy in technical knowledge about eLibrary which this workshop promises to fulfill. For the smooth running of eLibrary its necessary for all the volunteers to have abundant knowledge about eLibrary. We can be an efficient teacher only after we will be a smart learner. Volunteers who will be on field to deploy and monitor the eLibrary will be needing this training. This training was organised by Kathmandu University Open Source Community (KUOSC), an autonomous wing of Kathmandu University Computer Club (KUCC) at Kathmandu University to train the new and existing volunteers for contributing their valuable time in eLibrary with collaboration with Tribhuvan University (Pulchowk Campus) volunteers.

Entrepreneurship Workshop Episode 1
July 30, 2017

Entrepreneurship and Innovation community aims to encourage more students towards the notion of starting your own business. Not just that, in collaboration with other communities, this community aims to build improve skills as a Developer by organizing professional developer skills and tools. On 30th July 2017, the community organized a first session introducing the concepts of Entrepreneurship and importance of innovation in business. Amrit Twanabasu and Basnta Thapa were the main speakers in this event.

Software Freedom Day
September 16, 2017

Software Freedom Day (SFD) is an annual worldwide celebration of Free Software. SFD is a public education effort with the aim of increasing awareness of Free Software and its virtues, and encouraging its use. Kathmandu University Open Source Community celebrated this day with the participation of students and teachers of DoCSE. The chief guest was one of the pioneers of gcc project - Rob Savoye. He shared his experience and motivated everyone to contribute in the open source projects. There was discussions about GNU and gcc with him. Sanjog Sigdel talked about GitHub, Pratit Raj Giri gave information about Open Maps. There was also a short workshop on Wikipedia. Initiation of FOSS Kavre was done on the occasion of SFD.

Python Workshop
November 7-8, 2017

Python Workshop was oragnized by Kathmandu University Open Source Community (KUOSC). The event coordinator was Mr. Subash Sapkota. The main objectives of the python workshop were to impart the basic understanding to python programming language and to help the second year students with data structures by giving simple demonstration of use of data structures in any programming languages such as python. The key speakers were Ashutosh

Chapagain, Rajshree Rai and Kiran K. Chaudhary.

Open Data Awareness
November 8, 2017

To support Nepal's growing open data movement and increase its network of data-savvy practitioners, Open Knowledge Nepal has announced the Open Data Awareness Program, which aims to sensitize more than 300+ students and youth from seven districts. The Open Data Awareness Program aims to raise awareness about the concept and usage of open data to Nepal's digital natives, who are the current youth population and the potential future decision-makers and leaders of Nepal.

The objective of the awareness program is to make the youth of Nepal more aware of the benefits of open data, to fill in the gap of data literacy and to better prepare young people for a rapidly changing data scenario. Through the program, the university students and youths will be empowered to:

- Use open data for research and new projects
- Conduct data analysis and reporting
- Use new data tools and programming languages
- Build innovative solutions to tackle development challenges

Key Speaker: Nikesh Balami , Shubham Ghimire and Sagar Ghimire.

Organized by **Open Knowledge Nepal supported by KUOSC**.

Linux Talk
November 13-14, 2017

Like every year, Linux Talk was organized by KUOSC targeting the first year students. Discussion about history of open source software was done and preference of Linux over Windows was explained. Different commands through Ubuntu terminal were taught. The first year students were helped in installing linux based OS. Grub system was explained and they were taught to make bootable pendrives through rufus. The key speakers were Shubham Joshi, Beeshal Adhikari and Suyog Adhikari.

Teachers Training (by KUOSC)
November 17-18, 2017

Teachers Training is a workshop for the teachers of eLibrary sites in Nepal. Help Nepal Network has established eLibrary in different districts of Nepal. With its motto of 'One E-Library Per District', HeNN has already setup 41 eLibrary sites in different district of Nepal. There are 12 E-library sites currently being monitored by Help Nepal Network (HeNN) according to its 3 years of monitoring contract. The objectives of conducting Teachers Training were to make the teachers familiar in current working system, to introduce them new updated system build on XUbuntu, to explore the useful contents in our system, to make them able to solve problems and to understand every site problem and find the solution.
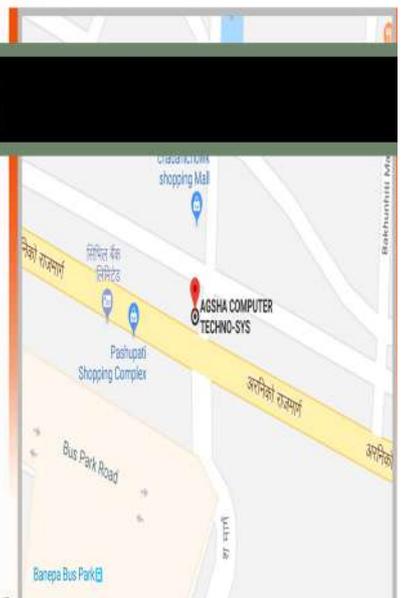
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About DLR(Digital Learning Lab)

The DLR Lab was established in 2016 to promote research culture in the university with following objectives:

- To promote online learning and e-learning pedagogy in higher education of Nepal.
- To develop online system to assist teachers and educators in professional teaching and learning.
- Empowering digital innovation in Education by using ICT.

Research projects

- Integrating Knowledge Management Techniques and HCI Principles for Effective Online Learning, funded by University Grants Commission (UGC).
- Time period: December 2017 - November 2018.
- Implementing Data Mining methods in Online Learning System. (Ongoing)
- Study of Pedagogy in Online Learning System. (Ongoing)
- Identification of Online Learning Users in Online Learning System. (Ongoing)
- Developing MOOC on Scientific Research Writing, funded by Nepal Academy of Science and Technology (NAST).
- Time Period: June 2017 – May 2018.
- MOOC for Higher Education in Nepal, funded by IDRC, Canada and administered by FIT-ED, Philippenes under the theme "Digital Learning for Development (DL4D)". Time Period: March 2016 – February 2017 For project details: Click here.
- Enhancing Online Learning by implementing Knowledge Management Tools and Techniques. (Ongoing)
- Usability Evaluation of MOODLE in Kathmandu University. (Ongoing)

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Information and Language Processing Research Lab (ILPRL), Department of Computer Science and Engineering, Kathmandu University

Background

The Information and Language Processing Research Lab (ILPRL) at the Department of Computer Science and Engineering, Kathmandu University was founded in the year 2004. The lab was found on the wake of the PAN Localization Project, http://panl1on.net, a multinational localization Project that was conducted in 11 countries and 22 partners of South and South East Asia. Kathmandu University was a collaborating partner along with Madan Puraskar Pustakalaya (MPP) representing the Nepal Country component. The PAN localization project was a forerunner in the domain of Software Localization and Natural Language Processing in Nepal and the participating countries.

Projects conducted under or in collaboration the ILPRL lab

1. NepaLinux Project [2004 -2009]
   The Project involved localizing the Debian-based Linux distribution into Nepali. Besides a fully localized interface for an operating system along with several useful applications in Nepali, it also included a Nepali spellchecker and a Thesaurus.

2. Dobhase Project [2005 – 2006]
   This was a first ever web-based English to Nepali Machine Translation Project. ILPRL lab, KU was the main partner whereas MPP was the collaborating partner to the Project.

3. E-Gov and Trust Issues [2010 - 2012]
   The Project was one of the first institutional grants awarded by the University Grants commission to the School of Engineering, Kathmandu University. It looked into the trust and e-readiness issues in the implementation of e-government in Nepal.

4. Opinion Mining Project [2012 - 2014]
   It was another institutional grant awarded by the University Grants commission to the School of Engineering, Kathmandu University. It laid a foundation in building resources for Opinion Mining or Sentiment Analysis in Nepal. One PhD thesis and several Masters dissertations were developed under Sentiment Analysis in the lab.

5. Nepali OCR Project – Phase I [2016-2017]
   This Project is a major milestone in the Nepali OCR, an endeavor to convert Nepali text documents in the image format (pdf, jpg, bmp, png etc.) into editable format. The developed software currently performs with an accuracy of above 90 %. It was conducted in collaboration with the ILPRL lab, KU and the Nepal Association of Blind (NAB), Nepal. The Project was supported by the Direct Aid Program, Australian Embassy to Nepal.

6. Nepali Text-to-Speech (TTS) Project [2017-2018]
   This is an ongoing Project being conducted in collaboration with ILPRL, KU and NAB, Nepal. The Project will deliver a Nepali TTS software which will interface with the screen reading software (NVDA) with a natural sounding Nepali voice. The Project is being supported by the Kadoorie Charity Foundation, Hong Kong.

7. Nepali OCR Project – Phase II [2017 -2018]
   After the successful completion of the Nepali OCR Project – Phase I, we have again been awarded this Project which is Phase II for porting the developed Nepali OCR software in the mobile version. The Project is a continued collaboration between ILPRL lab, KU and NAB, Nepal. The Project is supported by the Direct Aid Program, Australian Embassy to Nepal.

8. Popularity Tracking and Trend Analysis of Named Entities and Political Figures in News Media – [2017 – 2019]
   This Project is a Faculty Research Grant awarded by the University Grants Commission and aims to build a computational model to track the popularity and trend analysis of named entities and political figures in news media texts. With just Google Trends as the most similar project in the given domain, this Project holds significant novelty and research value not just within Nepal but globally as well.

With about 13 years of research excellence in the field of Software Localization and Natural Language Processing, ILPRL lab represents itself as a leading institution not only in Nepal but in the region itself. We have been working in close ties with prominent researchers and research organizations around the globe. The lab has been regularly hosting MS by Research candidates at Kathmandu University. The current focus is on Data Science and Analytics with significant engagement of state-of-the-art technol

ogies like Machine/Deep Learning.

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U-learning System Technology

U-learning is a technical teaching and learning method which is amalgam of mobile learning and e-learning.

Initially, research works were done in Kathmandu University regarding this project. Now, this lab has been established in IT-park in 2017.
The main objective of this research lab is:
- to create a friendly environment for students about teaching and learning techniques.
- to help and implement to government schools which are not facilitated with books and technology.

Firstly, this project was implemented in nine schools; two schools each from Sindhuli, Kathmandu and Chitwan and one each from Sindhupalchowk, Saptari and Dolakha in 2016.
The project was a huge success. Now, as we have decided to expand our project, three municipalities have been given the proposal: Kamalami municipality from Sindhuli district and Namo buddha municipality and Manchandeupur municipality from Kavre district. We are planning to conduct this project in fourteen schools of Kamalami, eleven schools of Namo buddha and twelve schools of Manchandeupur municipality.

In context of Nepal, this project is very helpful because students can learn the subject course without being physically present in class. It can also play a major role in every nook and corner of Nepal where students are not properly facilitated with internet, books and modern technology (Teaching and Learning)

This project was first used to teach English in nine schools in 2016. Further, it was tested as an objective exam for students of Kathmandu University. Now, our motive is to teach four subjects (Science, Maths, English and Computer science) in thirty-seven schools. We will be selecting at most two teachers from each school which will total upto 47-50 teachers and will provide training on how to setup the server, content development, upload and download of stationery materials and the use of tablet. This three day training program will be conducted three times a year.

The team members working for this project include Dr. Manish Pokhrel and Dr. Purusottam Kharel from Kathmandu University, Dr. Sanjeeb Prasad Pandey and Mr. Reg Bahadur Bhandari from Tribhuwan University and Mr. Cavin Sin from Korea of NSDevil Co. Ltd., Jinju National University of Education, South Korea who has also been providing the financial and technical support. Similarly, Asian development bank is also willing to support for nepal government school.

"Bridging the Digital Divide with Natural Language Processing Applications and Data Analytics"
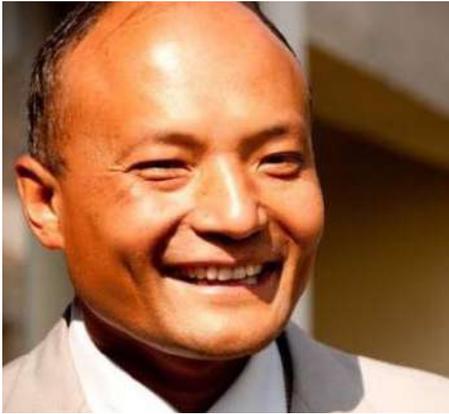
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Introduction

With the hardware getting cheaper and cheaper every day, the affordability of the common people to
buy the computer and other electronic devices has increased. This factor has to some extent addressed the issue of the "digital divide", which is basically a gap between those having and not having access to information technology from the perspective of "hardware" and "software". However, owning a device
does not necessarily mean that one has access to the content or information contained within or
provided by the device. There could be several factors coming into play in between like the content being in the language you don't necessarily understand, the technology lacking accessibility and usability
features, the unavailability of the given technology in your language and so on. The latter aspect of the "digital divide" caused by the "software" is getting more and more prominent in today's world.
Scientists all over the globe are working hard to address this issue and hence Natural Language Processing or NLP, a sub-discipline of Artificial Intelligence (AI) and Computer Science is getting more
and more attention. In this article, I try to highlight the role of NLP for bridging the digital divide.

What is NLP?

NLP or short form for Natural Language Processing basically involves two things – Natural Language Understanding (NLU) and Natural Language Generation (NLG). These two terms, NLU and NLG involve
both the humans and the machines or computers. By NLU, what is understood is that you build
capabilities in the machines to understand human language, both in the form of text and speech. To put
it simply, the software in machines should be designed and developed in such a way that queries or
commands posed by humans either in the form of speech or text to the machines are understood and processed by the machines in the benefit of humans making our lives much easier. Similarly, by NLG, we understand the capability of the machines to generate outputs in the form that is very close to how
humans would communicate with each other. In general, while both of these tasks are quite complex, NLU is considered more difficult than NLG.

The components of NLP

NLP comprises the following components:
a) Morphology deals with the word or lexical forms. This includes breaking down a word into its
root and affixes (prefix, infix or suffix). In that respect, morphology deals with the smallest unit
of a text, i.e., word or lexeme.

b) Syntax deals with the grammar and grammatical structure of the language. Each language has
its own grammar and grammatical structure. Whether a sentence is grammatically correct or
not is determined by whether the syntax of the language or the grammatical rules have been
followed or not. English, for example has a Subject Verb Object (SVO) sentential pattern
whereas Nepali, on the other hand follows a Subject

Object Verb (SOV) sentential pattern.

Furthermore, there is just one form of Subject agreement with the English verbs, which is number but in case of Nepali, there are three forms of agreement with verbs (gender, number and person). If the agreements are not followed, the resulting text would sound weird and funny.

Few examples of English and Nepali sentences are provided below for further understanding the above discussion.

English sentence: Ram eats rice. [Ram - Singular noun, hence "eats"]

Nepali translation: राम भात खान्छ। [Ram - Singular Number, hence "eats"]

English sentence: We eat rice. [We – Plural Number, hence "eat"]

Nepali translation: हामी भात खान्छौं। [We – Plural Number, hence "eat"]

English sentence: Sita eats rice. [Sita – Singular noun, hence "eats"]

Nepali translation: सीता भात खान्छे/खान्छिन्। [Sita – Singular noun and feminine gender, hence the feminine form in the verb endings]

English sentence: Dad eats rice. [Dad – Singular Number, hence "eats"]

Nepali translation: बुवा भात खानुहुन्छ। [Dad – Singular noun and entails honorificity, hence the honorific verb ending]

English sentence: Ram and Sita eat rice. [Ram and Sita – Plural Number, hence "eat"]

Nepali translation: राम र सीता भात खान्छन्। [Ram and Sita – Plural Number, hence "eat", which is a plural form of the verb agreement].

c) Semantics deals with the meaning of the text. A text may be grammatically correct, yet could be meaningless. Consider the sentence, "Cow sings." which translates to "गाई गीत गाउँछ" in Nepali.

The text although grammatically correct is not sensible in that cows generally don't sing. Texts can be also be ambiguous, which means that it can have more than one meaning. The popular example "I went to the bank." Illustrates the ambiguity in which the word "bank" can refer to both a financial institution and a river bank. The word sense disambiguation here needs to be done based on the surrounding contexts depending upon whether the preceding or following text talks about a financial institution or a river bank.

d) Discourse deals with connectedness between texts. If texts are meaningfully related to each other, we say that the texts have "strong coherence".

We also say that such texts are cohesive and are connected to each other by elements of cohesion. Generally, in larger texts, it may be an issue figuring out which pronouns are referring to which particular nouns. This problem is known as "anaphora resolution".

Given below is an example of a text with confusing referents.

"Sita and Gita went to the market. She told her that she had already been to that market earlier."

In the second sentence, it is unclear about who actually "Sita" or "Gita", the pronouns "she" and "her" refer to.

