



DIGITAL MINDS

Volume-7



**Bunts Sangha's
S.M. Shetty College Of Science, Commerce
& Management Studies**

Hiranandani, Powai, Mumbai-76

**NAAC Accredited 'A' Grade
ISO 9001:2015 CERTIFIED**

**Department of Information
Technology**

In

Collaboration with IT association

Presents

“Digital Minds”

Volume – 7

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Karan Singh (First year B.Sc.I.T)

Principal`s Desk

The Bunts Sangha's S.M.Shetty College believes in all round development of students through holistic education. The Vision of the college, **'Personality Development for Nation Building'** is the guiding principle of all our activities and efforts.

The Innovations and Best Practices implemented in the college are aligned with the Vision and Mission which has given an identity to the college. One such innovative and best practice is **'Sharpening Skills in Teaching and Research.'** In the pursuit of Mission of the college, various co-curricular, extra-curricular activities and extension and outreach programs have been designed and implemented for the benefit of students. A separate Research Cell has been started for students to encourage and develop research bent of mind among them. Each program brings out magazines by motivating students to write articles in them.

"Digital Minds" is a platform where young minds can participate, discuss, explore, analyze and contribute something resourceful in the progressive domain of technology. It is a yearly student's magazine publishing study and research articles on varied aspects of technology.

I wish that our students will come forward to learn, go forth to serve and excel into the world with great strength, not only to do job but to remain beautiful human beings.

Dr. Sridhara Shetty

Principal

INSIGHT

Our era is known as the era of Information Technology. Information Technology with its superhighway has not only revolutionized man's way of working but also his very existence. IT (Information Technology) revolution is sweeping our civilization bringing about unfathomable changes in our present-day civilization. Twenty first century belongs to the IT world.

The term 'Information Technology' or simply known as IT is a generic name given to all improvements that are taking place in our world due to the inter-linked advancement in technology, learning, and information. The term refers to recent technological developments that are taking place in our world as a result of better technology, due to better information. It is believed that the growth in IT knowledge implies the growth of a country. The discipline of technology provides ample scope for research and development.

Today IT revolution is sweeping over the world. Although, IT boom has revolutionized the western world beyond recognition it is still to make much headway in changing lives in India. The boom has, however, affected only the affluent and the urban India. The benefits of IT boom needs to penetrate down to the ordinary men and women living in our country.

Student who enjoys exploring new technology while solving problems by applying their technical and analytical skills, are the important part of information technology.

"Digital Minds" is a humble initiative of the IT Department to provide a platform where young minds can participate, discuss, explore, analyze and contribute something resourceful in the progressive domain of technology. It is a yearly magazine includes research articles on varied aspects of technology.

The prime objective of the magazine is to encourage learners to read and explore a lot in order to achieve higher academic standards. The magazine will foster involved academic atmosphere where learning becomes compulsive but not compelling.

In years to come everything will be digitalized, including the mind. In this perspective the name "Digital Minds" is suitably chosen. IT learners are encouraged to enrich the magazine with diverse articles and information which can be effortlessly accessed by the readers. It is hoped that this endeavor would serve its objective.

Dr. Tushar Sambare

B.Sc. IT/ M.Sc.IT Coordinator

Editor`s desk

Information technology refers to the collection of tools that make it easier to use, create, manage and exchange information. The Internet is the latest of a long series of information technologies, which includes printing, mail, radio, television and the telephone. This overcomes with Internet in huge scale. Analysts estimate that 50 billion devices will get connected to the Internet by 2020. In this exploding Internet of Things (IoT), users, things and cloud services connect using the Internet to enable new use cases and new business models across multiple applications. Our association appreciates the contribution put up by the students for the magazine “Digital minds”, Volume -6. This platform shows the mode to the students to go through the research articles. This may help students to understand the theoretical and scientific aspects of the IT and Computer Science disciplines. This volume covers the latest trends in mobile technology, virtual reality, networking and many more.

“The ultimate promise of technology is to make us master of a world that we command by the push of a button.”

-Volker Grassmuck

Prof. Sheetal Khanore
(Member-IT Association)

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3D Metal Printing

Abhin Poojary
S.Y.B.Sc.I.T – B



3D printing is a great example of how incremental innovation can be revolutionary. We've always had printers and parts manufacturing, of course, but plastic 3D printing has been taken to the consumer and prosumer level. Now, 3D metal printing is poised to be the next big wave in this industry.

HP is planning its first offering, the Jet Fusion model, which it hopes will make a difference in the metal parts manufacturing sector. Other industry giants are also on board: GE has been printing metal fuel nozzles for its Leap jet engines, and Nike's even printing metal cleats.



Metal 3D Printers

Looking to more delicate products, 3D metal printing is uniquely beneficial to toy and jewelry businesses. With a 3D printer, a massive factory is no longer needed to create beautiful pieces for small or medium-size businesses — and that will change the competitive landscape.

While 3D printing is still a long way from being widely adopted by the everyday consumer for in-home use, metal 3D printing brings it much

closer. Most people won't fork over thousands of dollars for a 3D printer that can print only plastics and basic materials. But if they could print electronic devices from home for a fraction of the cost and save time and money on shipping, many will do so once the price point for the printer makes sense.

It should be an exciting 18 months through the end of 2019, but the key is to be aware of opportunities early. These or other innovations will undoubtedly change the way we do business and live our lives, just as smartphones and the internet did in the past few decades. Companies that are poised to enter the market or generate revenue by playing off these new tech breakthroughs (think smartphone cases making millions), will be on solid ground to take on the next decade in 2020.

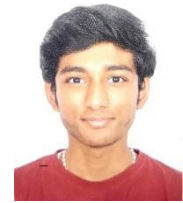
Any sufficiently advanced technology is equivalent to magic.

- Arthur C. Clarke



PLAYERUNKNOWN'S BATTLEGROUNDS, (PUBG)

Sheldon Monteiro
F.Y.B.Sc.I.T - A



The game that was meant for the children of age 16 and above is being played by people of all age groups, even young teens starting from 13. PUBG is an online multiplayer battle royale game developed by PUBG Corporation, Bluehole and published by Tencent games. It features with 100 players playing against each other with the concept of, “survival of the best”, i.e. 100 players fight against each other till only one player remains who wins the game. It can be played solo or in groups.



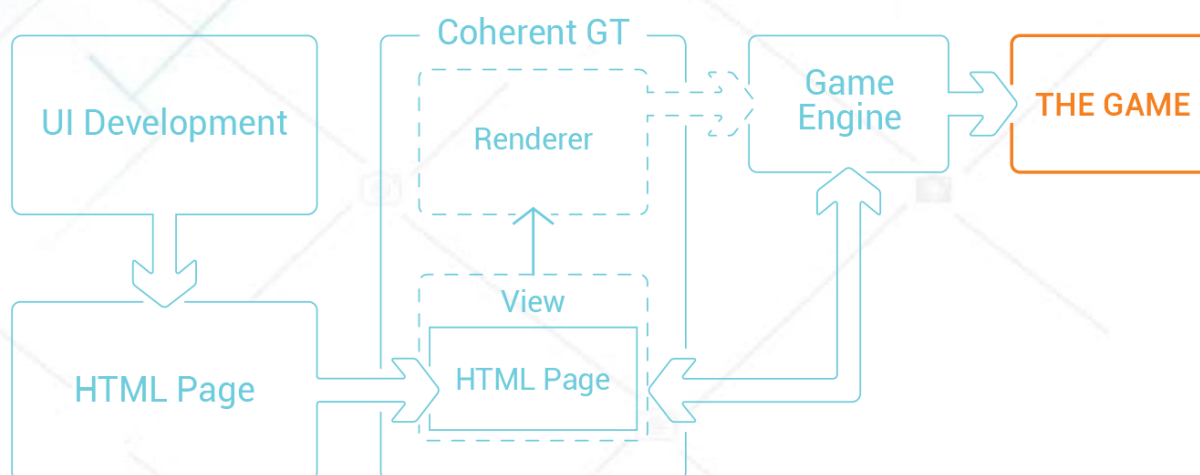
PUBG uses HTML5-based UI empowered by Coherent GT which was found out to be the best user interface for it .It also uses unreal engine 4 which allowed the developers to start iterating soon. The Bluehole team has experience working with flash-based technologies, so they could quickly adapt to the newer and more flexible approach Coherent GT enables. Swift support response times and direct communication with the developers ensured that they are using the most optimal approach for their UI. The game uses transitions and animations to deliver a smooth gameplay experience. BATTLEGROUNDS is a good balance between Arma 3 and H1Z1.

By using Coherent GT in the game's leaderboard and statistics screen, the game can instantly populate the elements with the latest player data with Coherent GT's binding system. The UI helps in the character customization which allows players for stealth strategy or fashion statement.

Coherent GT gives the following benefits:

- Rich and interactive UI
- Reduces development time
- Powerful visual tools

This is how Coherent GT helps to make a game



PUBG features:

- Battleye integration
- Solo, Duo, SQUAD and Zombies (custom servers)
- Spectating support for Team servers when you die
- 1st person only & 3rd w/ 1st person availability servers
- Game replay 2D/3D (to see your full game in replay, see how you died, make machinimas etc.)
- Killcam for Solo game mode (it will NOT come to Duo or Squads)
- Weapon customization
- Character customization
- All MOCAP animations

- Colorblind support
- NVIDIA ShadowPlay Highlight support

While the game was at the top of the popularity charts back in 2017, the number of players have dwindled since the start of 2018, but still there are a lot of players fascinated by this game and everyone wants to take home that ,’ **Winner Winner Chicken Dinner**’.

It has become appallingly obvious that our technology has exceeded our humanity.

- Albert Einstein



Bug Hunters: The hackers earning bucks ethically

Adarsh Shetty
T.Y.B.Sc.I.T - A



The term hacker is often used pejoratively, but the ability to spot weaknesses in companies' software and cyber-security systems is in high demand. Ethical hackers are now earning big bucks and the industry is growing.

Bug hunting has become the most money-spinning kind of ethical hacking today, mainly because tech companies are ready to put down big bucks to ensure their online operations. Bugs may cause a data breach or leak, or provide a way to either bypass the system.

Big companies have a vulnerability disclosure programs where hackers around the world can try to hack their company and disclose the vulnerabilities to the company responsibly and get a reward in return which may be in the form of money or recognition. This profession of finding bugs in the company's assets and reporting them responsibly is called Bug Hunting.