Some useful NLP applications

From an application perspective, NLP has a very big scope and usage. This is because communication between the humans and the machine is inevitable. And any such communication involves language processing. As mentioned earlier, the communication may be both in a textual or a spoken/speech form. Below, we briefly discuss some useful NLP applications.

i) Spellchecker

Just imagine that you have a presentation in the next thirty minutes and you are rushing to develop some slides in the last minute. You are worried that you might have some silly typos in your presentation. It is where an application like a spellchecker would be really handy. A spellchecker essentially does two things – detects any misspelled words in the text and then makes suggestions for corrections on the misspelled words.

ii) Stemmer and Morphological Analyzer

A stemmer and morphological analyzer takes a word and breaks it down to its stem or root form and its affixes (prefix, infix and suffix forms). For example, given the word घरमाथिका the application breaks the word into three components, घर which is the root word here followed by the suffixes माथि and का. The role of a stemmer and morphological analyzer is especially useful with problems involving language analysis.

iii) Parts-of- Speech (POS) Tagger

The words in any language is assigned a unique class based on the role it plays in the language. For example, English has eight parts-of- speech (POS), namely, noun, pronoun, adjective, verb, adverb, preposition, conjunction and interjection. A POS Tagger automatically assigns the parts-of- speech

(POS)
tags to each word in any running text. POS Taggers are especially useful in applications like Text-to-Speech (TTS) and Named-Entity Recognition (NER). In TTS, a same word, for example, "book" would be pronounced differently depending on whether it's parts-of- speech is a "noun" or a "verb". In NER systems the parts-of- speech of words can help automatically identify and extract the named-entities
(proper names of individuals and organizations, objects etc.).

iv) Grammar checker
A grammar checker application checks the text in the sentence level and determines whether it is grammatically correct or not. While grammar checkers can certainly be of immense help to humans as a
proof-reading tool to check the grammatical correctness of their texts, it is more relevant for correcting
machine generated human language texts.

v) Named-Entity Recognition System

A named-entity recognition system automatically detects proper names of persons, organizations and other defined objects, often referred to as named entities. It has pronounced application in information extraction, which requires extracting named-entities from texts.

vi) Sentiment Analysis or Opinion Mining
Sentiment Analysis or Opinion Mining deals with classifying the opinions expressed in documents into positive, negative and neutral. Other tasks under sentiment analysis or opinion mining include determining the degree or intensity of the expressed opinions. For example, even with the "positive" class of opinions, there could be a scale of positivity like "low", "high", "very high" etc. The tasks of sentiment analysis or opinion mining has become quite prominent these days with increasing amounts of user-generated content like reviews, comments, status, tweets etc. in news, social media and other platforms.

vii) Text categorization and classification
Text categorization deals with taking several different texts as input and automatically providing the
categories to these documents. For example, an online portal may publish different articles under different categories like "Sports", "Politics", "Economy", "Society", "Entertainment" etc. However, if

there a system in place which could do the same automatically, then that would be immensely useful from a language resources building perspective. Similarly, text classification classifies texts into two classes. For example, there could be a case you would need to classify incoming emails as "spam" or "ham". This is a typical text classification task.

viii) Machine Translation System
A Machine Translation or MT System provides translation of a source text to a target text. For example,
if we were to take an English text as "This is a test text." then it is a "source text" which translates to "यो परीक्षण पाठ हो" into Nepali which is the target text here. Historically speaking, machine translation systems were one of the first NLP applications which were taken up as early as after the second world war as a bid to understand documents in the foreign language, though with little success. Over the years, MT systems have matured a lot. Today, Google has extended MT support to 100 plus languages around the world including Nepali. However, the domain is still under development in many languages including our own.

ix) Optical Character Recognition System
Optical Character Recognition (OCR) system convert texts in image document formats (for example, .jpg, .bmp, .pdf etc.) into editable texts. The conversion of image documents to editable text format is to facilitate text processing in a full-fledged manner. Furthermore, it is also useful in creating useful language resources like the text corpus which are crucial for any language processing applications.

x) Handwriting recognition system
Handwriting recognition system recognizes handwritten texts and converts to digital text. It can be of
two types – online and offline handwriting recognition. Online handwriting recognition refers to
entering the handwritten input via the stylus or other input medium to the computer or other electronic

devices and the recognition of the input text during real time. Offline handwriting, on the other hand, deals with the recognition of the handwritten texts where the input would be in the form of scanned handwritten documents or images taken from some camera devices.

xi) Text-to- Speech system
Text-to- speech (TTS) system has the capability to

read out the input text. In this respect, any input text is
converted to speech by the underlying TTS engine and the converted speech is read out by the system. TTS serves as a very useful utility to the visually impaired community and also those who are not literate on the writing system of a language.

xii) Speech recognition system

Speech recognition system recognizes the speech provided as input. The output of such system can be in possible in different forms as demanded by a particular task. If it were a speech transcriber tool, it would simply recognize the input speech and provide text transcripts for the same. On the other hand, if it were a speech-to- speech translation system, both the input and the output would be speech, just that the language of the input and output speeches would be different.

Conclusion

Now that we have discussed the different NLP applications, we can clearly see that they have enormous potentials to transform the society. Machine Translation systems have the potentials to bridge the vacuum of knowledge to accessing and understanding technology as well as content. Similarly, OCR and TTS systems in a combined form can be used in a manner that can largely benefit the visually impaired community. Speech recognition systems and AI have already reached promising milestones – the latest innovation of the robot named "Sophia" which not only has the capability to hold meaningful conversations with humans but also show emotions is a corroborative proof of this. Technology which were thought to be unrealistic or simply "myths" are no longer so today. It is a known fact that this is an age of big data and the latest technologies like "machine learning" and "deep learning" have provided their next mile in terms of data analytics and prediction. Our cars are getting driverless and our homes have getting ever "smarter". Certainly, NLP has and will have a larger say in all of these because there is an inevitable component "communication" between "humans" and "machines". After all, a few of us must have even thought a few years back that we would have a full-fledged voice-based assistant capable of not just answering simple questions on the weather but playing one's best songs to turning on or off the home appliances.

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"Research is my Passion"

When I went to study in Seoul National University (SNU) of S. Korea as an exchange student during my master's degree in 2010, I realized the true importance of research and research lab. I was not habituated to such an extensive environment of self-learning and research, so I had a tough time in adjusting to that environment. I found SNU to be one of the highly recognized and top universities in the world, and I was highly influenced and inspired with their concepts of research lab and of engaging students in real projects. When I came back, I came with some memories and with a dream of getting involved in research projects and establishing a research lab, where students can share knowledge, exchange ideas and get engaged in research projects.

After my return to Nepal, I got an opportunity to work with Mr. Jae Min Kim, an e-Learning expert, who was sent to Kathmandu University through KOICA to establish E-Learning Center in the university. He was supervisor of my Master's Thesis. Working with him, I learned about the Korean

working style: full dedication and strictness towards a deadline. In 2013, my first research project proposal was approved by University Grants Commission (UGC), through which I learnt a lot about research projects and the actual way of writing research project reports. From that day till the present, I have worked in several research projects. Having visited several countries for my research dissemination, I have presented in several international conferences,

which, I believe, is a key to enhance and upgrade skills and knowledge.

Grooming the students is also an important part of any research project. Many students have presented our research paper in international conferences and published them in journals too. To my delight, one research project done under my supervision by undergraduate students was published in an international journal and that was the proud moment for me and my research team. At present, we have our own research lab, where numerous students have worked in the past and many are involved at present too. I have 19 publications till date and I'm looking forward to publish more in coming days.

Data Visualization and Tools

Mr. Manoj Shakya

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Data Visualization is one of the important activities in research. It is a way of representing information or data into meaningful diagrams. The primary aim of data visualization is to better see and understand the data.

Data or information is usually represented in following various graphs.

1. Bar chart
2. Histogram chart
3. Pie chart
4. Line chart
5. Scatter plots
6. Box plot

Bar chart is useful in comparing two or more than two values such as average temperature of each month in Kathmandu. Bar chart can be drawn vertically or horizontally. Histogram is a graphical representation of the distribution of numerical data. Pie chart are more useful when you want to now the proportion of various values. For example, female population and male population of a village can be represented in pie chart. Line chart shows the trends. Scatter plot determines the correlation between dependent and independent variables. Box plot displays the numerical data through their quertiles. It clearly shows the median value and even outliers. Besides these diagrams, there are many other charts/diagrams that people create with their data. For example, heat map, tree map, network map, stacked area chart are some popular graphs.

To create these charts and graphs, we need software data visualization tools. Following are some popular data visualization tools:

Microsoft Excel

IBM SPSS

Tableau

Origin

Minitab

Matlab

R Programming

Microsoft Excel is a proprietary software developed by Microsoft. It is considered one of the powerful tools to visualize data. It can easily generate bar chart, histogram, scatter plot, pie chart and many more. IBM SPSS is a proprietary software developed by IBM. SPSS offers advance statistical analysis and is very easy to statistically analyze data using various machine learning algorithms.

Among the mentioned data visualization tools, R is free and open source software. It is particularly developed for statistical computing. You can use R in many platforms including Linux, Windows and Mac. The latest version of R is 4.3. The main attraction of R is that it has many libraries that increase the capabilities of R in many aspects. One of the most popular libraries is ggplot2. This library is used to visualize data and can generate beautiful graphs and charts. The official site of R programming is https://www.r-project.org/ .

UNICODE
-Not a tool that converts English to Nepali

Prashant Subedi
CE 4th year

The use of Unicode has become popular among Nepali users. One of the reason for this wide spread popularity is availability of software such as Google Input Tools which allow users to type a word in English alphabet and convert it into Nepali. They are very easy to use, and people who can type fast in English can easily use them.

But many people who use Unicode, have no idea what it is. Some even think that Unicode itself is a way to convert English into Nepali. That's not remotely true!

Traditionally, Nepali was typed by assigning Nepali font to ASCII character set. (It is still done in many offices due to legacy documents, migration cost etc.). Due to this, Nepali could only be typed in word processors and text boxes which support such fonts. You must have noticed that text written in fonts such as "Preeti" and "Kantipur" become garbage English text when copied outside the supported programs. ASCII character set can support only up to 128 characters, since each character is of 7 bits. So, it is not possible to support all languages using ASCII.

But, Unicode defines almost all the characters from almost all the scripts in the world in terms of code points. Code points are a fancy term for decimals used to denote characters. (They do serve an important purpose of separating an abstract character from glyph and encoding scheme used, but let's not make things complicated.) This makes it possible to write something like "युनीकोड is awesome!", without a word processor.

Computers are basically only able to understand strings of 1 and 0. So, every text, image, audio, video are at the lowest level expressed in terms of binary digits. In ASCII, code points are represented directly using the binary equivalent. Eg: A = 65 and is stored as the binary equivalent of 65 in memory. In contrast, code points and binary representation of a character are not same in Unicode. Different encoding schemes such as UTF-8, UCS-2, UTF-16, UCS-4 etc. are used to encode code points into binary numbers. The most popular encoding scheme for Unicode is UTF-8. You must have encountered UTF-8 before if you have done some HTML or XML editing.

UTF-8 is a variable length encoding scheme. It was designed to be a superset of ASCII. All ASCII code points are valid in UTF-8. This means "A" in UTF-8 is same as that in ASCII. A UTF-8 character can occupy from 1 byte to 4 bytes. Nepali characters occupy 3 bytes. Nepali "क" is defined as hexadecimal '915'(U+0915) in Unicode standard. It is coded as 11100000 10100100 10010101.

So how does UTF-8 handle variable length characters? It does so by using bit markers. The following patterns are used to denote 1 byte, 2 bytes, 3 bytes and 4 bytes code points.

1 byte=0XXXXXXX (Covers ASCII)
2 bytes=110XXXXX 10XXXXXX
3 bytes=1110XXXX 10XXXXXX 10XXXXXX
4bytes=11110XXX 10XXXXXX 10XXXXXX 10XXXXXX

So, "क" which has code point 915 hexadecimal (0000 1001 0001 0101 binary) is represented using UTF-8 as 11100000 10100100 10010101.

If you want to understand more about how UTF-8 encoding works, you can checkout:

https://github.com/prashant-subedi/UTF-8-Support-Cplusplus

It is a support library for UTF-8 in C++.

KRACK
- The Breaking of WPA2

Yogesh Bhandari
CS 2nd Year

What is KRACK?

K RACK (Key Re-installation Attack) is a replay attack (a type of Man-In-The-Middle Attack) on Wi-Fi Protected Access protocol based on major vulnerabilities discovered by Mathy Vanhoef, that affect most if not all of the implementations of Wi-Fi Protected Access II (WPA2). According to Vanhoef, an attacker within the range of a victim can use this attack to read sensitive information like credit card numbers, passwords, messages, emails and so on that were previously assumed to be safely encrypted. Depending on the network configuration, attackers can also inject and manipulate data such as injecting ransomware and other malware into the websites visited by the users.

How does it Work?

When a client (your device) joins a network, it executes the 4-way handshake to negotiate a fresh encryption key. It will install this key after receiving message 3 of the 4-way handshake which is installed and used to encrypt data using an encryption protocol. However, the Access Point (AP) retransmits message 3 if it does not receive an appropriate response. As a result, the client may receive message 3 multiple times. Each time it receives this message, it will reinstall the same encryption key used by the encryption protocol. An attacker can collect and replay retransmissions of message 3 of the 4-way handshake. In this manner, the encryption protocol can be attacked, e.g., packets can be replayed, decrypted, and/or forged.

Are you affected?

According to the findings, weaknesses are present in the Wi-Fi standard itself, and not in the individual products or implementations implying that any correct implementation of WPA2 is most likely affected. The findings show that Android, Linux, Apple, Windows, OpenBSD, MediaTek, Linksys, and others, are all affected by some variant of the attacks. What this means for end-users is that if your

device supports Wi-Fi, it is most likely affected.

Do we now need WPA3?

No, the implementations can be patched in a backward-compatible manner. This allows patched clients to communicate with an unpatched AP, and vice versa. Although a patched client can still connect to an unpatched AP, and vice versa, both your device and AP must be patched to defend against all attacks.

How can you protect your Devices?

All of the end-user devices can be protected against KRACK by updating to latest security patch which

removes the weaknesses of the WPA2. All the major device manufacturers are already developing security patches for their respective devices. Thus, you can simply download and install these patches to protect your devices against KRACK. Furthermore, you can simply avoid using protected Wi-Fi outside of your homes such as offices and cafes which an attacker can easily access. Another simple solution is to use the Ethernet connection until your devices receive their security patches.**Where can you learn more about KRACK?**

Mathy Vanhoef, the researcher who discovered KRACK has published a website: www.krackattacks.com. Here, you can get all the information you need to know about KRACK including the demo of how the exploit works on devices.

SUPPORT VECTOR MACHINE

Rajshree Rai
CE 3rd Year

Support Vector Machine (SVM) is a supervised machine learning method used for both regression and classification problems. It is effective in cases where the no. of dimensions is greater than the no. of samples. It also performs outlier detection and hence, makes preprocessing easier.

DATA PREPROCESSING STEPS :

- Basic data cleaning should be carried out as in any other supervised machine learning methods.
- Categorical attributes should be converted into numeric attributes.
- Feature scaling is very important in SVM. The main advantage of scaling is to avoid attributes in greater numeric ranges dominating those in smaller numeric ranges.

MODEL SELECTION:

SVM provides 4 kernels to choose from. However, RBF kernel would be a reasonable choice as it can be used for linear as well as non-linear relationships.

PARAMETER SELECTION:

RBF kernel has two parameters C and gamma.
A low C makes the decision surface smooth, while a high C aims at classifying all training examples correctly. gamma defines how much influence a single training example has. The larger gamma is, the closer other examples must be to be affected. Hit and trial method can be used to select the two parameters.
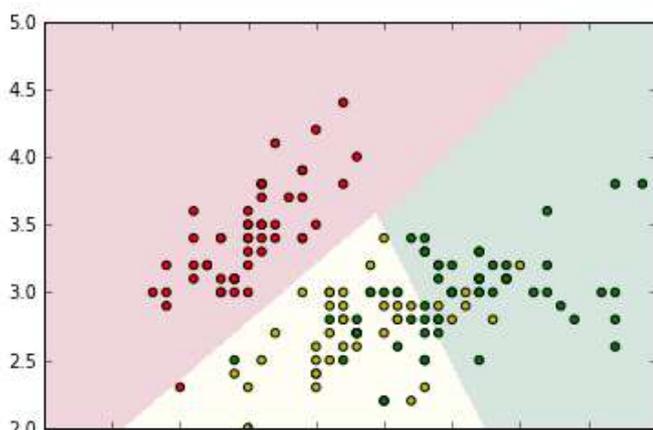

Fig: Support Vector Machine

SVM is simple and easy to implement. Beginners in machine learning can apply this method to familiarize themselves with the concept of ML.

ARE SMART PHONES RE-ALLY MAKING US SMART?