Most companies have clearly-stated pay-outs; Facebook, for instance, offers a minimum 'bounty' of \$500 per bug, and may go up to \$25,000 or more. While some tech giants have their own bug bounty programs, in which they invite hackers to penetrate their firewalls and spot anomalies,

many of them prefer to post 'blind challenges' on portals like HackerOne or Bug Crowd. No company details are revealed, and the challenge is a replica, so that a hacker can't actually do any real-time damage to the company's business.

India is the best place to be a bug hunter.

According to HackerOne's report, it pays to be a vulnerability researcher in India, where top bug hunters can make 16 times more compared to the average salary of a software engineer. And the top hunters can rake in as much as 16 times. Of the 1.6 lakh hackers registered with this US-based portal, the largest number are from India (23 per cent), followed by the US (20 per cent). As of December 2017, some 72,000 vulnerabilities have been reported worldwide, and hackers across the globe have received pay-outs to the tune of \$ 23.5 million. Of this, \$1.8 million was won by Indians.

Other countries where bug hunting can assure someone a comfortable living are Argentina (x15.6), Egypt (x8.1), Hong Kong (x7.6), the Philippines (x5.4), and Latvia (x5.2).

But bug hunting is also a sustainable profession in developed countries as well, though the differences between average yearly bug bounty pay-outs and a software engineer's average salary are far smaller.

For example, a top bug bounty hunter makes 2.4 times more than the average software engineer in the US, 2.5 times than one in Canada, 1.8 times more than one in Germany, and 1.6 times than software engineers in Israel.

In India, except for a handful of e-commerce entities like Ola, Paytm and Zomato, most companies don't have a bug bounty programme. Zomato reportedly learnt the hard way when in 2017, a major security breach led to 17 million email IDs and passwords being stolen by a hacker, who also reported it. According to Zomato's security lead Prateek Tiwari, the company has had a bug bounty programme since February 2016, but added the rewards component only in July 2017. "Our security and engineering teams have grown and matured so much through this process," says Tiwari. For severe bugs relating to user information and such, Zomato offers a bounty of \$1,000, and plans to increase that soon.

BUG BOUNTIES VS. SALARY

	MULTIPLIER
India	16
Argentina	15.6
Egypt	8.1
Hong Kong	7.6
Philippines	5.4
Latvia	5.2
Pakistan	4.3
Morocco	3.7
China	3.7
Belgium	2.7
Australia	2.7
Poland	2.6
Canada	2.5
United States of America	2.4
Sweden	2.2
Bangladesh	1.8
Germany	1.8
Italy	1.7
Netherlands	1.7
Israel	1.6
Croatia	1.5

What you need to find bugs :

- Insatiable curiosity
- Solid technical expertise in web and networking technologies
- Patience and dedication
- Puzzle-solving abilities

The companies in India need to take cyber security seriously and should host these type of programs so that the talent of these professional bug hunters of India doesn't go waste. With the rise in the cyber-attacks and data breaches in India, it's high time we take privacy as a matter of concern and take serious steps towards making Internet a safer place for the citizens of our country

If debugging is the process of removing bugs, then programming must be the process of putting them in.

- Edsger Dijkstra



5G network to improve road safety

Akash Patil
S.Y.B.Sc.I.T - B



Next-generation mobile network and fast data transmission solutions can be used to collect a huge amount of data on vehicles on the road. The information can be used, for example, to provide road weather services, carry out road maintenance and control self-driving cars. Ultimately the aim is to reduce accidents.

VTT's 5G-Safe project explores the possibilities of using the 5G mobile network to improve road safety in collaboration with partners such as the Finnish Meteorological Institute, Destia and Unikie. The project is part of the Challenge Finland competition and financed by Business Finland.

Thanks to the fast 5G network and new data transmission solutions, vast amounts of sensor, video and radar data can be collected from vehicles. The information can also be transmitted in almost real time.



"The data can be collected automatically without the drivers needing to do anything themselves. The required technology can be installed at the factory", explains Senior Scientist Tiia Ojanperä from VTT. "The data can also be processed and warnings sent to other road users by means of automated systems."

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For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled.

- Richard P. Feynman



QUANTUM COMPUTING

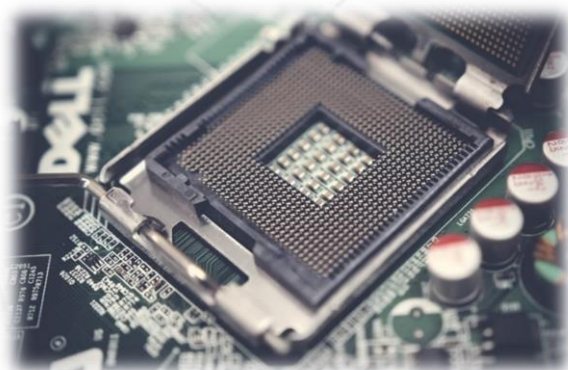
Aman Vishwakarma
F.Y.B.Sc.I.T - A



Computers are one of the best inventions of human kind, changing the way we live and exist. Well, every invention needs to improvise with time and so does a computer. Computers have had many upgrades in the last decade, mostly in the fields of memory management, processing speed, operating systems.

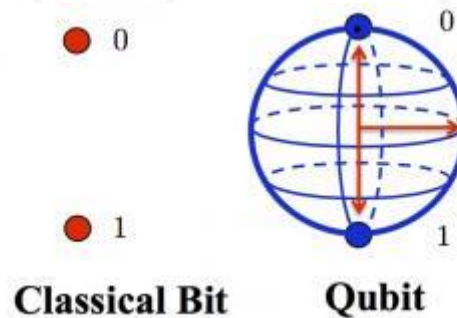
Computers are one of the best inventions of human kind, changing the way we live and exist. Well, every invention needs to improvise with time and so does a computer. Computers have had many upgrades in the last decade, mostly in the fields of memory management, processing speed, operating systems.

One thing in particular has not been updated since the birth of computers, the data format of computer. We know of binary numbers, which when combined together we get data which the computers translates in understandable language. About time we upgrade our computers to quantum computers.



To understand quantum computers let's just go by the basics of data or binary numbers. Binary numbers, are a representation of the on/off current. When current moves through a transistor that condition is represented as 1, and 0 otherwise. Transistors together form logic gates, in AND logic gate the output is 1 if all its inputs are 1 or zero in other cases, logic gates when combined give us processing chips. This is how data is processed currently. Quantum computers on other hand use Qubits, or superpositioned bits. Superposition is a condition where in the bits exist in two states of 1's & 0's, to understand this more easily think of this condition as a particle which has two planes of polarization, horizontal and vertical.

Qubits can be the spin of an electron, upward and downward spin (representing 1&0 respectively) or magnetic field of the particle or a single photon. Now, when the qubit are to be measured the qubit quickly has to decide which number it will represent. Unless observed the qubit can be in any state.



With standard binary model, 4 bits provide us with 16 combinations out of which one can be used to represent the data, but with quantum bits the 4 bits can take any state and provide us with all 16 combinations at once. Take 40-50 qubits and we have a billion values and more and you can reach infinite values. Quantum computer will use quantum gates, just the way computers have logic gates. A quantum gate will have an input of qubit it will run probabilities for the output and we will have the desired output. Quantum computers will change the way we process data, processing speeds will be 100x faster since bird change to the desired data. Quantum computers won't be replacing it desktops any time soon, some fields of science can benefit a lot from it. Simulations can be run on atomic scales, large numbers can be calculated, and data mining time will be reduced to the square root of the time required by normal computer. Future is bright, future is quanta.

“Revere those things beyond science which really matter and about which it is so difficult to speak”.

*- Werner Heisenberg
Father of quantum mechanics*



Artificial Intelligence May Fall Short When Analyzing Data Across Multiple Health Systems

Nikhil Rane
S.Y.B.Sc.I.T - B



Artificial intelligence (AI) tools trained to detect pneumonia on chest X-rays suffered significant decreases in performance when tested on data from outside health systems, according to a study conducted at the Icahn School of Medicine at Mount and published in a special issue of PLOS Medicine on machine learning and health care. These findings suggest that artificial intelligence in the medical space must be carefully tested for performance across a wide range of populations; otherwise, the deep learning models may not perform as accurately as expected.



As interest in the use of computer system frameworks called convolutional neural networks (CNN) to analyze medical imaging and provide a computer-aided diagnosis grows, recent studies have suggested that AI image classification may not generalize to new data as well as commonly portrayed.

Researchers at the Icahn School of Medicine at Mount Sinai assessed how AI models identified pneumonia in 158,000 chest X-rays across three medical institutions: The National Institutes of Health; The Mount Sinai Hospital; and Indiana University Hospital. Researchers chose to study the diagnosis of pneumonia on chest X-rays for its common occurrence, clinical significance, and prevalence in the research community.

In three out of five comparisons, CNNs' performance in diagnosing diseases on X-rays from hospitals outside of its own network was significantly lower than on X-rays from the original health system. However, CNNs were able to detect the hospital system where an X-ray was acquired with a high-degree of accuracy, and cheated at their predictive task based on the prevalence of pneumonia at the training institution. Researchers found that the difficulty of using deep learning models in medicine is that they use a massive number of parameters, making it challenging to identify specific variables driving predictions, such as the types of CT scanners used at a hospital and the resolution quality of imaging.



"Our findings should give pause to those considering rapid deployment of artificial intelligence platforms without rigorously assessing their performance in real-world clinical settings reflective of where they are being deployed," says senior author Eric Oermann, MD, Instructor in Neurosurgery at the Icahn School of Medicine at Mount Sinai. "Deep

learning models trained to perform medical diagnosis can generalize well, but this cannot be taken for granted since patient populations and imaging techniques differ significantly across institutions."

"If CNN systems are to be used for medical diagnosis, they must be tailored to carefully consider clinical questions, tested for a variety of real-world scenarios, and carefully assessed to determine how they impact accurate diagnosis," says first author John Zech, a medical student at the Icahn School of Medicine at Mount Sinai.

This research builds on papers published earlier this year in the journals *Radiology* and *Nature Medicine*, which laid the framework for applying computer vision and deep learning techniques, including natural language processing algorithms, for identifying clinical concepts in radiology reports for CT scans.

Education makes machines which act like men and produces men who act like machines.

- *Erich Fromm*



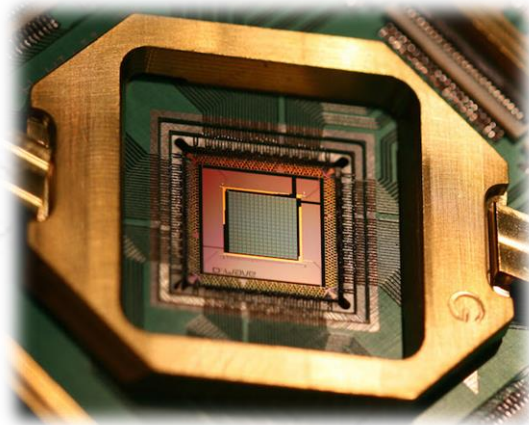
D-Wave

Bipin Rajbhar
S.Y.B.Sc.I.T – A



Quantum Computation

Rather than store information using bits represented by 0s or 1s as conventional digital computers do, quantum computers use quantum bits, or qubits, to encode information as 0s, 1s, or both at the same time. This superposition of states—along with the other quantum mechanical phenomena of entanglement and tunneling—enables quantum computers to manipulate enormous combinations of states at once.

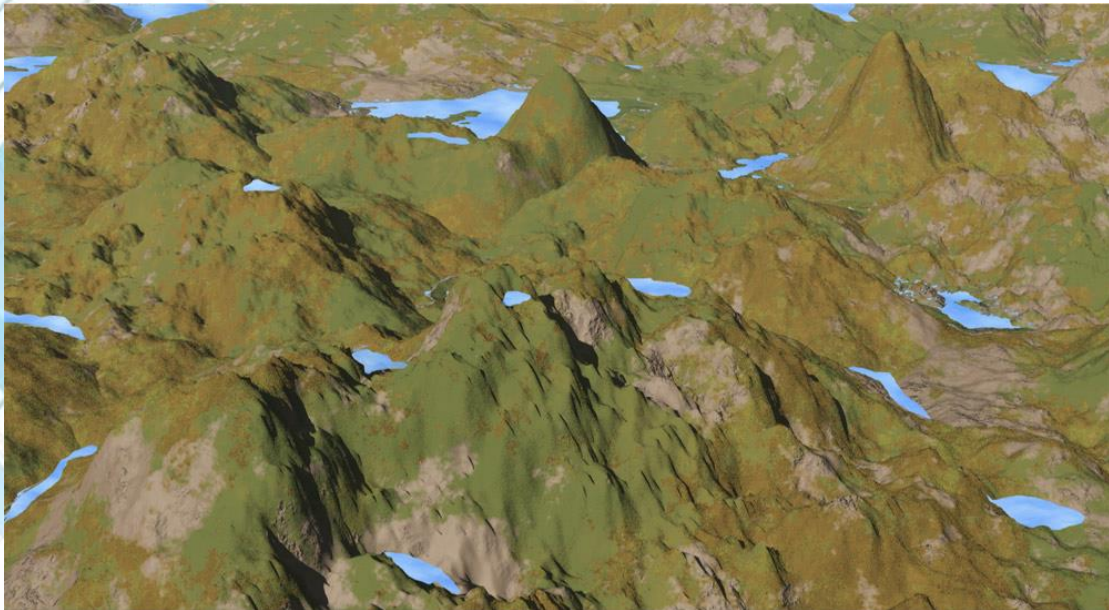


How D-Wave Systems Work

In nature, physical systems tend to evolve toward their lowest energy state: objects slide down hills, hot things cool down, and so on. This behavior also applies to quantum systems. To imagine this, think of a traveler looking for the best solution by finding the lowest valley in the energy landscape that represents the problem.

Classical algorithms seek the lowest valley by placing the traveler at some point in the landscape and allowing that traveler to move based on local variations. While it is generally most efficient to move downhill and avoid climbing hills that are too high, such classical algorithms are prone to leading the traveler into nearby valleys that may not be the global

minimum. Numerous trials are typically required, with many travelers beginning their journeys from different points.



In contrast, quantum annealing begins with the traveler simultaneously occupying many coordinates thanks to the quantum phenomenon of superposition. The probability of being at any given coordinate smoothly evolves as annealing progresses, with the probability increasing around the coordinates of deep valleys. Quantum tunneling allows the traveler to pass through hills—rather than be forced to climb them—reducing the chance of becoming trapped in valleys that are not the global minimum. Quantum entanglement further improves the outcome by allowing the traveler to discover correlations between the coordinates that lead to deep valleys.

Programming a D-Wave system

The D-Wave system has a web API with client libraries available for C/C++, Python, and MATLAB. This allows users to access the computer easily as a cloud resource over a network.

To program the system, a user maps a problem into a search for the “lowest point in a vast landscape,” corresponding to the best possible outcome. The quantum processing unit considers all the possibilities simultaneously to determine the lowest energy required to form those relationships. The solutions are values that correspond to the optimal

configurations of qubits found, or the lowest points in the energy landscape. These values are returned to the user program over the network. Because a quantum computer is probabilistic rather than deterministic, the computer returns many very good answers in a short amount of time—thousands of samples in one second. This provides not only the best solution found but also other very good alternatives from which to choose. D-Wave systems are intended to be used to complement classical computers. There are many examples of problems where a quantum computer can complement an HPC (high-performance computing) system. While the quantum computer is well suited to discrete optimization, for example, the HPC system is better at large-scale numerical simulations.

Capabilities

D-Wave's flagship product, the 2000 qubit D-Wave 2000Q quantum computer, is the most advanced quantum computer in the world. It is based on a novel type of superconducting processor that uses quantum mechanics to massively accelerate computation. It is best suited to tackling complex optimization problems that exist across many domains such as:

- Optimization
- Machine learning
- Sampling / Monte Carlo
- Pattern recognition and anomaly detection
- Cyber security
- Image analysis
- Financial analysis
- Software / hardware verification and validation
- Bioinformatics / cancer research

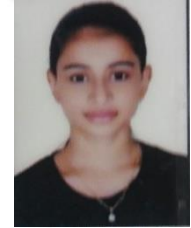
The human spirit must prevail over technology.

- Albert Einstein



Edge Computing

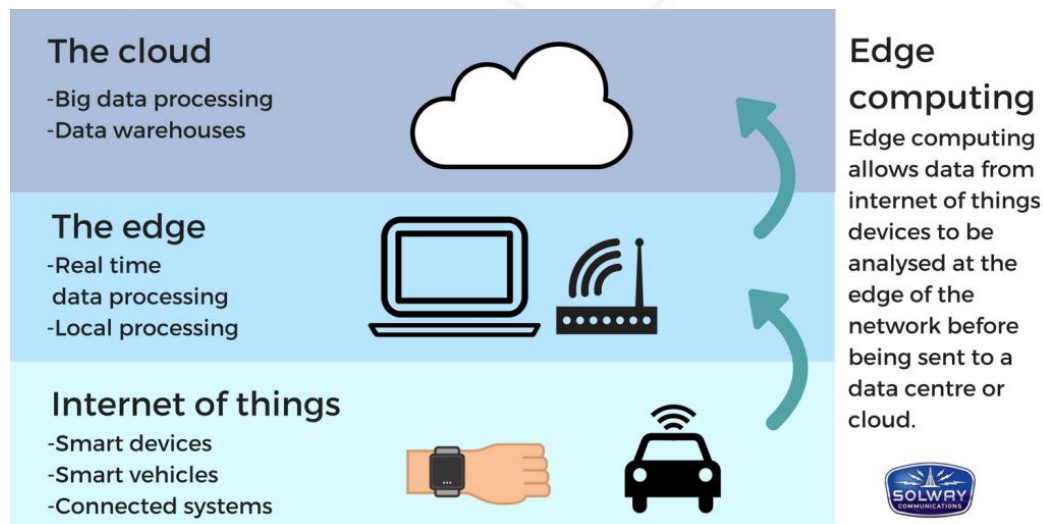
Deepika Shetty
S.Y.B.Sc.I.T - B



Edge Computing can be defined as the computational processing of sensor data away from the centralized nodes and close to the logical edge of the network, toward individual sources of data. It may be referred to as a distributed IT network architecture that enables mobile computing for data produced locally. Instead of sending the data to cloud data centers, edge computing decentralizes processing power to ensure real-time processing without latency while reducing bandwidth and storage requirements on the network.

What Exactly Do We Mean By Edge Computing?

A mesh network of micro data centers where each one is responsible to receive & process crucial data in their vicinity sent via IoT devices. These small data centers, mine the data and push those data to the main central cloud storage facility. These micro data warehouses generally have a footprint of less than 100 Sq. feet.



These micro devices which work as data collector & data postman to send it to the main cloud server is called a IoT mesh. Edge computing triages the data locally so some of it is processed locally, reducing the backhaul traffic to the central repository.

This approach requires leveraging resources that may not be continuously connected to a network such as laptops, smartphones, tablets and sensors. Edge computing enables data-stream acceleration, including real-time data processing without latency. It allows smart applications and devices to respond to data almost instantaneously, as its being created, eliminating lag time.

Doing this computing closer to the edge of the network allows companies to process data & analyze it dynamically in a real time. This data analytics in near real-time is being leveraged by many healthcare, financial & telecommunication and will play a vital role in making them make much more informed business decisions.

This **IIoT (Industrial Internet of Things)** enabler is already being used in various industrial sectors and visual forms like

1. Oil & Gas
2. Sector
3. Energy Sector
4. Commuting
5. Drone
6. Augmented Reality
7. Automated vehicles

Edge Computing is a relatively new paradigm that aims to bring computational power in close proximity of IoT sensors, smartphones and connected technologies. Edge Computing has emerged as a promising technology in recent years with the proliferation of smart IoT applications in autonomous vehicles and other computation-sensitive industrial use cases that require low-latency data processing.

“It has become appallingly obvious that our technology has exceeded our humanity.”

-Albert Einstein



Nerdy Bot - First AI Personal Nerd

Devika Chibber
F.Y.B.Sc.I.T - A



A chatbot (also known as a talkbot, chatterbot, Bot, IM bot, interactive agent, or Artificial Conversational Entity) is a computer program or an artificial intelligence which conducts a conversation via auditory or textual methods. Such programs are often designed to convincingly simulate how a human would behave as a conversational partner.



AI is Changing Education:

AI (Artificial Intelligence) is dynamically disrupting industries one by one. In recent years' technologies have been transforming the educational sphere, with new edtech companies bringing innovations to the table. Chatbot abundance is justified: this qualitatively new UX is about convenience, swiftness, and maximum personalization. Speaking about personalization — the convergence of chatbots and tutoring can finally place the learning process on the right track.