Prabhat Neupane | CE 1st Year

The intention of this article is to show how smart phones are impacting the society and also how smart phones are transforming the culture, social life, technology landscape and other diverse aspects -of modern society. But first of all, take a look on these questions... What's the first thing you do in the morning after you wake up? Somebody asks for either date or time, what do you prefer to reply?

Smart phone term was introduced in the market, referring a new class of mobile phones that provides integrated services from communication, computing and mobile sectors including voice communication, messaging, personal information management (PIM) applications and wireless communication capability. Definitions of smart phones as per its invention and its evolutionary phase seem a bit different. The convergence of communication and computing for mobile consumer devices is on the evolutionary course to bring interoperability and leverage the services and functions from each and every industry. In this process of convergence the smart phones are the leading devices taking the front end and playing the role of universal mobile terminal. A smart phone is a mobile phone with advanced features and functionality beyond traditional functionalities like making phone calls and sending text messages. Apart from general class mobile phones, smart phones are equipped with the capabilities to display photos, play games, play videos, navigation, built-in camera, audio/video playback and recording, send/receive e-mail, built in apps for social web sites and surf the web, wireless Internet and much more. Due to same reasons the smart phones have now become a common choice for consumers along with the use in business although it was initially intended for business users only. Today smart phones enable consumers, advertisers and publishers how to better engage, socialize using the modern technology in order to standardize and evolutionize the way of using the mobile phones. Smart phones from different vendors including Blackberry, Android, iPhone and Microsoft etc. are available. Mobile Application Market is another business sector introduced by smart phones. Different mobile operating system vendors have their own mobile application technology hence having a different market for Mobile Applications. This is resulting in a better competition which automatically is benefiting the users in terms of service and performance. In educational sector smart phones introduced another means for knowledge lovers to fulfill their thrust and dreams. Use of and number of mobile consumers accessing the Internet is surpassing fixed line Internet users. The growing demand of smart phones, availability of the Internet and high speed mobile browsing is ready to provide an alternative channel to deliver education services. This will provide an opportunity to users to utilize their smart phones to get educational benefits within their available time irrespective to their location. Smart phones enable students to text, co-operate on social networking sites, check e-mails, play online games, and even watch TV channels. This is one of the sources of distraction. This is not only distracting for a student, but it can also become distracting for other students around him and even sometimes for whole class. In addition to this, it wouldn't be easy for students to make calls during exams to cheat but it may be easy for pupils in a crowded classroom or examination hall to use their smart phones to access information online to cheat in exams. In fact some surprising statistics are there about the use of smart phones for cheating in the classroom. Misuse of smart phone could be through the use of text message exchange with other students, find answers on the Internet, using advanced calculator and phone applications, reading notes saved on their phones to help on the test. Smart phones can encourage bullying and hazing also. The online health care education portal survey results show that apps such as Run keeper, access health records electronically or participate in wellness programs have been taking benefit of mobile's health even without realizing it. Users with a click or simple touch of finger can access the health and related services anytime and anywhere, but along with the convenience it also poses several dangers as well. According to a recent article from CNN, this convenience of smart phone access to health resources

can be dangerous if patients start avoiding personal interactions with doctors for mandatory tasks. According to the article, on average, the targeted users use to check their phones 34 times a day, but not necessarily that it was really needed to check emails. Instead it is habitually checking which may result in relying on phone more than doing things themselves. Another aspect that has been noticed is that lots of parents let their kids carry and use smart phones even at their very young age. The convenience offered by these modern devices is indeed great, but on the other side also there are major issues associated:

❋ Games and other entertainment applications designed for kids may discourage them from interacting with other kids and people around them and disconnect them from the true essence of social interaction.
❋ Excessive exposure of these devices in early age can cause poor eye sight for kids.
❋ Use of smart phones exposes children to the habit of jumping from one option to another that trains them to gather small portions of information instead of concentrating and getting complete information. This habit is harmful for development of brain.
❋ Online and video games are addicting. Kids may easily get addicted and spend hours playing games which may be awful when they have smart phones with them everywhere they go.

According to "use it or lose it" psychology principle, the key to keep your brain functioning in its peak condition throughout your life lies in its smart use. The smart use of smart phone will increase your brain function instead of using the smart phone only for entertainment. It could be used to access useful information. Smart phones provide a mean to reduce stress in busy work life. In today's busy schedule smart phones enable users to interact with their friends and family as and when they get time. Interacting with friends and families, while traveling, waiting on any place enables users to utilize such time to promote their social life. It enables the users to stay up-to-date with the latest news and maintain social bond among them using various available social medias.

But addiction to smart phones can be described as wanting to be in constant communication with people even though when there is no real need for communication. Different psychic problem like anxiety and withdrawal symptoms in users increase when they do not receive any messages or updates. Another psychological impact is that users check their mobiles almost all the times, while at work time, with family or even when with friends. Lookout, a mobile security company conducted a study on smart phone users in USA and found that 58% of smart phone users check their phones at least once in an hour and another 54% of respondents said that they check their phone even while going to bed to sleep. As smart phones provide various options like distant learning and work-home interference, it also enables the user to access irrelevant content and promote cybercrime, cyber bullying etc. affecting personal, social and moral aspect. According to another report by security industries, smart phones and social networking sites are likely to become the next target for criminal attacks. Security holes on several smart phones were exploited and malicious software was found on several smart phones from different vendors. **Why do we, smart phone users usually check time on phones though we have watch on our wrist? Is there any compulsion to check any notifications before going to bed and as soon as we wake up?** The questions above mentioned and similar questions could be asked to oneself and we could relate the impact of smart phones on our regular life. There is no doubt that smart phones are brining great features and capabilities to consumers. Communication, addiction to phone, single device with all required features, business edge, convenient educational features, apps as new technology, entertainment, best utilization of time, disrespectful behavior, privacy issues, impact on culture, distraction at work and at education Institutes and many more provide us both positive and negative sides of the smart phones.

HACK AND THE SECURITY

Most of the people are familiar of these two terms "Hack" and the "Security" but almost they have the misconception that hacking is illegal and its ruin the future. Everything has its merits and demerits , similarly hackers are divided into black hat hackers and white hat hackers.The black hat hackers are the bad person , they do commit illegal activities and crime via internet . similarly, the white hat hackers are the good person , they perform legal activities and help to reduce the cyber crime called as pentesters .

Sandip Dulal

Every day thousand of newly virus are created and use for illegal activities which are launched by the black hat hackers. Advanced hacking is possible if you have the knowledge and concept about programming too. Basically the password cracking tools ,virus production, php bug analyzer are specially created using python script and it is called that the hacker loves python programming as its simple and easy to use than the other programming language. so to prevent form hacking, the security must be strong. If we see the past result and data, we can analyze that many hacks were occurred in Nepal's government site as well as on private site. What was the reason behind it ? The only reason is lack of strong security as the government do not want to hire the good hackers(pentesters) for testing their site as a result many bugs are left in the site which is advantages for black hat hackers to hack the site and leak the databases. some of the critical open web application security projects (OWASP) vulnerabilities are

(a) SQL injection
(b) Stored XSS and persistence XSS
(b) Insecure direct object reference (IDOR)

(c) cookies stealing
(d) Sub domain take over
(e) cross-site request forgery (CSRF)
(f) using component with known vulnerabilities

well, everyday new bugs and new hacks are found in day to day technologies. Just some few weeks ago, new bugs were found in android mobile, Iphone and windows. They found the bug in their Bluetooth device and many android ,iphone and windows are infected with this bug and such vulnerability name given as "Bluebrone vulnerability" . So time to time our android version, windows ,antivirus should be updated .Let me tell, there are some dangerous viruses that cannot be detected by the anti virus . so while surfing the net, everyone must be careful about what you are surfing and what you are downloading.

Updated News: on 2017/11/10 ,the Indonesian hacker hacked the Nepal television website (www.ntv.org. np) and put their defacement page in their website. But later on , the website was recovered. Major cause of website attack is lack of web strong security and if every Nepal's website owner provide the bug bounty for hacker as a reward then instead of hacking the website the hacker might report the vulnerability of their website to the concern authority.

Let's discuss about real and interesting fact about the hack.

(1) Anonymous hacker group is the first to launch the Distributed denial of service (DDOS) attack.

(2) Raspberry pi ,Arduino, USB Rubber Ducky , and the newly released hacking device "Bash Bunny" plays important role in hacking the wifi, stealing the credential data and many more.

(3) Shodan is basically a hacker search engine where we can get the online information of port, webcam, ip

and many more

Wifi Hacking:

In todays context , many people likely to use app "Andro-dumpers" to hack the wifi but the reality is there is only (10-20)% of chance because most of the ISP like worldlink, vianet etc has disabled the "WPS" feature . So the hacker mostly use "kali linux "operating system to hack any kind of stuffs . There are different method to hack the wifi like cracking the password but it might take long time so without cracking the password, the best and less time consuming method is "wifi-phisher". Wifi phisher is wifi social engineering tool that automates phishing attacks against wifi networks and its script is written in python. Nowadays different powerful hacking tools are available for different kind of hack with their programming script . Note that: The new vulnerability has been found that can hack the secure router "WPA/WPA2", the name of vulnerability is "KRACK" which stand for KEY REINSTALLATION ATTACKS found by the Mathy Vanhoef. Many router are infected through this vulnerability worldwide. Isn't it shocking?

Let's know some of the hacking terms:

(1) What is Remote code Execution?

 Remote code execution is the ability an attacker has to access someone's else computing device and make changes, no matter where the device is geographically located.

(2) What is capture the flag ?

     Capture the flag (CTF) is a special kind of information security competition for hacker or script kiddies or for pentesters. There are three types of CTF's
Jeopardy-style CTF's, Attack defence and Mixed.

(3) What is social engineering attacks?

      Social engineering is the art of manipulating people so they give up confidential information. Most of the bad hackers uses this social engineering tactics it is usually easier to exploit your natural inclination to trust than it is to discover ways to hack your software. For example: it is much easier to fool someone into giving you their password than it is for you to try hacking their passwords (unless the password is really weak).

(4) What Is buffer flow attacks?

     A buffer overflow condition exists when a program attempts to put more data in buffer than it can hold .

Who is security hacker or researcher and why security is important in cyber world ?

      A security hacker is someone who seeks to breach defenses and exploit the weakness in computer system or network. There are many IT company or offices who uses the computer system for their work so a good security hacker can only maintain the bug in their software or website so that they can prevent from being hacked by the "black hat hackers as well as from the script kiddie". To maintain the privacy and databases from being hacked , every company should hire the hackers for the penetration test of their website and software.
According to the Mark Zukerberg : " The hacker way is an approach to building that involves continuous improvement and iteration .Hackers believe that something can always be better , and that nothing is ever complete ."

ONLINE PAYMENT GATEWAY

Pratit Raj Giri

Blogger at *techjhola.com*

CS 3rd year 2nd sem

With the development of Internet, lots of possibilities have emerged on today's era. Internet has changed way of thinking and living of the people today. Nowadays we don't have to travel a mile to perform any kind of financial activities. We can do it by staying at a corner of our house, we can do any type of online business like online marketing, e-commerce, online sales, fund collections. And this is possible through online payment system. There are many online payment systems in Nepal like eSewa Nepal, PayWay, iPay, Young Business Technology, Pay Bill etc. Let's then know about some payment gateways in Nepal.

eSewa Nepal

eSewa is one of the largest payment gateway in Nepal. It is the first online payment system in Nepal and is also called Digital Payment Portal, which offers both online and offline payments to costumers, transfer funds to various banks and vice versa. It provides various services like paying Internet bill, telephone bill, electricity and drinking water bill, online shopping, bus tickets/tours and travels, School and College fee, Insurance, Finance, EMI, Dish home, airline ticketing and movie tickets within a minute. Good thing about eSewa is that it offers free registration.

The plus feature given by eSewa is that the registered user can receive money through various remittance like western union, from eSewa website or mobile applications available on android phones, iOS. Fund can be loaded to eSewa account via Internet or mobile banking of various partner banks of eSewa in Nepal. On performing fund transfer to/from another bank we have to pay a minimal charge as per eSewa policies. In addition to all this, eSewa provides reward platform in which users will be awarded some reward amount in most of the payments made through it like mobile phone recharge.

iPay

It is online payment gateway initiated by muncha. com which acts as an intermediary between the merchant and the shopper for purchase of merchandise online. iPay serves its customers to pay telephone bill, electricity bill, internet bill and other utility bills using iPay service. Further, one can buy recharge cards, top mobile phone in just few clicks. Flights booking for domestic airlines such as Buddha Air, Yeti Airlines, Simrik Air and Saurya Airlines are also available in iPay. Customers can also buy movie tickets, travel tickets of buses and manakamana darshan tickets with iPay. iPay also allows to pay the bills of various online shopping stores. iPay allows users to register for free. The service allows everyone to add funds through bank accounts using e-banking service and credit cards without sharing their financial information. Currently, iPay have signed up with some of the banks like Nepal Investment Bank, Kumari Bank, Laxmi Bank, Global IME Bank, NIC Asia Bank, Everest Bank and Prabhu Bank as their banking partners. In addition to all this, iPay operates on an exclusive reward platform in which users will be awarded some reward amount in almost every payment which can be instantly used.

PayBill

Powered by PayMate declares itself to be the first of its kind. PayBill is the first of its kind mobile payment service in Nepal, which helps to transform your phone into a wallet. So, you can pay your utility bills, shop online, buy movie & airline tickets, send flowers & gifts, subscribe to newspapers and magazines, pay school and college fees, pay for goods at your favorite restaurant and retail.

PayBill is the revolutionary secured payment product through a Mobile Phone where every transaction is verified by an "Alpha-code" followed

by "PIN Number" which is provided to every single user during the time of registration. The Mobile number is associated directly to the Bank Account where, the amount is debited from the customer's account automatically through a secured channel without human interference. DishHome, Music Nepal, muncha.com, hamrobus.com are also its partner merchants. But it has only four member banks: Everest, Nabil, RBB and Citizen which may make subscribers difficult for transactions as eSewa (in case of member bank and banking transaction to the online payment gateways) but is more secure due to Alpha-Code security layer. You can register to pay bill by downloading a form as well.

Next we have Khalti: Digital Wallet & Payment Gateway service in our list. Khalti is owned by Sparrow Pay Pvt. Ltd a company functioning under its parent company Janaki Technology. Janaki Technology is a leading Tech Company in Nepal with its successful products like SparrowSMS and PICOVICO.

Khalti provides a range of payment facilities including Mobile Recharge Topup, DTH and ISP payments, Movie Ticketing and Airlines Ticketing. Currently there are more than a dozen of service associates which we can take benefit according to the services that we are using. NTC, NCELL, DishHome, SIMTV, WorldLink, Subisu, BroadLink, UTL are some service associates. Khalti.com also provides Bank-to-wallet, Wallet-to-wallet and Wallet-to-bank facilities.

Nepal Investment Bank limited and Machhapuchre Bank Limited are current banking partners for Khalti.com.

The service is recently started in Nepal, but still it has some of the unique features that differentiates it from rest of the online payment gateways of Nepal. Web SDK, Android SDK, API Documentation, availability on multi platform (Android and iOS) are some of those features. On top of that, you will be satisfied with its User Experience. The app is easy to use with smooth user interface.

There are many other companies dealing with online transactions besides their regular tasks, but these are some companies working and dealing only for online payments.

Khalti

IMPORTANCE OF RESEARCH IN UNDERGRADUATE LEVEL

Name: Manish Raj Silwal
Faculty: CS
Batch: 2015 Feb

The graduate students who research on various topics face difficulties to publish their papers for the first time. Only after multiple practices, they are able to publish their research papers online. The main reason behind this is lack of research culture in undergraduate level. In Nepal, even the top universities and institutions are rarely able to incorporate the idea of research culture in undergraduate level. The students prefer grade-based course rather than research-based courses. This practice can be an influence of school level education, where the students just study for securing higher grades. Due to lack of knowledge-based studies in school level, the students are not habituated to do research in undergraduate level, and hence, they face difficulties in the graduate level.

A report from the Council on Undergraduate Research briefly summarizes that undergraduate research should be: faculty-driven, student-centered, and institutionally supported and provides the combination of factors necessary for: pedagogical effectiveness, enhanced learning outcomes, research productivity, and research program sustainability.

There are countless advantages of being an undergraduate level researcher. First and foremost, the student will find it easier to understand the course curriculum. Being a researcher will compel the student to read and understand other research works. This comes handy when they want to understand the course materials in depth. They will have an ability to find the related research works efficiently and understand them accordingly.

Most often, research is done in a group. So, while doing some research, one must have to keep balance between independence and collaboration. This helps the researcher maintain a collaborative effort to get a strong result. In future, this experience can be a bonus for the researcher to work in a group on his intern or job.

Research will lead to explore many fields and areas where one can build a career later. The experience will be helpful for the researcher himself as well as people around him. The researcher can help the people to take decision on where he should build the career on. The more involvement of researcher in research activities leads to broaden the knowledge of current affairs. So, he can be a good guide for everyone, including himself to have a secured career. The next thing is that research develops our problem-solving skills. The broad mind and vision of a researcher is set to see beyond what is apparent. This generates curiosity and that curiousness helps in interpreting the things from different angles. This interpretation leads to various ideas that will certainly solve the problem.

These advantages show the importance of doing research in an undergraduate level. If the university explains the procedure and importance of research for undergraduate level students, the students can ignite the passion for research. The curriculum itself can be strong if research is added to it. Then the determined students can research on certain fields which will hike the level of both student and university.

References

1. Madadin and Ritesh G Menezes, "Research at an Undergraduate Level - An Insight into its Importance," 6 March 2016. [Online]. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4850235/. [Accessed 2 December 2017].

2. Teitge, Christopher R. Madan and Braden D., "The Benefits of Undergraduate Research: The Student's Perspective - The Mentor," 1 May 2013. [Online]. Available: https://dus.psu.edu/mentor/2013/05/undergraduate-research-students-perspective/. [Accessed 2 December 2017].

3. A. Padmaja, V. S. V. Laxmi Ramana, P. Rajeshwar Reddy, "Importance of Research at Undergraduate Level | SpringerLink," 12 September 2014. [Online]. Available: https://link.springer.com/chapter/10.1007/978-81-322-1931-6_101. [Accessed 2 December 2017].

RAKTADAAN JIWANDAAN

What comes to your mind after hearing these words? You might have been hearing these words frequently. You might have been coming through posts related to blood donation on social medias quite often as well. You might have been hearing about blood donation programs and campaigns quite a lot. But have you ever wondered why despite all these blood donation programs and campaigns and all the social media awareness, people still die due to insufficient blood at times of need. Let's explore the reasons and help us to solve this problem through the use of our soon to be released android application "RAKTADAAN."

Ayush Kumar Shah
CE 3rd Year

First of all, let's explore the causes of insufficient blood during emergencies. We know there are several blood donation programs and campaigns for collecting blood. You might as well have donated blood in such programs. In fact, recently a blood donation program was conducted in the Kathmandu University as well in which many students and faculties donated blood. But why are such programs still not being able to fulfill the blood requirements when needed.

What are the major problems?

After donating blood, have you ever wondered what happens to the blood you just donated? You have very limited idea what happens to it. You don't know whether your blood saved a life or not. Mostly, the blood you donated are kept in various storages of respective organizations for use in future during emergencies. However, the quantity of blood is not enough as there aren't enough quantities of rare blood groups available in storage. Accidents occur without the consent of people. People may require blood any time. A large number of patients are in need of blood everyday. Blood is not always available in the blood banks so a donor is required. Likewise, in many cases of accidents and other emergencies, fresh blood is required which is not available and people have to run from hospitals to hospitals, call their relatives, friends, colleagues, go through posts on social media, requesting for blood for their loved ones, only to wait for someone's response in agony. Moreover, it is difficult to find a blood donor manually due to mental and psychological stress during the time of emergencies. Furthermore, this takes a lot of time and sometimes due to limited time, people die just because he or she couldn't get blood in time. Our country, being a poor and developing country, the health facilities are quite poor. We do have few blood banks but each patient is not benefited by them. Each day, huge number of patients lie on the deathbed throughout the country due to lack of blood supply.

You might be wondering that if even the blood donation programs, social media awareness cannot solve this problem, then how can we actually solve this problem. Although, we cannot completely solve this problem, we can save some time to prevent the deaths of people. Since we are Computer Engineering students, we tend to solve most of the problems by digitalizing everything. Thereby, our team, (Ayush Kumar Shah, Bibash Shrestha, Deepesh Shrestha, Sunil Prajapati and Kamlesh Kunwar) from CE 2015 Batch have developed an android application called "Raktadaan" which helps people during such emergencies.

Our goal is to help people through an application that could be handy at the time of emergency and it is what people would like to have on their smart phone to save time. "Raktadaan" is an android application that helps people when in need of blood urgently. The current system that is being used by the blood bank is manual system. There are a lot of limitations in the manual system like it is time consuming, manpower consuming, difficulty in retrieval of data, which we aim to unravel in our application. Our main vision is to help people make a direct connection between the suitable donors and the receivers through our application. The number of people using smart phones has significantly risen in the last decade. People have more access to their smart phones than to a person. With this application people can always have a helping hand when they require blood urgently. This application is very

useful when you don't have any information about blood banks or any donors. People all over the nation can be able to assist themselves in finding the matching donor during emergencies through our application.

How does our application help people?

Our application helps people mostly by helping them save time to find suitable blood during accidents or other cases of emergencies. Our application has an online database which stores the records of people, including blood groups, location, contact numbers, etc, throughout the country. At times of need, people can use our application and enter the blood group and range (in kms) and the application will automatically detect the current location of the user where the blood is required and will search the records of nearby people within the user defined range and show a list of matching records. The user may also enter other locations (which is auto-completed while typing) if blood is required elsewhere. Then the user can directly call or message the required donor from the list through our application and get blood in time. This saves a lot of time. Many lives can be saved due to the amount of time required to find blood. Furthermore, the donors are aware that their blood saved someone's life and they have a sense of inner peace and spiritual satisfaction unlike the case where they don't know what happened to their blood after donation in blood banks. However, we are not discouraging blood donations in blood banks and other blood donation programs rather we are just trying to provide people with more time saving alternative during emergencies in case people can't find blood on time from hospitals and blood banks.

Likewise, we have made it easy for people to post to Facebook in case a record is not found by generating a form with the information like blood group, mobile number and current location already filled in so that the user can post to Facebook in no time.

Some other features of Raktadaan

» Quickly search the nearby matching donor
» Authentication of the user account using SMS verification.
» Retrieve current location through GPS and search blood accordingly or search in user defined locations.
» Directly call or message the matching donor
» Privacy protection by allowing you to hide your mobile number
» Editable private profile
» Ability to report people
» Ability to post to social account
» View and get directions to nearby hospitals in a map
» View and get directions to the available donors throughout the country in a map
» Get important health tips frequently
» Selectable English and Nepali language application interface
» Minimum INTERNET and data usage
» User friendly application interface
» Access from any part of the country at any time
» Ability to thank the donor through the application after getting blood
» Ability to send feedback to us through the application

Thus, we have tried to help people thorough this application during emergencies as much as we can by helping them find suitable blood as quickly as possible. "Raktadaan" is a social application for the benefit of all the people throughout the nation and is not developed for commercial purpose. We plan to release this application very soon i.e. within a month in the play store so that it is available for the people and people all over the nation can benefit from our application. We have also thought of handing over this application to an organization or to the government for the benefit of people. We hope our application will be able to save many lives in the coming future and we guarantee that we will be working to improve this application and add more features for the benefit of people as per the feedback of the people.

10 PRINT CHR$ (205.5+RND (1)); : GOTO 10
-Visualized using JavaScript

Nadeem Shakya
CE 3rd year

The '10 PRINT CHR$ (205.5+RND (1)); : GOTO 10' is a single line of BASIC code for Commodore 64.

At first, let us know what is 'Commodore 64' and 'Basic' in brief:

Commodore 64 also known as C-64 or CBM 64 is an 8-bit computer developed in 1982. It holds its name in the Guinness Book of World Record for number of highest selling machine. It gets its name 64 from its 64K RAM.

BASIC – stands for Beginner's All-purpose Symbolic Instruction Code is a general high level programming language.
o
So what does this line of code result to....??

The one-line code when run on Commodore 64 generates this amazing looking maze-pattern.

(You can view this maze generation phenomenon in YouTube: https://www.youtube.com/watch?v=mgjoBLOZVE0&t=26s)

Let's discuss about the topic in brief:

Different authors (10 Authors exactly) collaboratively, has written a book named '10 PRINT CHR$ (205.5+RND (1)); : GOTO 10' - which is the line of code itself. The authors describe that how a one-line of code can be used as a lens to consider the phenomenon of creative computing and the way computer programs work.
(You can download the pdf file of the book from: https://10print.org/)

Breaking Down the Code.
10
        This indicates the line number in BASIC.


```
1   var x = 0;
2   var y = 0;
3   var spacing = 10;
4
5   function setup() {
6     createCanvas(300, 300);        //canvas setup.
7     background(0);                 //setting background color to black
8   }
9
10  function draw() {
11    stroke(255);
12    if(random(1) < 0.5) {          // using probability
13      line(x , y , x + spacing, y + spacing); // backward slash
14    }else {
15      line(x, y + spacing, x + spacing, y);   // forward slash
16    }
17
18    x += spacing;                  // incrementing slash horizontally
19    if(x > windowWidth) {
20      x = 0;
21      y += spacing;                // incrementing slash vertically
22    }
23  }
```

PRINT
This is a print statement in the BASIC. It is relative to something we refer now a day as "PRINT ("HELLO WORLD!")".

CHR$
It is a function in BASIC which takes a numeric code and returns it corresponding character which may be an alphabet, digit, punctuation mark etc. The commodore 64 used PETSCII character code.

205.5+RND (1)
All mathematic computation is done in floating point numbers in Commodore 64.
RND returns a random value between 0 and 1 which adds to the number either resulting to 205 or 206.
In PETSCII code table, 205 is '\' and 206 is '/'.

; (Semi-colon)
Using ; after the print statement causes the next character to be printed immediately after the previous one.

: (Colon)
        Used to separate the BASIC statements.

GOTO 10
        Used to branch the statement to line 10. Used instead of loops.

NOW LET'S VISUALIZE 10 PRINT CHR$ (205.5+RND (1)); : GOTO 10 USING JAVASCRIPT
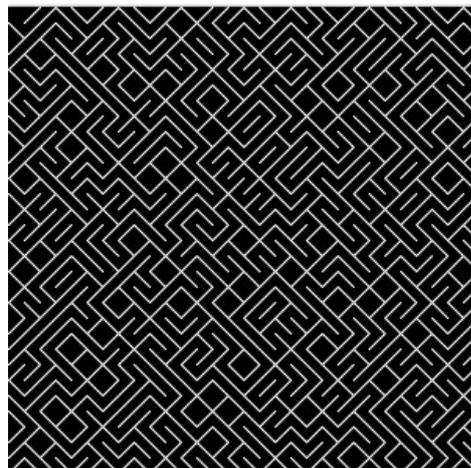
Here, I've used p5.js which is a JavaScript library.
(See more about p5.js at https://p5js.org).

Here is the code I wrote to

duplicate 10 PRINT CHR$ (205.5+RND (1)); : GOTO 10 in JavaScript.

WHAT WE OBTAIN FROM ABOVE CODE AS A RESULT

Here we can see that how the concept of a one-line code generates an amazing looking maze pattern.

If you guys want to see the maze generation phenomenon of my code, please visit the link: (http://nadeemshakya.com.np/projects/10Print/empty-example/)

A BRUTE FORCE ALGORITHM FOR COMPUTATION OF INTEGER COMPLEXITY

Deep Sharma
Masters Batch 2015

The complexity ||n|| of an integer n is the least number of 1s needed to represent it using only additions, multiplications, and parentheses. For example, the numbers 1 through 10 can be minimally represented as

1=1(1)
2=1+1(2)
3=1+1+1(3)
4=(1+1)(1+1) (4)
 =1+1+1+1 (5)
5= (1+1)(1+1)+1 (6)
 =1+1+1+1+1 (7)
6= (1+1)(1+1+1) (8)
7= (1+1)(1+1+1)+1 (9)
8= (1+1)(1+1)(1+1) (10)
9= (1+1+1)(1+1+1) (11)
10= (1+1+1) (1+1+1)+1 (12)

so the complexities for n=1, 2, ...10, are 1, 2, 3, 4, 5, 5, 6, 6, 6, 7.

A Brute force algorithm for computation of Integer Complexity is presented here:

1. Input Maximum Number, Nmax
2. Comp1 be an empty list, let s= [0,1,2,..........Nmax]
3. divisors= {[1], [1], ... (number of elements in s) times}
4. for(k=2;k<=Nmax;k++)
{
j= 1, m= k
while(m<Nmax)
{
add k to divisors[m]
m= m+k
}
}
5. Let Comp1[1] = 1

6. for(n=2; n<=Nmax;n++)
{
s= Nmax+ 1
for (k=1;k<=n/2;k++)
{
a= Comp1[k]+Comp1[n-k]
if a<s:

s=a
}
div_n= divisors[n]
tau_n= number of elements in div_n
p= Nmax+ 1
for (k=1;k<tau_n-1;k++)
{
d= div_n[k]
a= Comp1[d]+Comp1[n/d]
if a<p:
p=a
}
Comp1[n]= minimum of (s,p)
}

This is a Brute Force algorithm to compute Integer Complexity. Comp1 will carry integer complexities of all integer from 1 to Nmax. Brute force algorithm is not a good idea to implement. There are lot of works happening in Integer Complexity. Major researches happening in this area can be accessed from

Cornell University online library.

The above brute force algorithm computes the values of ||n|| for $1 \leq n \leq N$ in time $O(N^2)$ and space $O(N \log_2 N)$.

Fuller has proposed an algorithm in which reduces the amount of space required in above algorithm.

The basic idea of Fuller's algorithm can be accessed from "ALGORITHMS FOR DETERMINING INTEGER COMPLEXITY" by J. ARIAS DE REYNA AND J. VAN DE LUNE.

THE EMPIRE OF WORDPRESS

(The Whats, Whos and Hows of the web overlord)

Ezan Shakya
CE 3rd year

WordPress is something for everyone from beginner to intermediate to advance users. If you're a beginner or someone who doesn't want to write codes, you can learn the fundamentals using the WordPress back end to create pages, posts, navigation menus, adjust basic settings and you can combine it later with pre-existing themes and plugins to create your own websites.

However, if you're an intermediate and advance user you can roll up your sleeves and learn how to create themes from scratch which means you can begin with o files and o lines of codes and you can write everything together, so you can really learn how to bend WordPress to your will and get it to do whatever you need to do.

What is WordPress?

Well, it is a free open source Content Management System (CMS) which, in Layman's term, is a free tool to help you build websites, it's as simple as that.

Who uses WordPress?

You've probably heard WordPress being used by small businesses or for personal blogs, but it is also used by governments, schools, non-profits and Fortune 500 companies, which means that WordPress is a big deal in the world of web-hosting and it is made for pretty much everyone. It doesn't matter who you are or what you are trying to achieve with your website. There is a good chance that WordPress can help you. Not only can WordPress help you but the community surrounding the WordPress can also help you, and it is a massive community. 28% of the web is powered by WordPress. That's more than one in four. What makes this all more impressive is that it is used by over 59% of websites using a CMS. Now, it could be understood why it is an amazing statistic we should all be excited about, and that we all benefit from. And finally the greatest strength of WordPress is the attitude surrounding it. There is a very can-do, self-empowered, helpful, lets-keep-things-simple-but-remember-we-can-achieve-anything attitude towards WordPress.

What is there in WordPress?

Generally, a WordPress screen consists of dashboard which you might think as a WordPress-admin or back end or a home base where you administer your websites. This is where you post and create pages. As it is the back end, it is not visible to public that view your website. Think of it as the printing press or the office you have, had you owned a newspaper publication. It remains aloof from the general public who only see the front-facing newspaper. WordPress is not just limited to posts and pages. Yes, that is where it starts, but we can make many other custom contents via WordPress. We can extend and customize WordPress to help keep it organized, dynamic and easily accessible to public.

How does a WordPress website look?

Wordpress does not place any restrictions on how your website should look. Why some WordPress website feel like "cookie-cutter" and look the same is because certain theme has become very popular. Theme is what the audience sees. So, do not think of WordPress as a theme playground. Think of it as a tool; a tool that stores information on a database (MySQL) for you that makes the data easy to access, easy to manipulate, easy to query, easy to represent to public and you can leverage your own HTML, CSS, PHP and JavaScript code to output whatever you want to output.

The beautiful part about WordPress is that there is no "right" or "wrong" way to put together a WordPress website. If you want to use a free theme, you can. If you want to buy a premium theme, you can. If you want to design, craft and code your own themes, you can. That is what makes WordPress so amazing. It is a huge community of people, all using the same platform but they all use it in their own different way.

Hyperloop- The next gen vehicle

An efficient transport system is a prerequisite for the duo; initiating and sustaining economic development. Although, there has been advances in the field. The severity of traffic congestion has taken many of the cities around the world by swarm. As a result, this causes an average working class person to spend 2 hours or more on the road each day. This seems like a tiny number for a day but consider it in an year and you get 720 hours i.e., 30 days of traveling and mind you its not an amusing adventure, its a hectic routine.

This century of science and technology has enabled us humans to find a way out of any problem befallen upon us and fortunately this very problem might just have a solution too.