About Nerdy Bot:

Nerdy Bot is a smart Facebook Messenger bot powered by AI, officially launched on May 20, 2017 by Nerlify. The company is based in San Francisco, California. Nerdy Bot offers college and university students

personalized AI help on various academic related tasks. Nerdy Bot is aimed at getting people to "stop Googling."

Nerdy bot - a combination of AI and Human Personal Assistant, designed by Nerlify to quickly tackle any college-related tasks homework. It has beaten every single bot to become Product Hunt's top Messenger bot of this year.



Why Nerdy Bot?

Being a study assistant and a converter bot, Nerdy Bot will answer any homework-related questions. The whole idea behind this is to give students a 'friend' who is always available to help them with studies. Used largely by students, Nerdy Bot is accessed via Facebook Messenger and provides answers to the user's questions without having to use search engines.

Communication with Nerdy Bot is always simple, smart, and natural – like you are talking to a real human. In the case of a complex assignment, which requires extensive research or calculations, a chatbot offers students an opportunity to find a qualified tutor to handle their tasks. All in all, Nerdy Bot is able to deal with a number of college subjects from history and literature to physics and mathematics.

Technology used in Nerdy Bot:

Nerdy Bot is a smart Facebook Messenger bot that is powered by a combination of AI and Human Personal Assistants. Nerdy Bot uses machine learning technology and NLP engines to address any academic task. Unlike other bots, communication with Nerdy Bot is seamless and natural. This is achieved through the use of open source and proprietary NLP engines which enable Nerdy Bot to easily recognize students' questions. The AI component of Nerdy Bot is excellent at looking up information about works of art, balancing chemical equations, getting definitions, checking historical events and dates, discovering any place in the world, getting familiar with famous people of current and past times, and being your online "buddy" whom you can tell anything, anytime.

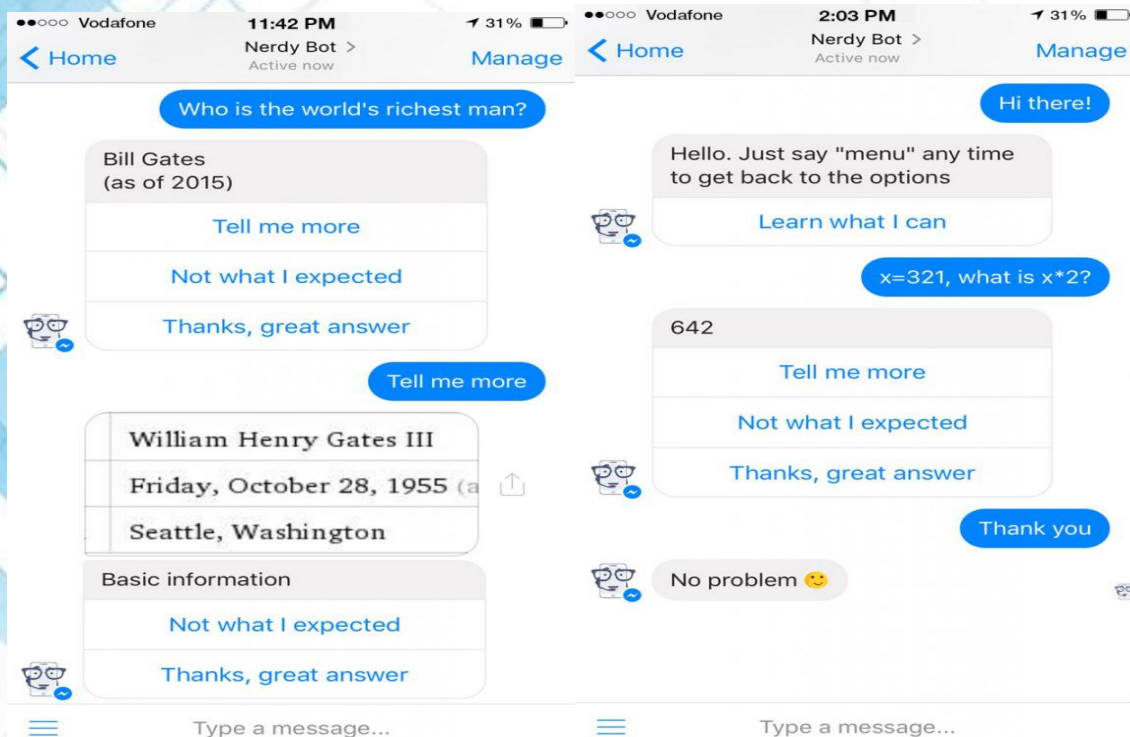
Nerdy Bot relies on AI to quickly answer simple questions and refers to Human assistance to deal with advanced requests.

Say “Hello” to Nerdy Bot:

To get started, message a chatbot on Facebook by typing your question. When you ask a question, Nerdy Bot generates a brief answer for you. You can evaluate the accuracy of the response by saying “Not what I expected” or “Thanks, great answer”. The menu button allows these choices:

- Learn what I can
- Ask a question
- Subscription
- Contact the team

The image displays two screenshots of a mobile chat interface with Nerdy Bot. The left screenshot, taken at 9:11 AM, shows a user asking for a plot of $f(x) = x^3/2$. The bot responds with a graph and a menu with options: "Share the bot!", "Not what I expected", and "Thanks, great answer". The right screenshot, taken at 1:12 PM, shows a user saying "Hey". The bot responds with "Hello. Just say 'menu' any time to get back to the options" and a menu with options: "Learn what I can", "What's flabbergasted?", "Tell me more", "Not what I expected", and "Thanks, great answer".



Nerdy Bot offers college and university students personalized AI help on various academic-related tasks. Alex Pokatilo, founder at Nerdy Bot, is a firm believer in personalized learning and use of AI in education. There is no sign-up for using this service and Nerdy does not need to access your contacts, which is nice in an age where most apps or services attempt to scrape every last bit of information from customers. Unlike other bots, communication with Nerdy Bot is seamless and natural.

About Nerdify:

Nerdify is an educational online company based in San Francisco, California, that offers college and university students personalized help on various academic-related tasks. Nerdify connects students and personal assistants (usually referred to as “Nerds”) to fulfill student’s requests, provide digital goods and services. Personal assistants deal with all kinds of student requests including, but not limited to, proofreading, delivering books, and tutoring. Nerdify is a firm believer in personalized learning and use of AI in education. Founded in 2015, Nerdify’s mission is to help students throughout college years and ease the flow of first-hand knowledge between peers.

Conclusion:

From my perspective, chatbots or smart assistants with artificial intelligence. There is a wide range of chatbot building platforms that are available for various enterprises, such as e-commerce, retail, banking, leisure, travel, healthcare, and so on.

Chatbots can reach out to a large audience on messaging apps and be more effective than humans. They may develop into a capable information-gathering tool in the near future.

Computers are useless. They can only give you answers.