What was once the highest extent of superlative craftiness surmised within
the heads of intellectual minds might just have entered into the realms of possibility. All that with the invention of the fifth form of transportation known to mankind- The Hyperloop.

A hyperloop can be formally defined as a high speed transport system consisting of passengers in a compressed capsule that rides on a cushion of air. The tube consists of a near vacuum environment. We could think of it as a small portion of a train hovering over a tunnel that has no train tracks.

The concept was put forth by the pioneer of sustainable energy, Elon Musk. He is believed to have developed the idea during a traffic jam which made him an hour late for a meeting. As to our knowledge, he is too busy getting his hands dirty with building rockets,electric cars and solar panels. So as any witty businessman should do- he has outsourced the project in the form of a competition to the ones who deem themselves capable of executing this prodigious idea.

Now lets get more into the mechanics of how this would work. It is similar to how a air hockey table works except the air is generated by the high-speed passage of the pod through the tube and a super-powerful electric compressor on the front of the pod that pumps air to the back. Linear induction motors will be placed at different points along the tube preventing slowing of the system in the partial vacuum environment. The air pressure in the tube will be one-sixth of the air pressure
of that of The Mars.

This tech marvel will create history as it is proposed to run somewhere between 900-1200kmph. This means one can get from LA to
San Fransisco in just 30 minutes.

With having all those perks, the ticketing expenditure however remains below par. It is roughly estimated to be around $25-$30 as the system costs only $6 billion to build. This is considerably low for experiencing something so close to teleportation.

As necessary, the concealed windowless capsule is immune to weather conditions, is accident free,and energy efficient(utilization of solar panels which makes the hyperloop generate more power than it consumes in the closed system).The customer experience is a winner. In addition to that, the air pressure generated produces a natural cushion for safe passage. Could it be anymore safer?
But, it is way too soon to predict how this system will fare off in the real world with the project being in the initial stages. However , one successful test has already taken place in the Nevada desserts across a 1600 foot long steel tube. If everything goes accordingly, the hyperloop is expected to be available to the general public by 2020.

Yet the question arises- will hyperloop live up to the hype that has got millions more like me excited into the venture or will it stumble somewhere in between and convert from a would have been to a should have been?

A few more years in the making and we will get an answer to the other side of this tale but until then lets dream on.

**Dinank Bista
CE 3rd Year**

HOW DOES THE INTERNET WORK?

Roshan Gautam
CE 4th year

Did you know, as of June 2017, 51% of the world's total population is on the Internet. The entire world is now connected with the Internet. With its wide range of applications, it is now considered as the quintessential part of the technology. Be it for social media, education, entertainment, movies Internet has now become the buzzword. It is difficult to even imagine living for a day without the Internet.

Surprisingly most of the Internet users are unaware about how the Internet really functions. Even those who are expert on using the Internet are unaware about how it actually works. Hence every activity on the Internet like sending mails, watching videos etc. can feel like a magic unless we know what activities lies behind the scene.

Understanding the Internet Phenomena

Understanding how the Internet works is not so complex but it is not so simple at the same time. The prerequisites for understanding in details are endless while understanding the phenomena in the surface level does not demand the person to be from the technical field.

Let us first recall and realize the definition of the Internet.

What is Internet?

In the most basic sense, Internet is the global network. It is the network of network in which users at one computer can get information from any other computers provided they are granted with the permission.

To guide with the understanding, I would like to use a real-life scenario as an example. Suppose your friend lives five blocks away from your residence. You and your friend need to share data among each other in regular interval say twice a day. To facilitate the data transfer, consider that you guys have connected your computers using an Ethernet cable. Obviously, you cannot succeed transferring without following some communication protocols. So, isn't this Internet? It is also important to understand that Internet can exist in different forms with various protocols.

Fallacious Assumption about the Internet

Most of us visualize the Internet as the cloud and likely so we assume that satellite is the main tool for the connection. This is in fact logical statement yet it is incorrect. Unlike the assumptions of the majority the statistics show that 99% of the total Internet runs through the optic fiber cable.

By the time you access the Internet it passes through three different networks maintained by different companies. They are Tier 1,2 and 3 networks respectively.

Tier one network: These network companies have established the direct connection between various countries via optical fiber cable. Their main responsibility is to facilitate the Internet services by establishing distant connection.

Tier one companies have already maintained the connection by laying the submarine cables in the sea bed. These submarine cables carry telecommunication signal across stretches of the ocean. The whole Internet is running on the cables laid by the tier 1 network companies.

In order to ensure that the communication is reliable, the tier 1 company has also laid the backup submarine cables for most of its main line connection. The life of the submarine cable is around 25 years so the tier 1 company bears the responsibility of making sure that the cables works fine and also replacing them on need. They use the software to check and regulate the traffic and for routing the traffic through other permissible channels on demand.

If you are interested to know more about tier one network connection points throughout the world you can visit https://www.submarinecablemap.com/. This website is updated regularly and provides information free of any cost.

Tier two network: The tier 2 network companies pay money per units of data transferred to tier 1 company and distribute the connection via their own maintained network throughout a region usually smaller as compared to the region covered by the tier one network (usually a country or a province).

In normal practice we know and refer the tier 2 network as the Internet Service Provider (ISP) company. Depending upon the infrastructure that the ISP have set up, there is collaboration between two or different ISP for providing the services.

Tier three network: The tier 3 network companies are local in nature. They purchase the Internet from the tier 2 network and distribute the connection via their own infrastructure sufficient for a city or a small province.

Tier 2 company usually charge their customers more

than what they pay to their respective tier 1 network. They offer the different data packages at a cheap rate that lures the customers but in fact there exist a win-win situation for both the parties.

Easy way to visualize everything

It is tier 1 network which links the countries to countries. Tier 1 network brings the Internet to your country. Then it is the tier 2 network which brings the Internet down to your city or village. So finally tier 3 company brings the Internet to your house. Tier 1 is the backbone of all the connection. It is the network which takes the data from origin to the final destination.

Sometimes if the communication is to take place in a local level then tier 2 or tier 3 network can independently handle the routes from source to the destination without routing the packets to the tier one network channel.

What is the cost of the Internet?

The example which I have mentioned above should say it all. The cost incurred for Internet service should be the sum of cost that is required for initial setup of

the connection infrastructure and that incurred for the maintenance of the employed infrastructure. Speaking in a single phrase "The Internet is free", but the users are charged by their respective network

companies as they are the beneficiary organization for making the connection happen. Since they need to collect the incurred capital for initial setup cost and cost for maintenance of entire network infrastructure, it becomes mandatory for us to pay for their service we use.

If you are still confused about the way it works the following case will visualize the process in simple manner.

Try this out!

For a windows user, run command prompt as an administrator then type in the command tracert space domain name. The tracert command is a command prompt command that is used to show the details about the path that a packet takes from your device to reach out to the destination. It basically displays how the packets of the data are routed as they are transferred through the network.

My Internet service provider is ClassicTech Private Limited. When I tried tracert to the domain ku.edu.np, the output followed as below.

From a given IP address you can find out the location including latitude, longitude, city, region and country using the website https://www.iplocation.net/.

In my case the command has showed that whenever I need to access the KU website. Firstly, the packets go to the router at my home. Then my packets are directed to Birgunj city of Narayani zone. Again the packets of data are redirected to the Kathmandu city of Bagmati zone. Now then the packets travel USA to the city of Houston in Texas where ISP is Rice University. Then packets return to city of Kathmandu (Putalisadak to be precise), where the ISP is Web Surfer Communications. The routing is not yet completed the packets now go to Jawalakhel station of Web Surfer Communications. As for my test I found the website being hosted from Jawalakhel station.

```
C:\Users\Roshan>tracert ku.edu.np

Tracing route to ku.edu.np [116.90.239.10]
over a maximum of 30 hops:

  1      2 ms      3 ms      3 ms  192.168.123.254
  2    175 ms     75 ms      5 ms  103.192.76.1
  3      9 ms     12 ms      5 ms  197-noc.classic.com.np [202.94.66.197]
  4    150 ms      9 ms     17 ms  npix-pts.websurfer.com.np [198.32.231.4]
  5      5 ms      6 ms      6 ms  116.90.227.107
  6    101 ms      9 ms     39 ms  116.90.232.18
  7     10 ms     48 ms     13 ms  soa.ku.edu.np [116.90.239.10]

Trace complete.
```

Academics Predictor and Analysis

Manasi Kattel and Rajshree Rai
CE 3rd Year
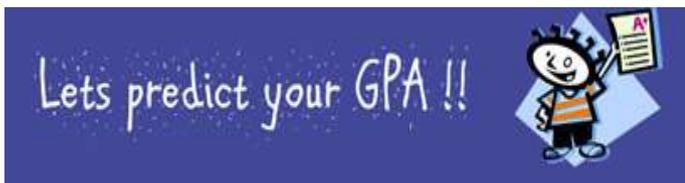
"Academics Predictor" is a desktop application that predicts GPA of students through machine learning which is an application of artificial intelligence. The regression model which was used for prediction was trained on the dataset collected from the students of Department of Computer Science and Engineering of Kathmandu University. The dataset was collected through google and printed forms which comprised of queries regarding the study habits and personal background.

The dataset was structured into machine readable form through data cleaning and preprocessing. The numeric attributes were converted to standard normally distributed data. Then they were scaled with respect to one another so that none of the attribute would get more weightage by default. The regression model only accepted numerical data as input. Hence, the categorical attributes had to be converted into numerical attributes. This encoding was achieved through getdummies function. As our data collection was very small compared to the number of attributes, we had to select the most impactful features. F_regression of sklearn was used for this purpose. The number of attributes were reduced and the error reduced drastically. The dataset was split into training and testing set by using Cross validation. The training set was used to train the model and the testing set was used for error calculation.

In statistics, linear regression is an approach for modeling the relationship between a scalar dependent variable y and one or more explanatory variables (or independent variables) denoted X. GPA was treated as a dependent variable depending on several independent variables which were deduced through feature selection. The data were split into train set and test set. The training set was fitted to the model. Thus, the GPA was predicted.
After GPA prediction, the error was calculated from the testing set.

A graph was plotted to show the relation between the predicted value and the test values.
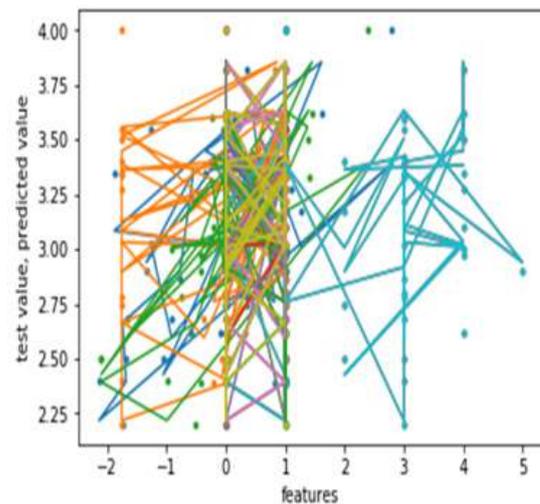

Fig Graph between test values, predicted values vs features

In the above graph, dotted points represent actual values and the lines represent predicted values. It can be observed that many values were correctly predicted as the dots and the lines intersect. It was found that KUCAT score had the highest correlation with the predicted GPA.
Hence, GPA prediction with mean absolute error of 0.21 was successful through the application of linear regression model.
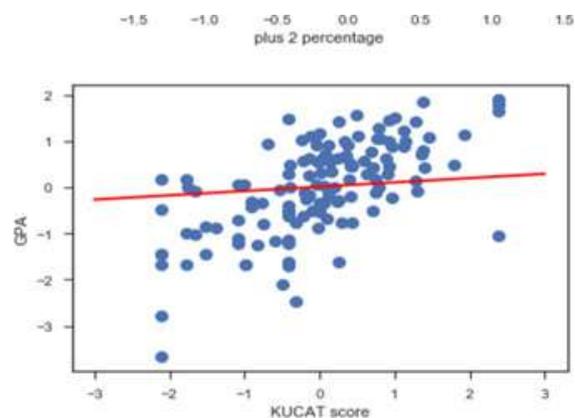

Fig: Scatter plot of KUCAT score

DO ROBOTS DESERVE HUMAN RIGHTS?

Kushal Bhatta
CE 3rd year

The humanoid robot Sophia was recntly granted citizenship in Saudi Arabia becoming the first robot to receive citizenship anywhere in the world. Many were upset with this news as she was granted more rights than women living in the same country. The rest brushed it aside as a ridiculous PR stunt. However, this situation sparks a debate: "Should Robots be given Human Rights?"

Unlike Sophia, most robots do not show human like characteristics. But for the ones who do, can one deem it necessary to provide rights like citizenship? Will those robots at some point deserve "human rights" or "personhood rights"? How will we determine when that point is reached?

When, if ever, will a robot deserve "human" rights?

- When it possesses an uploaded personality (a formerly living human instantiated in an artificial body)

- When it can make a copy of itself (reproduction without the aid of another species)

- When it passes the Turing Test (can convince experts that it is capable of human-level "thinking")

FOR

- The human brain is just a computer; neurons on and off, 1's and 0's; input observation or, output reaction. It is a complex program of chemical signals, but that doesn't make our emotions any less real. If we program robots with the ability to feel, they deserve the same or similar rights.

- If they are able to feel pain physically or emotionally.
- If the denial of rights to robots creates an irreconcilable conflict between humans and robots.
- If robots achieve human consciousness.

AGAINST

- If they were produced to be conscious but still have been indoctrinated/programmed to believe a certain way, then their right to vote could be exploited to influence an election.

- They should only be given rights that they themselves advocate for. Only when robots are capable of understanding what a right is can they be eligible to gain that right. A robot that doesn't understand property cannot be given a right to property, for instance.

- Giving robots rights might take away the liabilities of the owners in case of accidents.
- Demanding rights for robots when the world is fighting for women's rights could result in a controversy.

Are robots equivalent to humans? No. Robots are not humans. Even as robots get smarter, and even if their intelligence exceeds humans' intelligence, it does not change the fact that robots are of a different form from humans. To put it simply, a robot is a technology to help humans.

Should robots be given rights? Yes. Humanity has obligations toward our ecosystem and social system. Robots will be part of both systems. We are morally obliged to protect them, design them to protect themselves against misuse, and to be morally harmonized with humanity. There is a whole stack of rights they should be given, here are two: The right to be protected by our legal and ethical system, and the right to be designed to be trustworthy. But what about the rights Human enjoy? Don't these Robots deserve them too? The answer remains conflicted.

With each advance in robotics and AI, we're inching closer to the day when sophisticated machines will match human capacities in every way that's meaningful: intelligence, awareness, and emotions. Once that happens, we'll have to decide whether these entities are persons, and if they should be granted human-equivalent rights, freedoms, and protections.

American lawyer and author Wesley J. Smith, a Senior Fellow at the Discovery Institute's Center of Human Exceptionalism, says we haven't yet attained universal human rights, and that it's grossly premature to start worrying about future robot rights.

The debate goes on and new opinions arise. After all, who is to say who's wrong?

OVERVIEW OF DRONES IN NEPAL

Khim Bahadur Chhetri
CS 4th year

Image source : http://geographical.co.uk

Nowadays, Drone is not a new term. Few of us may have used it, some may have seen it, and surely many have heard about it. However, there are few of us yet to know about it. Well it's never too late, this article is just for you.

Before directly jumping into the drones, let's get to know about Unmanned Aerial Vehicles (UAV) or Unmanned Aerial Vehicles System (UAVS) first. UAV, as the name suggests, is the pilot less aerial device and non-crewed aircraft capable of flying by remote control or through the use of on-board computers. Other names for these types of devices are Remotely Piloted Vehicles (RPV), Remotely Piloted Aircraft (RPA) and Remotely Operated Aircraft (ROA).

The term drone covers the broad categories of UAVs that can perform several activities. When people talk about the drone, they are talking about a range of UAVSs. Then what actually is drone? Drone is simply a flying object that produces continuous humming and buzzing sound almost resembling honey bees. And technologically, drone is a UAV, a flying robot which may be remotely controlled or can fly autonomously through software-controlled flights with the use of GPS and sensors.

Generally, drones are misunderstood as a camera fitted device, used only for cinematic purposes but it has wide range of applications. These includes inspection and monitoring, surveying and mapping, precision agriculture in agronomic development, aerial imaging, flights dynamics and simulation, UAV swarming etc.

Previously, drones were used only for military purposes but later it was made available to common people. And here in Nepal too drones have been popular for research and study purposes. In the context, Nepal Flying Lab had also trained 30 people from different engineering backgrounds at Kathmandu University. This was initiated by "We Robotics", a global network of robots where people accelerate and scale the impact of their humanitarian aid, global development and environmental protection using appropriate robotics solutions, though it had been already used commercially. As a result it proved to be effective in rescue and survey during the devastating earthquake of 2015. And with growing technology, drones have resulted to be very effective in Nepal.

Globally, there are strict rules for operating drones. Likewise, Nepal also has few sets of rules defined by Civil Aviation Authority of Nepal (CAAN). For a tourist willing to fly drone in Nepal he/she should obtain prior permission from CAAN (not necessary for drone less than 2kg and flying below 200 ft. from the ground level), Ministry of Home Affairs and Department of Tourism. And for research and study purposes, prior permission of Line Ministry/ Department relating to the subject matter of research/study, Ministry of Home Affairs and CAAN (not necessary for drone less than 2kg and flying below 200 ft. from the ground level) is needed. Local authorities should be informed prior to flying drones in public places. Moreover, drones should not be flown over aircraft zones, military areas, etc.

It should be known that our flight should not harm other people and their privacy. However, small flying toy can be operated inside the private premises. For further details about rules you can go to https://www.caanepal.org.np/drone/.

Despite existing rules and regulations, some people are seen neglecting them. The negligence maybe due to hectic procedure of being granted with permission from three different departments. Nevertheless, rules are rules and are ought to be followed but the authorities should also consider making this procedure smooth and feasible.

As mentioned before, drones can be used in various sectors with various unique purposes. In the context of Nepal, it can be used especially for surveying in geographically challenging sites, agricultural aspect, mines exploration, monitoring and surveillance, post calamities rescue and relief, real estate and construction, recreational and humanitarian purposes, etc. Furthermore, drone has been used to count the number of Rhinoceros in Chitwan National Park. Nepalese youths have adopted this technology widely for what they call vlogging, making youtube videos and as a beautiful travel companion. The craze of drone cameras among Nepalese can be predicted by things like "Drone Selfies" which is trending amongst the youths.

P.S. If you are looking for a drone too, you can buy it from SmartDoko and Oliz store.

LOOKING BACK AT STARTUP WEEKEND

Kiran Maiya Prajapati
CE 4th Year

Have you ever seen an idea turn into reality? Do you have a business plan that you think is great?
An idea, without implementation, has no value. A good business idea can succeed only if it can cater to customers' needs. Recently, I participated in a Startup Weekend that took place at KUSOM on Nov 10 to 12 where I had an opportunity to experience how an idea comes to life. I must say, there's nothing like going through the process of building a business from the ground within 54 hours. Through this article, I would like to share my experience and some of the things that I learned during the process.

Before I go into further details, let's first look into how the startup event worked.
1. Participants can pitch their ideas within 60 seconds.
2. Not all pitched ideas were selected. Each team could vote in 3 other ideas (except their own) that they liked. On the basis of the votes, top 10 ideas got selected.
3. These top teams then worked on their ideas for the weekend.

On the first day, before everything, we were all asked to write a word on a paper. Teams of 6 members were formed from among the participants. Combining the words written by each of the

teammates, we were asked to come up with a business idea and do a mockup pitch. I was amazed by how the team worked together to make something meaningful. After that, the real pitch started. My friend and I went there with an idea as well. I went up to pitch the idea. Confidence! Confidence! Confidence! The word flashing through my mind before giving the startup pitch. Almost all of the participants pitched their ideas.

Our idea was also voted most and it was selected. Then we started forming a team and started planning out. For the rest of the weekend, we worked on different agendas, some of us were making the prototype, others were focusing on the business model and the rest were focusing on the final day presentation. During the weekend we met different mentors. We got a wide range of responses from them. Each one of them was incredibly helpful. We learned to be open to change, try new things and adopt from what we learn.

On Sunday morning, we finalized the pitch, product, and presentation. I had to pitch the idea among a panel of judges. Although I was nervous that whole day, I rocked the pitch. Overall, it was a true learning and fun experience. Don't find an excuse, just get out there and do it. There is nothing to lose just a great experience to gain.

BRAIN FINGERPRINTING

Araju Nepal
CE 3rd year

There is not a place in the world where a crime does not occur. Its almost inevitable. But just because it is so, it does not mean we cannot do anything to check that it remains within limits and is not repetitive. However, we are a repetitive spectators to such scenes. When we hear crimes being committed, people being tortured or even killed or, the news of robberies and rapes. They don't amaze us, it just create a routined chill through the spines. These words of brutality is just some dining-discussion for us and we have all learnt to digest the fact that those who commit such savagery are walking free with head held high. And the victims? Well they are the one who walk as though are the culprits!

This is due to the rule of law itself. The rule which says that the culprit is innocent until proven guilty. And the the victims need to provide evidence enough to prove him/her otherwise. But I am about to give you something that would change the scenario, if and only if its implemented.

Brain Fingerprinting:
The term reveals itself. However, you may be wondering that if its something related to brain how is it even a fingerprint. Well in that case you and I are no different. But I found, thats how it is coined.
Lets start from the beginning. What exactly is Brain fingerprinting? Irrespective of the prior knowledge you have let me guide you through it.

Scientifically, it can be tagged as a simple computer based technology, primarily designed to determine information in individual's brain. It works by measuring brain-wave responses to words, phrases or pictures presented on a computer screen.
And casually, its something with which we can catch a criminal.
But not undermining the fact that we are from a digital background, we need to have some knowledge about the science behind it.

This was invented by Lawrence Farwell. But it still remains controversial, unproven and questionable technique which is said to use electroencephalography(EEG) to determine whether specific information is stored in a subject's brain. The measurement is done by an EEG event related potential, a P-300 MERMER.

In computer terms, it has a certain mechanism for its conduct which goes this way -

• A picture/word is shown to an individual which is a stimulus.
• The neurons of the brain are triggered which generates brainwave(P-300).
• The electrical potentials accumulate in brain(MERMER).
• Headgear is fitted with electrodes placed on scalp that measures brainwaves which then generates analog signals which are amplified by EEG then the data is studied using a computer program which helps determine whether the person is guilty or not.

HOW ?

Well, lets see.
Suspect is tested by representing the information by different colored lines.

RED - It is the information that the suspect is expected to know. It arises due to target type stimulus.
GREEN - It is the information not to suspect. The irrelevant stimuli is responsible for this type of brain waves.
BLUE - It is the information of the crime that only the perpetrator would know. This occurs due to

probes(life experienced related type of stimuli).

Limitation:

Brain fingerprinting detects information-processing brain responses that reveal what information is stored in the subject's brain. It does not detect how that information got there. This fact has implications for how and when the technique can be applied. If a suspect acknowledges being at the scene of the crime, but claims to be a witness and not a perpetrator, then the fact that he knows details about the crime would not be incriminating. There would be no reason to conduct a test, because the resulting "information present" response would simply show that the suspect knew the details about the crime – knowledge which he already admits and which he gained at the crime scene whether he was a witness or a perpetrator.

Also we cannot neglect the cons it can produce upon its usage. According to the words of the critics, it is believed that Brain Fingerprinting threatens cognitive liberty and violates the sanctity of the mind which I think is not entirely true. They believe that it intrudes individual's right to mental privacy, hence it should not be mandated by courts, governments, corporations, or any other institution.

However, the pros overshadows the cons. We are clear about the fact that it can and will create mental pressure to the person but I can say that we not using it against any random stranger on the streets. It should be applied to the prime suspects only at the final stages with proper supervision after the investigation, with the sole purpose of punishing the ones guilty and only them. It not only helps prosecute the guilty but also saves the innocents from being penalized. Moreover, it contributes in forming a country with an impartial system which is worth relying to. And it promotes walking up to the justice system which guarantees fairness to each and everyone who have been victimized one way or the other. I personally think that Brain Fingerprinting can be a boon to our country, but I respect the fact that each one of us has a perspective and can take any arguments that suggest otherwise.

Are we living in a computer simulation?

Ashutosh Chapagain
CE 3rd Year

Let me begin with a presumption that you all have seen the 1999 blockbuster, THE MATRIX. If you have not, I strongly suggest you watch it before moving further.

Here goes-
Have you ever wondered that the plot of the movie 'The Matrix' might be real? What if you, me, your girlfriend, practically everyone are characters of a great computer game? What if our whole universe is a science experiment of some junior high-school student in another universe? We, humans, who consider ourselves as the most intelligent species might be the idiots who drool and wander around in our simulator-created graphics. If that is the case, we might imagine that everything in our lives is just a creation of some other entities (we may call them god), designed for their egocentric entertainment.

Recently a group of computer scientists concluded that the most fundamental property of matter is information(not energy). This hypothesis is quite intriguing because the more we learn about the universe, the more it appears to be based on mathematical laws. Somehow suggesting that it might have been programmed by someone else. Another such instance that contributes to this hypothesis is our "limitation". Why is our capability so limited? It's as if someone has embedded a ceiling function in our character. Next instance is what if there is a bug in the great game our whole universe lives in? This might answer why there are some irregularities in the laws of physics.

Every fundamental object which makes our universe is discrete in nature. From atoms to cells to photons, everything possess a property of atomicity. This property is very similar to the concept of "bits". There is only either 0 or 1.However, we can be quite sure that we can never prove that our life is not a computer simulation because any evidence we get could be itself simulated. So, if we think with an open mind without any skeptical thought, there is actually a possibility that we might live in a world of computer simulation. This might suggest that we live in a big hoax or who am I to really question this. After all, I may have been programmed to write these very words at this very page and this all may seem amusing to my creator.

In the end, even though the chances that this idea turns out to be true might be "effectively zero". Live life imagining that you are the Neo, and you are the one to save our species against the bots.

Excited for the future? You should be!

Future of Technology and Elon Musk's vision

Rupesh Ghimire
CE 4th Year

In the year 1820, a person's life expectancy was less than 35 years, 94% of the global population lived in extreme poverty, and less that 20% of the population was literate. Today, human life expectancy is over 70 years, less than 10% of the global population lives in extreme poverty, and over 80% of people are literate. These improvements are due mainly to advances in technology, beginning in the industrial age and continuing today in the information age. So, what does the future hold for us? What should we look forward to? Flying Cars? Humanoids? Or Time Travel?

First, let's talk about Elon Musk. If you don't know who he is, then YOU SHOULD.

Elon Musk is a South African–Canadian-American billionaire, inventor and an entrepreneur. People best recognize him as the co-founder of Tesla Motors and PayPal. But he is involved with many more companies like SolarCity, Hyperloop, OpenAI, Neuralink and a Tunnel Boring Company. And Oh yeah, Musk is also known as a visionary, with plans to start a self-sustaining colony of a million people living in glass domes on the surface of Mars. So basically, a man with vision and capability to change the world. At this point I feel it necessary to point out that I am a big fan of Elon Musk and my opinion related to this matter is rather biased. Anyways, let's talk about what big innovations and breakthrough can we expect to see in the future (at least in this millennium).

Machine Learning and Artificial Intelligence:

"OK Google! How long would it take me to reach the moon?" Today, we can ask our smartphone this question and we would get an answer. Just think about that for a moment....We have technology that understand us and replies back. It may seem like a common thing but it is a pretty big deal. Smart Assistant, Advanced Image recognition, video games AI, Chat bots, etc. are some real world usage of Artificial Intelligence that we see today. Machine Learning and Artificial Intelligence will be the backbone of future technological development. Most of the future tech will be based on Machine Learning. With the rapid progress in the field of AI and Machine Learning, we will soon be seeing smarter machines that are capable of human like intelligence and abilities. Unless, Skynet comes online and Terminators end up destroying humanity (lol). But that is a topic for another day.

Self-Driving Cars:

With the launch of Tesla Model S and Tesla Model X, the possibility of Self-Driving cars has become very real. Today a Tesla Car can take you from a point A to point B on its own. It can change lanes, handle turning and basically drive like a human would. And with companies like Google, Apple, Uber and many more invest

ing in R&D of driverless cars, it won't be long before we will see Self-Driving Cars on the road. Elon Musk believes Self-Driving cars will arrive within the year 2021.

## Virtual and Augmented Reality:

Computer processors have now become fast enough to provide comfortable and convincing virtual and augmented reality experiences. Companies like Facebook, Google, Apple, and Microsoft are investing billions of dollars to make VR and AR more immersive, comfortable, and realistic. So it is safe to say that VR and AR that have been dreamed about by many for decades, in the next few years, they'll finally become a mainstream reality.

Inter planetary Habitation/Space Colonization:

Planet Earth has become crowded. There are too many people and not enough space. So, what is the solution? Well Elon Musk believes Mars is the solution. SpaceX founder Elon Musk has outlined

his highly ambitious vision for manned missions to Mars, which he said could begin as soon as 2022. While many are skeptical about the prospect of humans being able to live outside of Earth, there are many scientists and scholars who believe that this is indeed possible. So sometimes in the distant future you could be sitting in a glass dome in Mars, sipping coffee and watching the new episode of Rick and Morty.
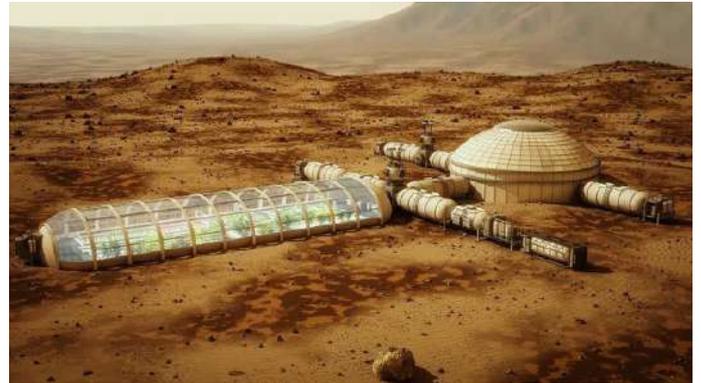
Clean/Renewable Energy:

As the supply of nonrenewable fossil fuels is constantly decreasing, major focus is being given to alternative clean energy. Energy is the heart of technological growth and so there have been a lot of interests in the field of clean renewable energy. Solar Energy is looking to make a major impact in the Clean Energy in the coming future.

Well, it is not possible to list everything here but there are many other things to get excited about. 3D printing, faster Internet, better performing computers, drones, and computerized medicines are some other things that are sure to be looked forward to.

So, the truth: Right now, today, in 2018 is the best time to start up. There has never been a better day in the whole history of the world to invent something. There has never been a better time with more opportunities, more openings, lower barriers, higher benefit-risk ratios, better returns, greater upside than now. Right now, this minute. This is the moment that folks in the future will look back at and say, 'Oh, to have been alive and well back then!'

Art of Googling: DoCSE's way

Mala Deep Upadhaya
CS 2nd Year

Search engines for large collections of data preceded the World Wide Web by decades. Google is the most common search engine today with 70% of the Internet users searching through Google. There are two types of Search engines: Full-text sized which is Google and search-able subject index i.e. Yahoo.
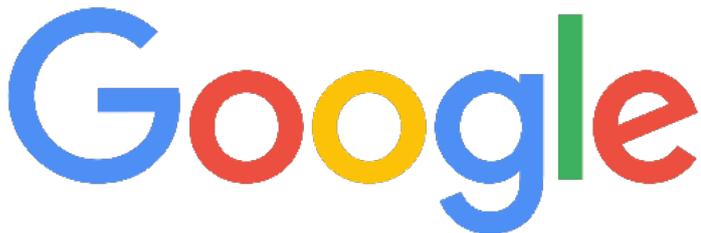
Googling is the practice of checking out a prospective data via Google's search engine or simply searching out the content as per your need through Google's home page. Most of us search via Google in normal way, this article will teach the advanced way. In jargon "DoCSE's way".

While searching for piles of data, we should be aware of the time consumed in going through all the results shown by Google. For this, following syntaxes can be handy:

inurl: restricts your search to url of web pages only.
intext: searches only body text (i.e. ignores link text, URLs, titles)
cache: finds a copy of the page that Google has indexed even if that   page is no longer available in internet.[for me, its wow !]
related: finds pages that are related to the specified pages.
        eg: related: news

filetype: gives you result as based on filetype.
        eg: SEE Results filetype:pdf

Google's default simple search allows you to do quite a bit, but not all, so for DoCSE's way, advanced search comes in handy.

Go to (http://www.google.com/advanceds_search?hl=en)

Advanced search provides more options to narrow the results by date, location, region, name, language, or file format.

Apart from searching tips, here are the correct and best ways for searching in Google.

1. Choice of words can make a big difference to the search results we get with Google.

2. Google provides limit in search query by 10 words and after reaching the limit it skips so for this, use of wildcards turn to come in handy.

Otherwise : Do as I say not as I do or what you do I don't care
DoCSE's way : do as * say not as * do or what ***

3.Exact searching is possible through quotes (" ").
        Try_1: Diddle hey diddle
        Try_2: "Hey diddle diddle"
Both Results are different. So while searching use " " for exact search.