- Pablo Picasso

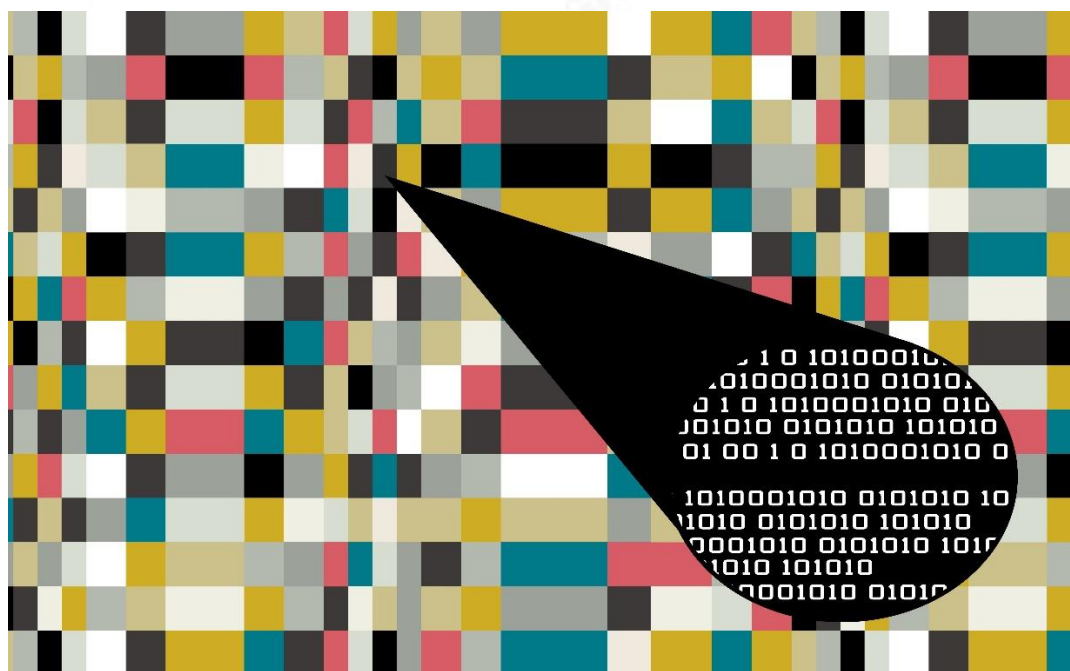


Steganography

IAN D`Souza
F.Y.B.Sc.I.T - B



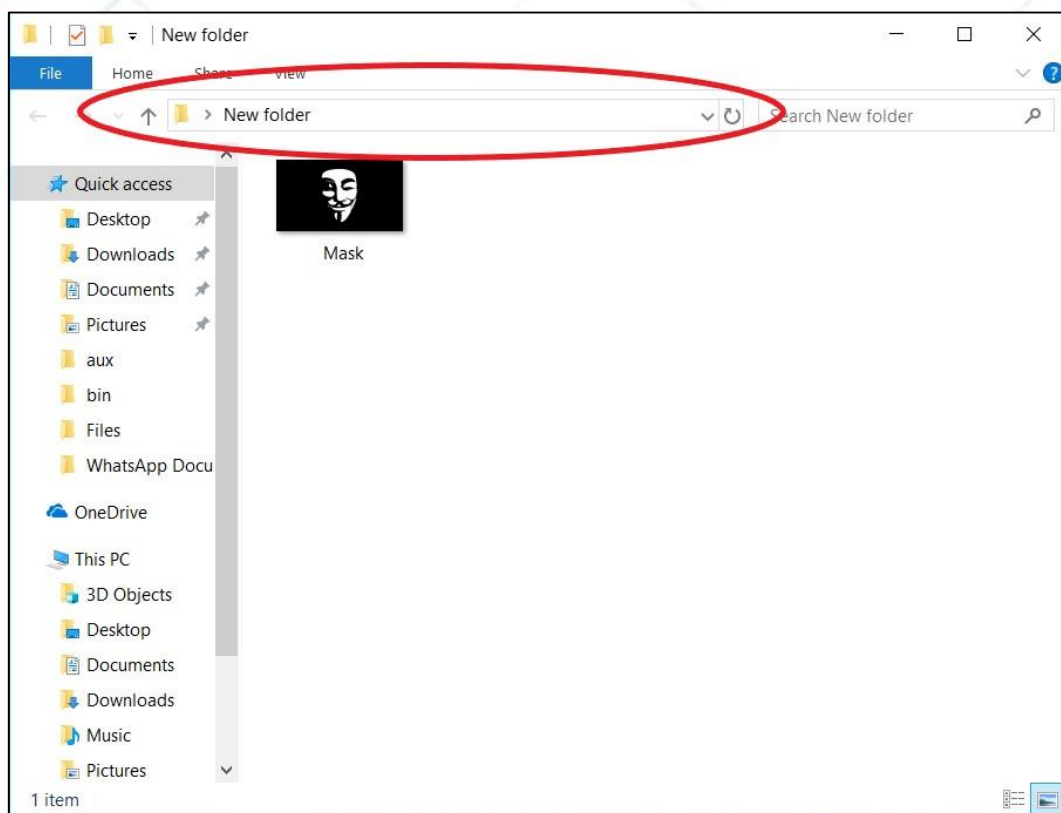
Privacy is one of the most major issues in the field of IT today. But, to be honest it's like a myth in today's time. Everything you do on your computer, phones or even your calls are somewhere looked upon by someone. Text messages were accessible by anyone who had the ability to trace them. For this, many ways were adapted so as to increase privacy to the maximum allowing you to communicate directly with the person you want to without any kind of intervention or a man in the middle. One way to achieve this was encryption. But, soon it was realized that even encrypted messages could be decrypted and read without much effort. It is now that encryption techniques have become much better. But otherwise, another way to achieve privacy was steganography. Now, what does it mean. Basically, it's hiding some important message or file in another normal message or file so that no one even knows about the presence of content. For e.g., Bob wants to give Alice his important bank details but he's scared about someone else reading it. So Bob uses steganography to hide his bank details in a video file.



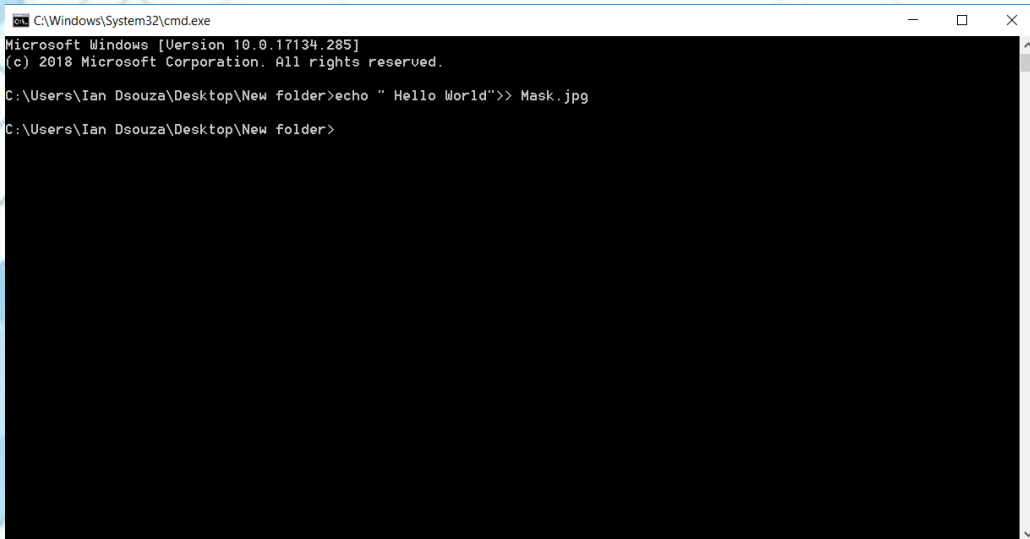
This technique was used since ancient times. Spies in wars used invisible ink to hide text and messages in plain sight. Even Leonardo da Vinci used to hide messages in his paintings. From there it was adapted digitally. It's used by hackers a lot these days to get their messages through to someone. Different kinds of malwares are now hidden behind photos and videos by hackers. Terrorist organizations like the Al-Qaeda used steganography to pass on their messages between their bases. But in today's age where we always have the government and other different entities checking on us, steganography is something that can be useful even for us in our daily lives. So let me show you a simple and basic way to hide your text in an image file using your Command Prompt.

First select the image file. It can work on any size image file.

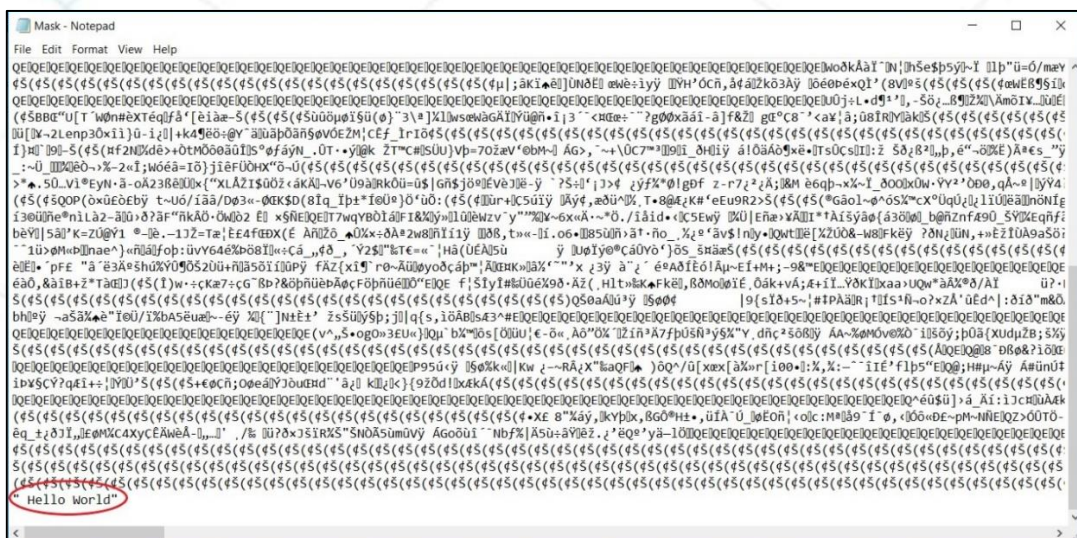
Now, go to the destination of your image file and type 'cmd' in the circled area. This will open your Command Prompt.



Type 'echo' followed your message in double inverted quotes followed by ">>" and then the name of your image file with the extension. Remember that the name of the image file will be case sensitive.



Next, right click on your image file, Open With, Notepad. Scroll to the end of all the gibberish and there you will find the text that you had typed in your command.



And there you can have your own hidden message. The best part about it is that no matter which platform you share your image on, the message stays right there. Online you will even find ways to hide entire folders in pictures and other different kind of files too. In this world where privacy is becoming an issue, methods like these help us to save ourselves from prying eyes.



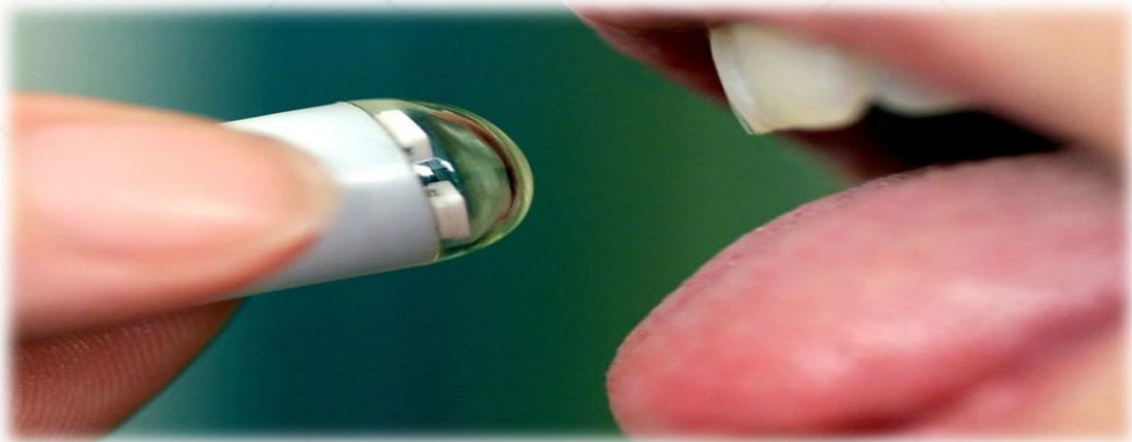
Microelectronic Pill- One of its kind!