4.Use hyphen to exclude words.
        Try_1: Mustang
        Try_2: Mustang – car

        Result: 1st = Shows both cars and the place
                2nd = Only shows the car

5. Also remember that spelling doesn't matter, so don't feel like "Ah!I typed it wrong!", Google will give suggestions as 'Did you mean?'.

So, remember that Google search is a very powerful search tool. Using the tips outlined above, you can find anything and everything you would ever

need on the World Wide Web faster than the normal way.

DoCSE's way stands better than others. Happy Googling.

2nd = Only shows the car

5. Also remember that spelling doesn't matter, so don't feel like "Ah!I typed it wrong!", Google will give suggestions as 'Did you mean?'.

So, remember that Google search is a very powerful search tool. Using the tips outlined above, you can find anything and everything you would ever need on the World Wide Web faster than the normal way.

DoCSE's way stands better than others. Happy Googling.

Prajwol Lamichhane
CS 2nd Year

TOR ANONYMITY

Internet is much deeper. In fact, the World Wide Web represents just 4% of networked web pages. The remaining 96% of pages make up what many refer to as the "Deep Web", "Invisible Internet," or "Invisible Web". This massive subsection of the Internet is 500 times bigger than the visible Web and is not indexed by search engines like Google. The content of the deep web is hidden behind the HTML forms. So, basically 4% of the web that a search engine can access is the Surface Web. The 96% of the web that a search engine can't access is referred to as the Deep Web. The Dark Web then is classified as a small portion of the Deep Web that has been intentionally hidden and is inaccessible through standard web browsers. In order to access the Deep Web, we need to use a dedicated browser. Tor is the most commonly used, but I2P and Freenet provide an alternative solution to Tor.

Tor is a free software that aims to provide anonymous communication between entities on a network. It is short for "The Onion Router". Tor was originally developed by the U.S. Navy with the purpose of protecting U.S. government communications during intelligence operations. Tor network conceals our identity by moving the internet traffic over different Tor servers, which are actually other people's com-

puters.It's goal is to provide low latency connections transparent to the end user, while the information exchange still is resistant against traffic analysis and other attacks. This is achieved by a set of encrypted layers and frequently changing paths between a subset of the routers that participates in the routing system.

Tor installs directly into the web browsers and establishes the connections needed to access Deep Web sites. The above image shows how a Tor network works. Our data is bundled into encrypted packets before it enters the Tor network. After this, Tor takes off part of this packet's header, which includes information like the source, size, destination and timing, all of which can be used to learn things about the sender. Next, Tor encrypts the rest

of the information, which a normal internet connection cannot do. Finally, the encrypted data is sent through many of the servers (called relays) randomly, each of which decrypts and then re-encrypts just enough of the data to know where it came from and where it is going next. The encrypted address layers used to anonymize data packets that are sent through the Tor network are like an onion, thus the name. The Visible Web functions off of commonly known domains: .com, .org, .net. Tor allows for access to the Deep Web with page domains .onion.

The most common argument against tools for anonymous communication is that criminals can use it to plan future crimes, exchange illegal content etc. without revealing themselves. For example identity theft is becoming more and more common among

A well known example for this argument: To make black market purchases, users utilize Bitcoin. For the purposes of this content, Bitcoin is the black market currency of choice. While Bitcoin has beneficial purposes, the story of the currency will not be told here. This is just a single example. The various reasons to use Tor are to avoid being tracked by advertising companies on the Web, reach Internet services and sites blocked by the ISP or participating in chat rooms for victims of all kinds of abuse. Also, Government agencies use Tor for intelligence gathering and people in different countries without freedom of speech use it to communicate with other freedom seekers.

The most immediate noticeable drawback to Tor, is its performance. The fact that the data goes through many relays makes it very sluggish, especially when it comes to audio and video. It is also important to know that using Tor is infact vulnerable. In fact, many believe Tor to be fairly easily hackable, as exit nodes can see your traffic if the site you are accessing does not use SSL. Due to the anonymity provided by the Tor, the deep web has been popular nesting ground for criminal activities like drugs, child pornographies, weapons trading, hiring hitmen, etc.

The Tor software protects us by bouncing our communications around a distributed network of relays run by volunteers all around the world. It prevents somebody watching our Internet connection from learning what sites we visit, it prevents the sites we visit from learning our physical location, and it lets us access sites which are blocked. Anything we do on this browser is safe from the prying eyes of the government, hackers, Google Ads and other advertisers.

We are the one responsible for what we do on the internet. Hence, we must be diligent on deciding how we conduct ourselves on the internet.

Beginning Your Coding Journey

Subash Sapkota
CE 4th year 1st semester

"Don't worry if it doesn't work right. If everything did, you'd be out of a job."
- Mosher's Law of Software Engineering

Beginning to code can be a daunting task. Even the first 'Hello World' program can take a while to understand. Because to be a good programmer one needs to start thinking like a computer, newbies often lack that ability. Starting out, the code usually makes no sense and you will be asking yourself 'How the hell did that work?'. And as you gain more experience with coding you will begin to see patterns even though those 'How the hell did that work?' moments will be frequent and never really cease to amaze you. When your code is mess and nothing is going your way, those are the times when remembering your purpose for learning code that will help push you towards your goal. It is important to start with small and with the basics and then start writing some code to practice. Believe it or not, bad programming is also one of the phases that you should pass to become a better programmer. Eventually when you start to get the hang of it, go ahead and say good job to yourself and finally just keep on practicing. Here are some points that could help you on your coding journey.

- You should have willingness to learn. Try to focus on one particular language at the beginning rather than learning multiple languages.
- Whatever language you are going to start with, try not to learn superficially but learn deeply and understand the flow of the execution of that particular language. Every language has a documentation guide that you can refer to if you ever get stuck.
- Build the habit of creating an algorithm before jumping into code.
- Surround yourself with people who code. The coding community is just awesome and spans across the globe. You'll find lots of courses to learn coding online and people who will tag along in your coding journey. Websites like edX, Coursera, Udacity and freecodecamp are a great place to start. Eventually you'll want to jump over to stack overflow.
- Always keep engaging yourself in projects. These can be something as small as a personal portfolio page or anything in which you can apply the things you have learnt. Alternatively, you can enroll yourself into others' project or create your own and try to finish the given project in given time.
- Try to solve the problem in multiple ways. If any errors occur while coding, try to debug yourself.
- Have the habit of creating plans before you start anything. This is especially important for projects done as a team.
- Don't be afraid if you fail to solve anything but if you do just remember that Thomas A. Edison once said, 'I have not failed. I've just found 10,000 ways that won't work."

The bottom-line is anyone can become a good programmer with enough patience and dedication. What makes you different from other programmers is how well you understand the real problem and how efficiently you can solve the problem using code. That said, the more important thing is to have fun while writing code. As a programmer, there will always be more things for you to learn - new languages, new frameworks, new concepts. The list goes on and on. Finally, you should always remember to try and solve the problem in different way.

"A good programmer is someone who always looks both ways before crossing a one-way street."
-Doug Linder

Right Choice Of Programming Language

Bibek Neupane
CE 3rd Year

often find a lot of people almost regretting about having chosen a "wrong" programming language for a certain project. There are numerous programming languages that programmers use with great ease in the market right now. And some of the programming languages that were used in the past are now losing their catch in the market. This means there is no certainty that a programming language will last forever. So, if you are learning a language investing huge portion of your busy schedule, and after sometime you find another more stylish one; which does the exact same work more efficiently and has an extreme usefulness in the present context, wouldn't that be heartbreaking? Well if you ask me, I would surely deny that.

There is absolutely nothing wrong in learning something. Sorry for being dramatic in that sentence, but it is quite true. Most of the programming languages have quite similar format for coding. For example, if you learn C programming language, you learn about declaring variables, executing a code, loops and many more. Now think for a while, even if you are never to work in C again, would it be a waste? Well, certainly not. But will it make learning C++ any easier? Well, obviously yes!

It's just the syntax that is different, pattern is more or less the same. And learning C++ will eventually make learning PHP (OOP php, LARAVEL) easier.

"However is there something I can do to make sure I choose the right Programming Language?"

Well, there is no programming language right for everybody and everything. As we all know each of the programming language has its own merits and demerits. However, I suggest you should choose the language you learn based on the work you want to do in future. Don't go with the mass, go with the vision you have for yourself in future. And the most important thing is your locality, your market-place. The place you want to be working may require a different programming language.

Well it's no surprise that JAVASCRIPT is one of best programming language to learn but that doesn't mean PHP is helpless. In my own viewpoint, in Nepal, PHP can survive for longer time than it may in any other countries. So even though programming languages come and go, the knowledge you gain from it only makes you a better learner and practitioner for any forthcoming programming language you step into.

"Her": Future of AI

Prelisa Dahal

CS 3rd year
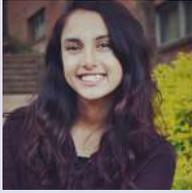
Her? After hearing this, what is the one thing that comes to your mind? Or who is the one person that is on your mind?

Whenever people say Her , we often imagine a female with whom we are attached to most (in most of the cases), or we often think people gossiping about a female. But today, I am relating "Her" to a movie by Spike Jonze, who is a writer and director of the movie "Her".

The movie relates human life with technology about how it can go parallel in future. Though the movie was created thinking about how technology can affect human relationships, in the present context still research process has to be done to be on that state as shown in the movie.

Basically, most of the people say that technology can never read human mind but the movie shows the rapid development of the technology which has emotions like that of humans. Technology that can communicate with humans seamlessly, sing, manage files and even fall in love. The artificial intelligence-like component of Siri on the iPhone, shows that an operating system like Samantha as depicted in the film isn't that far off.

What will the next generation of intelligent computing look like?

The movie "Her" has captured the public imagination with its vision of a lightning-fast evolutionary trajectory of virtual assistants, and the emotional bonds we could form with them. Is this a likely future? The film's narrative arc shows the evolution of Samantha operating system and her relationship with her user, Theodore, transforming from a competent assistant, to a literary agent that proactively arranges the publication of Theodore's letters, to an ideal girlfriend, and ultimately to an entity that loses interest in humans because they have become unsatisfying companions. Throughout the movie, Samantha is an impressive conver-

sationalist with a perfect command of language, a grasp of the broader context, a grounding in common sense, and a mastery of the emotional realm.

This is a dizzying progression, but even Samantha's first, strictly utilitarian incarnation is impressive. Her speech recognition, natural language understanding, speech generation, dialog, reasoning, planning, and learning all far exceed the current state of the art. She is able to take on complex tasks, she filters Theodore's inbox with a sophisticated understanding of the goal and is able to engage in flexible reasoning without any predetermined responses. In contrast, today's virtual assistants engage in simple dialogs and produce scripted chat. They are capable of limited predictive and proactive behavior, but learn slowly, and mostly automate one-shot commands placing or directing calls, making appointments, finding directions, sending messages, and performing searches.

Emotional Intelligence

One of the most compelling aspects of Samantha is that she behaves in an utterly human like manner, with a true sense of what is humorous and sad. This is yet a higher level of reasoning, and huge challenges remain to truly understand and program social relationships, emotional ties, and humor, which are all parts of everyday knowledge. It is more conceivable that we will be able to make a system understand why a person feels sad or happy (in the most primitive terms, perhaps because of realization of

goal failure or goal success), than actually simulating or replicating visceral feelings in machines.

Is it necessary to make intelligent systems human like?

Much of human behavior is motivated by emotions and not by any logical arguments. The machine thus needs to understand to some degree why a human is doing something or wants something done, just as much as we demand an explanation from them about their own behavior. There is also a very practical reason to want this. In order to interact effectively we need a model of the "other", whether it's an app or a person. At a high level of sophistication it will be faster and more efficient to allow us to start from such models we have of humans, as opposed to slowly discovering the parameters of a wholly alien and new "AI tool."

There is also that astonishing voice... Samantha had us at that first playful and breathy "Hi."

The amazing emotional range and subtle modulation of Samantha's voice is beyond what today's speech synthesis can produce, but this technology is on a trajectory to cross the awkward zone of 'close but not quite human' performance in the next few years.

Real intelligence — or Simulated?

A natural and compelling voice greatly bolsters the appearance of intelligence. The downside is that apparent (but not real) intelligence leads to over-expectation on the part of users, which in turn leads to conversational failures. Our focus today is thus on building conversational systems that can recover from such incorrect inferences on the part of the user, and move the dialog forward in a graceful manner.

Whether the intelligence is real or simulated, we appear predisposed to give systems exhibiting such behavior and such voices, the benefit of the doubt. In fact, our tendency to be taken in by superficially human like behavior is leading to the re-examination of the Turing test as an effective measure of machine intelligence. The Turing test requires that a human judge engage in a conversation with a human and a machine, and if it's not possible to reliably tell the machine from the human, the machine is said to have passed the test.

Samantha interacts with Theodore when he invokes her through a button press, and sees the world when he shows it to her through his phone's camera. Today's assistants make use of a variety of signal feeds to optimize their actions, since these all carry meaning: touch, gesture, audio, video, location, and motion. The systems use such sensory feeds to identify and locate users, but also to better understand their activity and to adjust their own behavior to the circumstances. Today's assistants no longer need to be woken up with a button press, instead responding simply by being spoken to, listening continuously for cues within the right context. We can anticipate giving our future "always on" and "always aware" assistants permission to listen over extended periods to our conversations, meetings so as to have a running understanding of what concerns us and thus how to best help us.

Today's intelligent systems have only a very limited ability to handle unstructured information: question-answering systems either require extensive curation and pre-structuring of information sources, or else piece together answers based on a superficial processing of source text in a way that does not support deep reasoning.

Ultimately, the real promise of AI , at least as we see it is not the creation of artificial companions, but an Amplification of Intelligence through the creation of amazing and transformative tools.

MAKING KU LIFE MATTER

"Why always be someone following the mass?
It's the perfect time to learn to become the one who can lead them"

Depenti Karki
CE 4th Year

After enrolment of anyone at Kathmandu University(KU), the first thing they come to know before their internals, lab exams or end semester exams are the invitations to join different departmental and inter-departmental clubs like: Kathmandu University Computer Club (KUCC), Kathmandu University Youth Red Cross Circle (KUYRCC), Amnesty International Kathmandu University Youth Network (AIKUYN), Kathmandu University Robotics Club (KURC), etc. Seniors come to your class, give information about respective clubs, list out the projects done so far and motivate you to get involved in their respective clubs. I am in my fourth year now and the experience I had so far in these 3 years is the question in the mind of many first-year students: "Is it important to join such clubs??" which is valid too. If the result is worthless then there is no point in joining such clubs and giving your precious time rather than being in the KU ground, studying or hanging out with friends and making good memories. But, here I tell you that it's not worthless.

I am always interested to explore the world of technology, so I joined Computer Engineering in KU. My interest leads me to join KUCC which is an independent club totally operated by the students of Computer Science and Engineering of KU with the vision of "Empowering ICT". Participating in programs and workshops conducted by KUCC allowed me to get in touch with

professionals in the field and

also connected me to my seniors whose experience and expertise have helped me to learn and grow both as a programmer and as a person. Programs like Linux Talks, Cyber Security Workshop, IT Meet 2016 and 2017, and various other programs that KUCC conducts regularly have broadened my knowledge, experience and my ability to work in a team to achieve the goal as a group.
In April 2016, I along with a team participated in a hackathon organized by Nepal Telecommunications Authority (NTA) to mark International Girls in ICT Day with the theme "Fight Violence Against Women". In that hackathon, we developed an app named WAPP "We are with you". Though we couldn't make it as the winner, we learned a bunch of new lessons. I don't believe that winning is the most important thing, it's

taking part, that is important. Of course, winning would have been great but the lessons we took home taught us more than winning would have. The concept before and behind the development of an app, the insights of presentation skills, and the new, innovative ideas which require proper thinking were some important learnings. By joining such events, one can gain knowledge from people at the same level and simultaneously analyze the level of competition in the market.

I was also involved in KUYRCC which works for humanity. Starting as a general member in

the first year, an executive member in the second year and working my way up to be the vice-president in the third year and now alumni of this youth circle have been an essential part of my three years journey. I took part in numerous programs. Through my involvement in programs within and outside KU, I got opportunities to explore new places. Besides that, I also got a chance to know people from different localities, their problems and some ways we can adapt to solve them. Helping needy people provides a kind of self-satisfaction to me. Along with that, KUYRCC helped to groom my personality with different first-hand experiences and responsibilities. It expanded my networks with various people from different fields within KU and with people from different organizations which are active in Kathmandu. Along with that, it helped me to overcome my

fear of public speaking. During my first year, I used to hesitate to speak in public - which I still struggle with but involvement in different programs raised my confidence level. And nowadays, though with little wrestle, I have overcome that fear.