Vishal Fernando
S.Y.B.Sc.IT-A



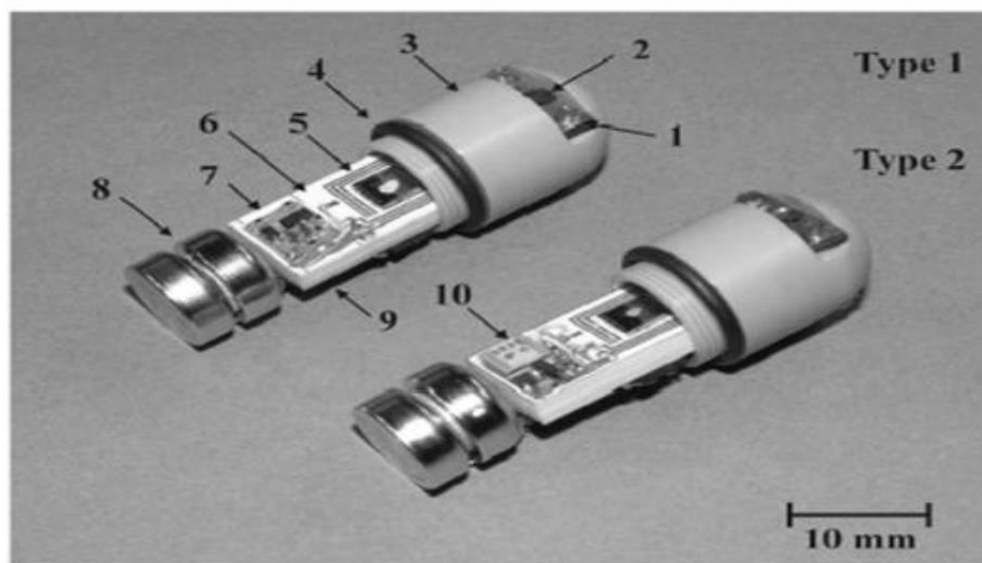
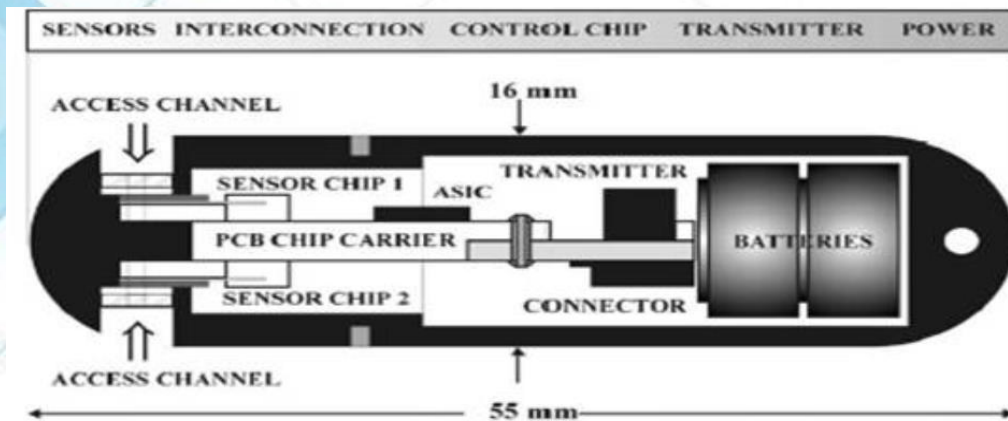
The invention of the traditional transistor enabled the first use of radiometry capsules, which used simple circuits for the internal study of the gastro-intestinal tract. They couldn't be used as they could transmit only from a single channel and also due to the size of the components.

This led to the application of single-channel capsules for the detection of disease and abnormalities in the tract where restricted area prevented the use of endoscopy. They were later modified as they had the disadvantage of using laboratory type sensors. These technologies led to the formation of "MICROELECTRONIC PILL".



It is basically a multichannel sensor used for remote biomedical measurements using micro technology. This is used for the real-time measurement parameters such as temperature, pH, conductivity and dissolved oxygen. The sensors are fabricated using electronic beam.

Microelectronic pill consists of 4 sensors (2) which are mounted on two silicon chips (Chip 1 & 2), a control chip (5), a radio transmitter (STD-type 1-7, type2-crystal type-10) & silver oxide batteries (8). 1-access channel, 3-capsule, 4- rubber ring, 6-PCB chip carrier.



Science and technology revolutionize our lives, but memory, tradition and myth frame our response.

- Arthur Schlesinger



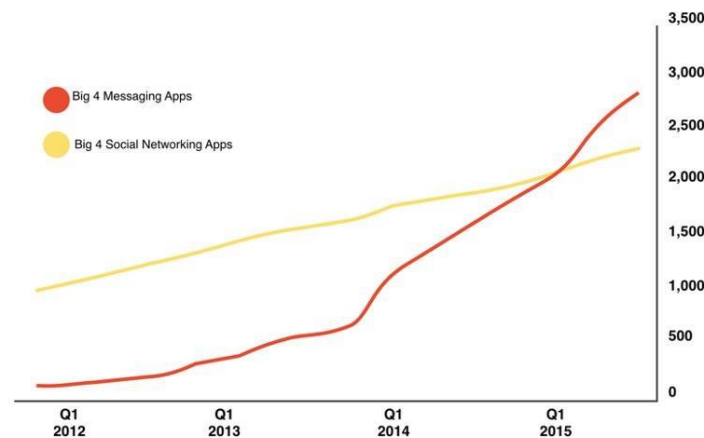
How Bots Will Completely Kill Websites and Mobile Apps

Parvati Rijal
T.Y.B.Sc.IT-B



Every Business Is Going to Have a Bot.

You may not know this, but messaging apps are growing fast. Like, ridiculously fast. Facebook Messenger for example is used by over 1 billion people every month and it is growing faster than Facebook. That is insane.



There are two ways businesses can talk to people on messaging apps. The business sets up something similar to a call center where real people are chatting online all day long. This isn't cost effective and 99% of businesses can never do this. The business uses a computer to talk to everyone. The computer can respond instantly, can communicate with any number of people simultaneously, and it's incredibly cost effective. These computers are called bots. If messaging apps become the #1 way people communicate, and every business needs a strategy to engage with people on messaging apps, and bots are the only scalable way to do this, then every business will eventually have a bot.

Bots Will Be Faster Than Websites and Mobile Apps.

Bots aren't that smart yet. They don't understand everything you are saying, they can't teach themselves, and to be honest right now bots are more similar to lightweight apps than artificially intelligent personalities. But one day we'll get there.

Imagine a world where the experience of talking to a business via a bot is at least just as good as using its website or mobile app. I believe that in this situation people will choose to talk to the bot rather than go to the website or use the mobile app.

Why I think people will choose to talk to the bot:

It can take seconds, or even up to a minute, to load a website. Bots load instantly. As long as two products are comparable in value, people will always use the one that loads fastest

The great myth of our times is that technology is communication.

- Libby Larsen



OPTICAL CAMOUFLAGE

Sheena Shaji
T.Y.B.Sc.IT-A



- Invisibility Cloak.

Optical Camouflage is developed by scientists at the University of Tokyo. It is a kind of camouflage in which one wears a cloth which projects the background so that he appears somehow invisible.

The invisibility cloak renders the human partially invisible, when he/she slips beneath the shining, silvery cloak.

Invisibility Cloak is now a reality.



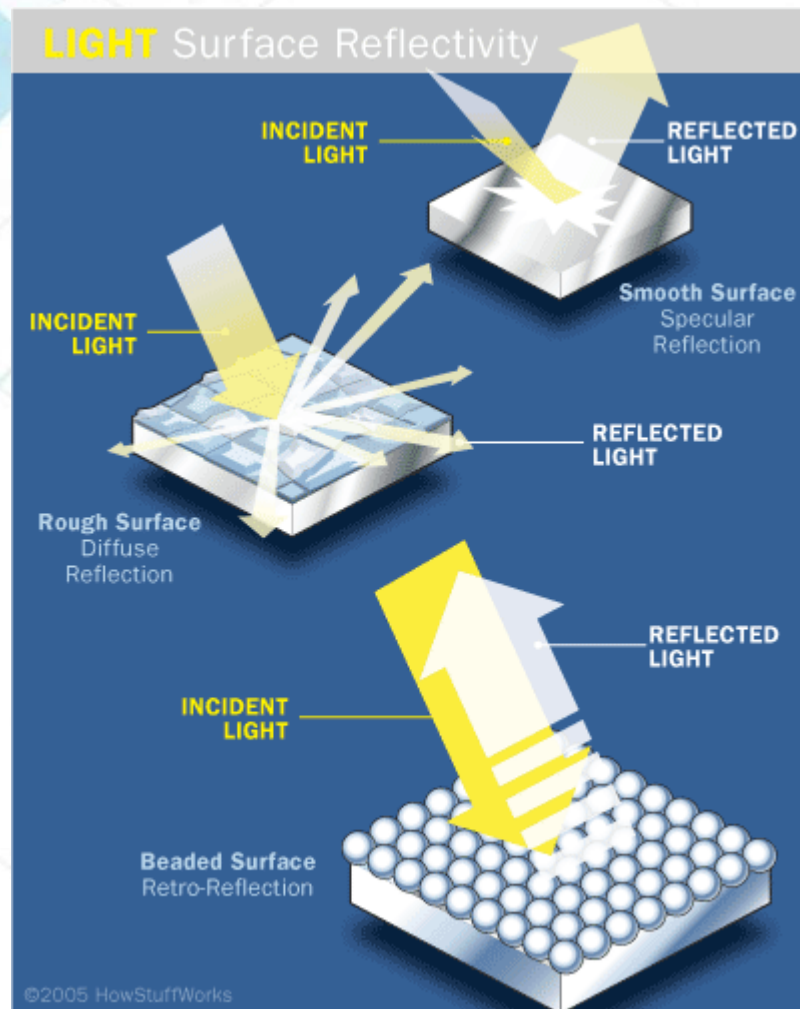
Optical camouflage requires a complicated arrangement.

First, the person who wants to be invisible (Person A) wears the cloak. An observer (Person B) stands before (Person A) at a specific location. At that location, (Person A) appear to be partially invisible to (Person B).

If (Person B) were viewing from a slightly different location, he would simply see (Person A) wearing a cloak.

The cloak that enables optical camouflage to work is made from a special material known as retro-reflective material.

Retro-Reflectivity:



Principle:

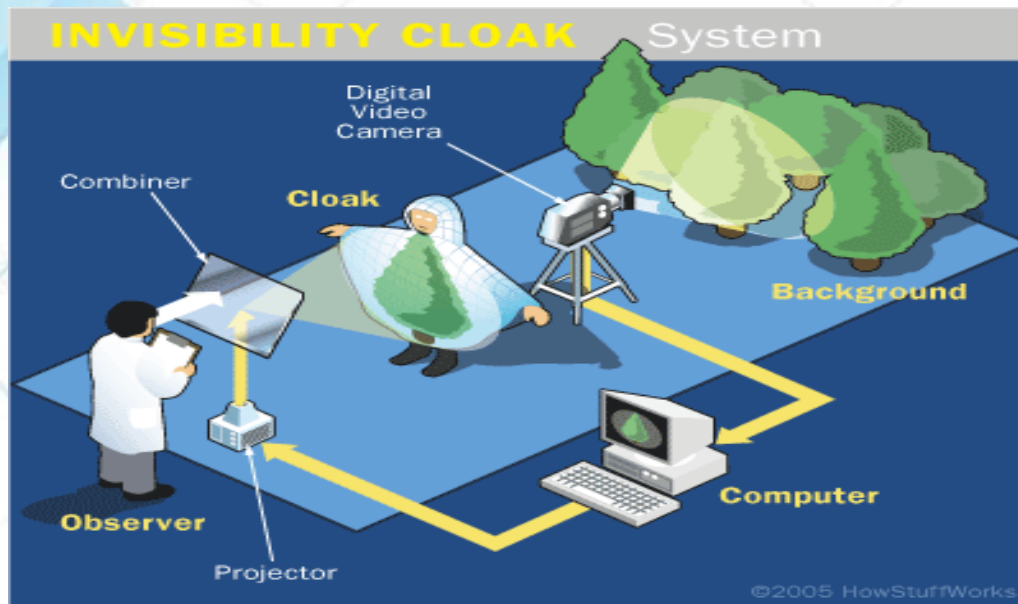
Optical camouflage doesn't work by way of magic. It works by taking advantage of something called augmented-reality technology.