Along with these and my academics, I was selected as a fellow at Women Leaders in Technology(WLiT) during my second year. WLiT is a Non-Governmental Organization that aims to encourage passionate girls studying in the field of technology who want to attain key leadership positions and equips themselves with technical and leadership skills. In a boot camp (a workshop for 2 weeks), they taught us about personal development and app development. Motivational speakers encouraged and boosted our self-confidence to lead in the field of IT. During the closing day of boot camp, I along with my team presented an app named "Yatayat" which would give the information of the routes of vehicles to non-familiars as well as tourists in the Kathmandu valley. Through WLiT I came in contact with organizations like YoungInnovations, Women Lead, Karkhana, Kazi studios, NTA. It's always a privilege and honor to get an invitation from these organizations for the participation in the events as a WLiT member. I also had a chance to learn and work with students from different colleges. During my fellowship period, I was assigned a mentor who helped me to have a clearer vision towards my career.

So, my involvement helped me to become a responsible person, learn new skills, expand my networks, broaden my knowledge and know my career better. So, it is better to get enrolled in clubs with your field of interest whether they be inside or outside the KU. Although time management is the most challenging part but if you try once then you can. Events you attain and tasks you accomplish will definitely help you to develop yourself academically and personally. Whichever club you choose or whatever path you take you must always keep your study on the top of your priority and move ahead. I know good GPA matters but the happiness, experience, and memories which you will get during the involvement in the clubs will be priceless and remain throughout your life. Make your 4 years in KU an unforgettable journey and take a bag full of experiences that can be shared in the days to come.

Be active. Be different.
THANK YOU

Time in ku is like good times. Good times never dies. Jati masti garnu cha KU ma garnu. Tyas pachi ta aat chahincha masti garna.

Ritesh Jung Thapa
Batch of 2012

It takes time and effort to learn a new skill, a new programming language. So what is critical is not that "you have to rush else you get left behind", what is critical to understand is that you don't have time to waste. Your attitude will take you to places. Be a better you, make a better world.

Sajan Maharjan

Hello guys it has been a great experience being a part of kathmandu university. There had been lots of ups and downs, a breaking point where you might think you cannot take it anymore. But thats all part of under graduate, you just need to put yourself together and work hard. You might experience failure at some part of your journey but remember you can never know the taste of success if you have never failed.

Rupesh Dahal
Batch of 2012

Hello guys it has been a great experience being a part of kathmandu university. There had been lots of ups and downs, a breaking point where you might think you cannot take it anymore. But thats all part of under graduate, you just need to put yourself together and work hard. You might experience failure at some part of your journey but remember you can never know the taste of success if you have never failed.

Prakash Dahal
Batch of 2013

ALUMNI

As I look back to my experience at DOCSE, I think it was the most important part of my academics. I learned a great deal, both intellectually and practically during my studies. I do wish all current and future students would take advantage of the many opportunities that DOCSE offer and prepare themselves for future personal and practical development challenges. The whole experience has been awesome and I could go on for pages, but I will leave it at this.

Sarthak Pokharel
Batch of 2013

Aanchal Adhikari
Batch of 2013

Challenge yourself and take up every opportunity you get to develop yourself; you'll never know how much potential you have until you face challenging tasks. Getting involved in club actiwvities is a great way to socialise, develop new skills and further sharpen the skills you already have. Keep Calm and Enjoy KU life.

The four years that I spent as a student of KU and as a member of KUCC were very gratifying. KU provides a great environment for students to grow and realize their ambitions. The activities at DOCSE taught me that some qualities like leadership, time management and the skill to thrive as a team player can only be gained by getting involved in activities that are outside the periphery of the course. KUCC provides the chance to get involved in other activities that are outside the scope of the course and prepares us for the challenges in the practical world. 'Go forth, challenge yourself and conquer.'

Mudita Shakya
Batch of 2013
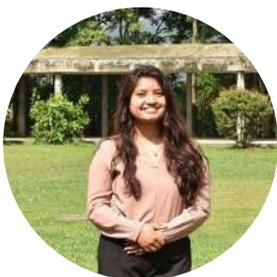
Aakriti Pandey

Studying computer science is the best decision I ever made. It never gets boring and there's new thing to learn everyday. However, sometimes its intimidating, seeing long lines of code written by others, but its not that difficult as it seems. All you need, is to start learning and one thing will lead to another. You are just one google search away from being awesome, as someone said "Internet remains a place where you can start from nothing and soon challnge the gods."

Shakar Bhattarai
Batch of 2013

Fours years of at Kathamandu University: Hectic assignments, numerous projects infinite examinations and Countless Memories. These keywords pretty much sum up any Undergraduate students life.

Good luck , to all my juniors, to making it through this incredible journey, where at times you're going to feel like putting yourself into fire while at others you'll feel like you're the luckiest person alive to be where you are. And like often stated, the destination is nothing compared to how amazing the journey is.

As an almunus and the one who is supposed to write this message, I have an important "word of wisdom" I wish to "enlighten" you with.

I went into an engineering school with high hopes, all of which , I believed would become a reality once I put in everything into what the college had for me to offer and so I did. I graduated with a pretty decent grade, and have a decent enough start to my career.

However, if I had another shot at college, I would probably spend way more time learning, exploring my creativity without being bound by what the college had for me to offer.

I believe I could be way more creative, diligent and knowledgeable than I am now, had I realized this during the early stages of my university life

College is not about mere learning, it's about learning how to learn. You're never going to get the grooming and academic environment once you graduate. Definitely not in the huge corporate houses you wish to spend your careers in.

Challenge the syllabus, be curious. Question anything and everything, push your professor to give you more.

At the same time, LOVE. Your special one is at your campus, find them. Grow yourselves professionally and socially. And to top it all, enjoy your Undergraduate life.

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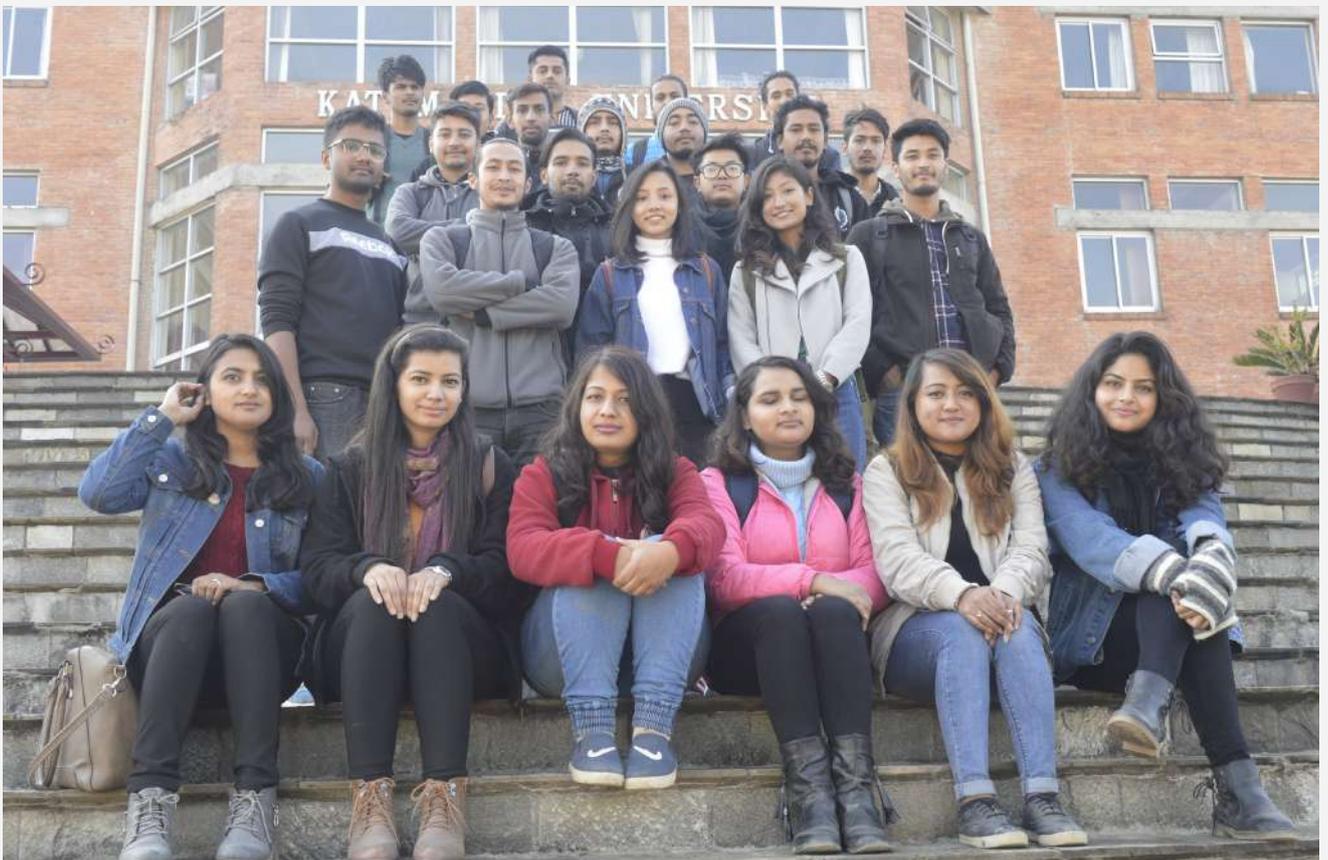
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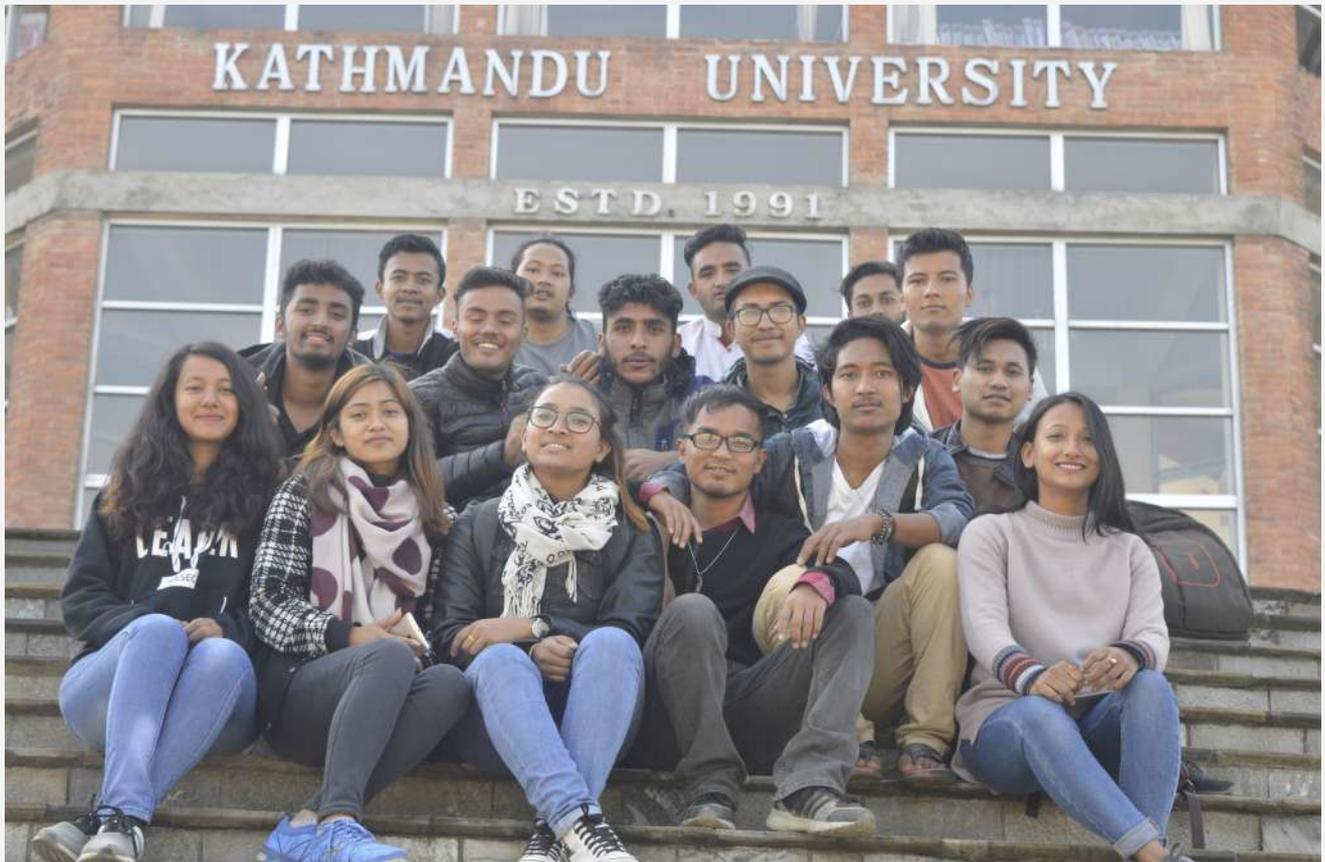
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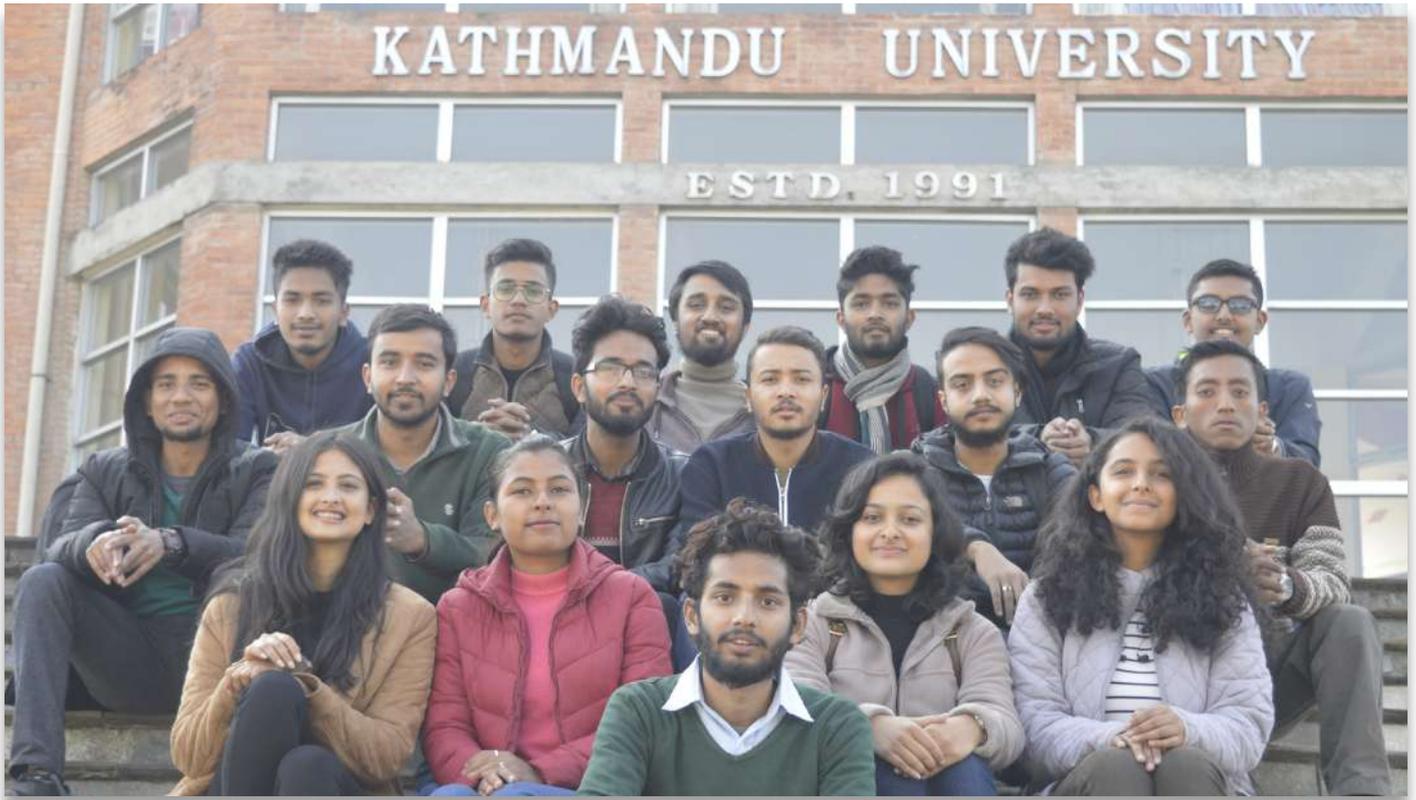
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IT Quiz

Designing Challenge

Googling Competition

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Acoustic Evening

Blood Donation

Python Meetup

Penetration Testing

Coding Competition

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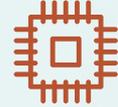
Hardware Competition

Almuni Meet

Project Demonstration

Counter Strike

DOTA 2

Idea Pitching

Mini Militia

Clash Royale

Yomari Code Camp

Localization

Photography

FIFA

Hackathon

Selfie Contest

LTSP E-Library Demo

VR Meetup

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