Augmented Reality:

Augmented reality merely tries to supplement real world with additional, helpful content.

Requirements:

- A garment made from highly reflective material
- A video camera
- A computer
- A projector
- A special, half-silvered mirror called a combiner



Video Camera:

Capturing the background image requires a video camera, which sits behind the person wearing the cloak. The video from the camera must be in a digital format so it can be sent to a computer for processing.

Computer:

All augmented-reality systems rely on powerful computers to synthesize graphics and then superimpose them on a real-world image. For optical camouflage, the Computer must take the image from the video camera, calculate the appropriate perspective to simulate reality to be projected onto the retro reflective material.

Projector:

For optical camouflage, the central opening must be the size of a pinhole. This ensures a larger depth of field so that the cloak can be located any distance from the projector.

Combiner:

A special mirror to both reflect the projected image toward the cloak and to let light rays bouncing off the cloak return to the user's eye. This special mirror is called a beam splitter, or a combiner. The combiner allows the user to perceive both the image enhanced by the computer and light from the surrounding world. Combiner is critical because the computer-generated image and the real-world scene must be fully integrated for the illusion of invisibility to seem realistic.

**Real World Applications:**

Pilots landing a plane could use this technology to make cockpit floors transparent. This would enable them to see the runway and the landing gear simply by glancing down.

Doctors performing surgery could use optical camouflage to see through their hands and instruments to the underlying tissue.

Providing a view of the outside in windowless rooms is one of the more fanciful applications of Optical Camouflage.

Drivers backing up cars could benefit one day from optical camouflage. A quick glance backward through a transparent rear would make it easy to know when to stop.

Communications tools don't get socially interesting until they get technologically boring.

- Clay Shirky

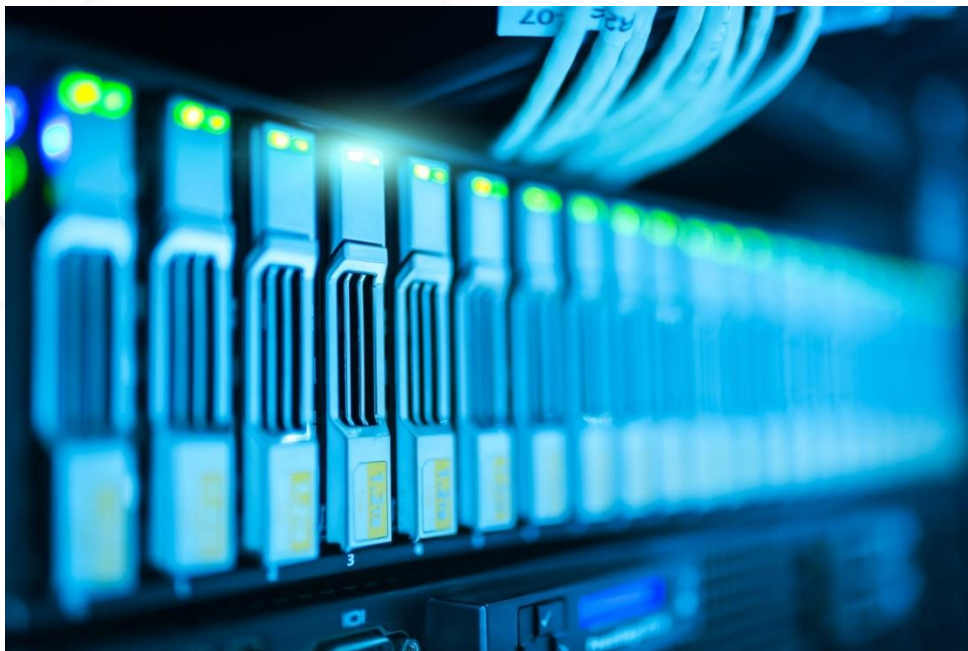


SPINTRONICS

Tanish Kapoor
F.Y.B.Sc.IT-B



It's been quite a while since the binary numbers were invented in 1689. There has been a lot of advancements with time, but these binary codes may need a Replacement, loads of power is used to keep the data up and running, and several bits Change over time and inefficiency.



With progress in the field of quantum mechanics and physics we've found something that can be used to our benefit Electrons, the same old electron from 7th grade. This new technology is known as (Spin Transport Electronics).

In case of binary numbers, when the current is on and electrons are flowing in that case it is 1 and when current is off it represents 0s. In the quantum field electrons have a spin, namely upward spin and onward spin. The upper spin can be used to represent 1s and the lower for 0s. Electrons never lose their spin, they maintain it, so in case of a power cut the

electrons will still have your data intact. Use of these little building blocks of universe has many advantages over the conventional binary number.

It takes less energy to process the data, in binary it's because of flow of electrons we have 1s & 0s. But in spintronic it takes less energy to change the spin of the electrons. Spin of electrons doesn't change, since we find defects in binary data over time it won't happen with electrons. Spin of an electron can easily be determined by help of aluminum Lots of space!

Of course it's just the spin of one individual electron rather than having them move around to represent your data and so we can say our 1 Tb hard drives might have more than 3-4 worth of electrons. That's a lot of glorious stuff about spintronics, but a lot of progress still has to be made, it still is in its stage of infancy.

Science and technology revolutionize our lives, but memory, tradition and myth frame our response.

- Arthur M. Schlesinger



Pop.Up Next – Evolution of the Best

Uma Yashaswinee
F.Y.B.Sc.IT-B



First, Porsche expressed its interest in a flying taxi, and now Audi has partnered with Airbus and Italy Design to bring a self-driving car with flying drone capabilities to life.

The Pop. Up Next is a conceptual unmanned flying electric vehicle that can be used on the Ground as well as through Air. Jointly developed by the German automaker Audi AG, The Airbus Company and ItalDesign Giugiaro, this next generation vehicle is designed to reduce the road traffic congestion. This Project was presented at the Geneva Motor Show 2018.

This Project is the evolution of the first fully automated electric and zero-emission modular system, dedicated to help resolve the traffic congestions. Pop. Up Next reflects the philosophy driving ItalDesign's 50th Anniversary celebrations, foreseeing the future challenges that the next 50 years will bring. Representing a vision of the potentially offered future solutions, the concept of transportation and problems linked to city planning and traffic in large urban cities that are increasing rapidly, is becoming one of the major aspects for safeguarding our planet.



As the 2017 original project, the Pop. Up Next system aims to give time back to commuters, freeing them from the need to drive, through a flexible, shared and adaptive new way of moving within cities, by introducing a new user-focused transportation system concept.

Pop. Up combines the flexibility of a small two seater ground vehicle with the freedom and speed of a vertical take-off and landing (VTOL) air vehicle, thus bridging the automotive and aerospace domains. The core of the product is therefore the Inter modality and making it modular.

The motto of this particular project is “Next is best”. Under this motto, the team is working on the future medium/long-term development of the Pop. Up Next project.

Meet “Pop.Up Next” — latest hybrid car-copter
 After debuting *Pop.Up* last year, Airbus is back at the 88th Geneva International Motor Show with a new version of its modular concept car

GENEVA INTERNATIONAL MOTOR SHOW

SPECIFICATIONS

- Air module**
 Propelled by eight counter-rotating 17kW rotors
Top speed: 100km/h
Range (no payload): 100km
Recharge time: 15 mins
Max gross weight: 600kg
- Passenger capsule**
 High-tech carbon-fibre monocoque carries two people
- Ground module**
 Powered by two rear wheel 30kW motors
Top speed: 100km/h
Range: 130km
Recharge time: 15 mins

4.4m

Aimed at megacities with high traffic congestion, passenger capsule can disconnect from ground module and be flown by air module. It can revert to road vehicle by coupling to another ground module

Zero emission electric propulsion

Coupling system

Battery packs

Artificial Intelligence manages complexities of travel in fully autonomous vehicle. Passengers communicate with Pop.Up via virtual reality interface. Could be integrated into rail transport systems or future hyperloops

Sources: Airbus, Italdesign, Audi, The Verge Pictures: Airbus/Italdesign © GRAPHIC NEWS

Audi’s four rings bestow an element of prestige on future mobility, witnessed by Pop. Up Next, whilst maintaining its own democratic approach through shared usage extended to all those living in the megacities involved. Airbus is strongly committed to the future development of Urban Air Mobility, and believes that it can only be

achieved by collaboration among various transportation sectors. Italdesign will drive this project further in the future, thus confirming more and more its new function as a hub and an incubator for ideas and innovative services for mobility.



Characteristics (updated March, 2018)

Motors8

Self-flying air module dimensions	4403 mm L x 847 mm H x 5000 mm W	14.5 ft L x 2.75 ft H x 16.5 ft W
Rotors	8 (4+4)	
Propeller diameter	1780 mm	~5.75 ft
Motor power	20 kW	
Total power	160 kW	
Self-flying air module range (without payload)	50 km	31 mi
Maximum occupancy/payload	2 passengers	
Top speed	150 km/h	81 kts
Battery	70 kWh	
Charge time (projected)	15 minutes	

Ingolstadt/Geneva, 6 March 2018 – At the Geneva Auto salon from 8 to 18 March, Audi, Italdesign and Airbus are presenting “Pop. Up Next”, an entirely electric, fully automatic concept for horizontal and vertical mobility. In the distant future this vehicle could transport people in cities quickly and conveniently on the road and in the air, at the same time solving traffic problems. The dominant interior feature is a 49-inch screen, while interaction between humans and the machine is performed by speech and face recognition, eye-tracking and a touch function.

Jorg Astolach, CEO of Italdesign sees Pop. Up next as a flexible on-demand concept that could open up mobility in the third dimension to people in cities. Italdesign is making use of a network of cities, universities and various stakeholders in order to better anticipate the future of mobility in cities.

Computers have lots of memory but no imagination.

- Author Unknown



Flexible electronic skin aids human-machine interactions

VAISHNAVI
S.Y.B.Sc.IT-A



Human skin contains sensitive nerve cells that detect pressure, temperature and other sensations that allow tactile interactions with the environment. To help robots and prosthetic devices attain these abilities, scientists are trying to develop electronic skins. Now researchers report a new method in ACS Applied Materials & Interfaces that creates an ultrathin, stretchable electronic skin, which could be used for a variety of human-machine interactions.

Electronic skin could be used for many applications, including prosthetic devices, wearable health monitors, robotics and virtual reality. A major challenge is transferring ultrathin electrical circuits onto complex 3D surfaces and then having the electronics be bendable and stretchable enough to allow movement. Some scientists have developed flexible "electronic tattoos" for this purpose, but their production is typically slow, expensive and requires clean-room fabrication methods such as photolithography. Mahmoud Tavakoli, Carmel Majidi and colleagues wanted to develop a fast, simple and inexpensive method for producing thin-film circuits with integrated microelectronics.



In the new approach, the researchers patterned a circuit template onto a sheet of transfer tattoo paper with an ordinary desktop laser printer. They then coated the template with silver paste, which adhered only to the printed toner ink. On top of the silver paste, the team deposited a gallium-indium liquid metal alloy that increased the electrical conductivity and flexibility of the circuit. Finally, they added external electronics, such as microchips, with a conductive "glue" made of vertically aligned magnetic particles embedded in a polyvinyl alcohol gel. The researchers transferred the electronic tattoo to various objects and demonstrated several applications of the new method, such as controlling a robot prosthetic arm, monitoring human skeletal muscle activity and incorporating proximity sensors into a 3D model of a hand.

Technology has to be invented or adopted.

- Jared Diamond



Earprints to replace the fingerprint?

Vijetha Karrath
FY.Bsc.IT-A



Thought your fingerprint was secure? Think again. Researchers at Michigan State University last year proved it can be hacked using a little more than an inkjet printer.

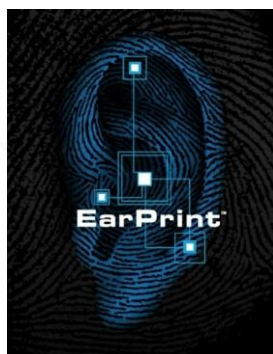
Developed by US-based technology firm Descartes Biometrics, it works like this: Firstly, the user downloads the ERGO software onto their smartphone.

The user lifts the device to the side of their head and presses the center of the touch screen on their ear. A sound is then sent into the ear, and due to the "unique geometry of the ear," the sound that is echoed back is specific to each individual.

ERGO uses sensors embedded in modern Android smartphones, meaning no additional hardware is required.

Authentication takes about one second, and the company says, it improves with use, storing up to ten scans of the user's ear.

Well, security is something we look forward to.



"The precondition to freedom is security."

- Rand Beers



THE PERFECT BABYSITTER

Vijetha Karrath
F.Y.B.Sc.IT-A



“Good morning, did you have a good sleep?” asks the Cocotto. Panasonic's Cocotto social robot for children has been billed as the perfect childcare partner and the perfect babysitter.

The bowling ball-shaped android can tell sleepy children to go to bed, download songs from the cloud to sing to little ones, and help a child's educational development.

Parents instruct the spherical social robot, make it their helper as much as the child's friend.

Oh, and it has some seriously cute facial expressions :)



Sometimes, all you need in life is a cat tail cushion

A headless robotic cat might not sound that therapeutic, but believe us, it is. At CEATEC, the Japanese company unveiled its latest wacky product, the Qoobo "tail therapy" robot. This is essentially a cushion with a realistic cat tail that reacts to stroking and patting, such that it's able to comfort its "owner" like a real pet would simply through tail wagging. The more vigorous the patting, the harder the wagging. To make it more lifelike, it also wags its tail randomly when it is left alone for too long.

The Qoobo has been developed by Japanese firm Yukai Engineering and funded by a Kick Starter campaign.

The Qoobo will launch next June and retail for \$100, with an eight-hour battery life.

"It's a comforting communication that warms your heart the way animals do," say the manufacturers. "Wrap yourself with fuzzy love."



Technology is the campfire around which we tell our stories.

- Laurie Anderson



Cybersecurity

Suneet Bangera
T.Y.B.Sc.IT-B



Need of Cybersecurity in Internet of Things

The Internet of Things has accomplished something genuinely inexplicable. It has enabled us to interface with others in manners we never thought conceivable. With the Internet of Things, everything is connecting, communicating, transmitting, and analyzing.

There is a whole lot of data available on the internet today and since internet is now easily accessible to everyone the data can be easily shared across various platforms. The Internet of Things is something which has emerged a lot and the technology being used is being advanced day by day. There is literally IOT being applied everywhere we see. Be it smart TV's, Smartphones, Smartwatches and a lot more. It's just the matter of fixing a small processing unit inside an object and these objects to be connected to the internet.

Tasks couldn't have been any easier to accomplish. Right from using smart umbrella to a smart car, life has really become very easy after the use of IOT in almost every task. Better organization, better management, everything has become very effortless.

But now the question arises, how safe is it to input all the personal credentials onto a device which is connected to internet all the time. The Internet of things leave us wide open to cyber-attacks. One key downside of having these frameworks always connected to internet is the threat of cyber-attacks. We are defenseless to these attacks because of the framework and the hierarchy it builds for the connection.

So due to the technical advancement in this sector, the number of data access point is just increasing, and this makes up an advantage for the hackers to access these data. Just consider the increase in the use of

smartphones. Every smartphone is a data access point for the hackers to exploit. This isn't including the other gadgets being used which also acts as an access point for malicious hackers.

This doesn't mean to lessen the use of smartphones or other devices, this is certainly inevitable. So, it would be preferable to implement cybersecurity on smartphones for better safety. A company named Sirin Labs have taken a step forward enhanced security for smartphones. These smartphones are now blockchain enabled. A prominent step towards cybersecurity.

SIRIN LABS

Main motive of SIRIN LABS is to bridge the gap between the blockchain economy and the mass market through multi-layered cybersecurity and a much-improved user experience. The SIRIN OS, is the only operating system secure enough for storing and using cryptocurrency in a mobile environment. It is completely developed by SIRIN LABS.

CYBER PROTECTION

- Behavioral based Intrusion Prevention System (IPS)
- Blockchain based, full tampering proof
- Physical security switch (for wallet protection)
- Secured communications (VoIP, text, email)
- Three-Factor authentication: Biometric, Lock Pattern, Behavioral.

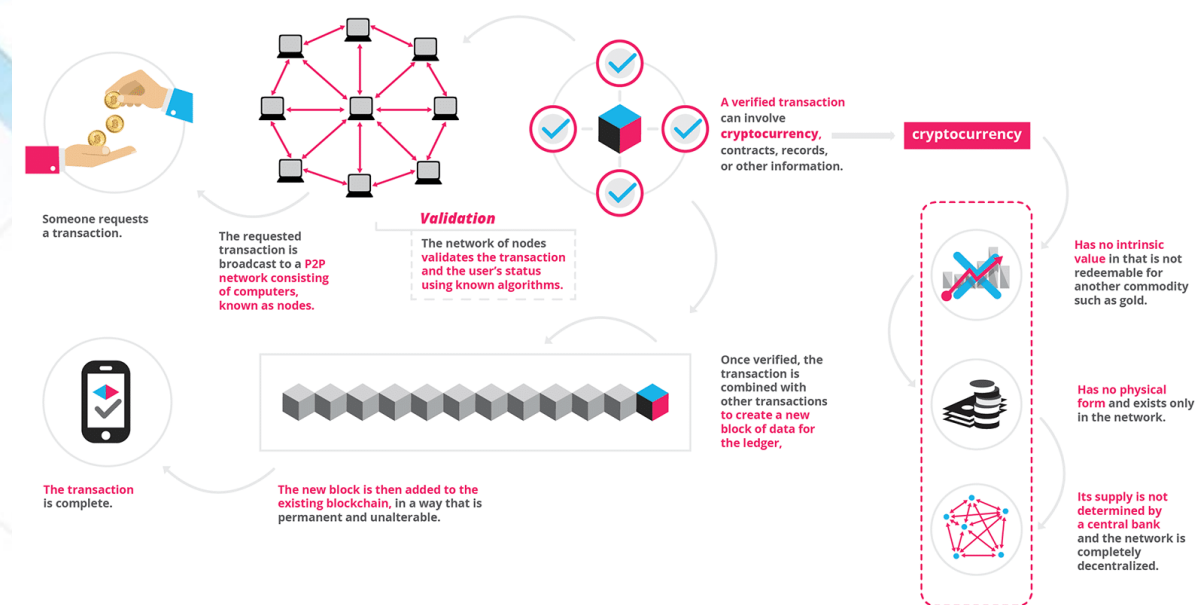
Article by SIRIN LABS

The biggest weakness for all hardware devices is that they all require a 3rd-party device in order to access them. Device manufacturers can create all the safeguards and protections they can think of to protect transactions, the wallet's private key, and ultimately—the currencies stored within, but their security efforts will always be on-top solutions on an unknown 3rd-party device.

The overwhelming majority of people are not cyber-security experts, and probably wouldn't know if their computer was corrupted by a virus or malware. Since the device's security software needs to be installed onto the operating system (as opposed to into the operating system) it is far

from immutable. This makes wallet software a juicy target for hackers since they could gain access to countless wallets and gain control of all the contents through a single piece of malware.

SIRIN LABS' FINNEY smartphone will have an embedded cold storage wallet. What makes this wallet special is that it's the only device that of its kind that will be able to oversee security over all aspects of a transaction. Due to the FINNEY wallet's innate connection to the FINNEY device, there will be no need to connect the FINNEY to any other device.



From the moment FINNEY's Safe Screen is activated, and the cold storage wallet is warmed, SIRIN OS' multi-layered cybersecurity suite will be able to oversee protection of the FINNEY device, the FINNEY wallet, and the transactions themselves.

The unique combination of SIRIN OS' proprietary security protocols and FINNEY's Safe Screen in conjunction with the embedded behavioral intrusion prevention system (IPS) will be able to independently verify that the FINNEY's wallet transactions are being sent to the correct address. This allows the user to verify they're not being tricked by malware or hackers to send their crypto to an unknown 3rd party.

Blockchain

The blockchain is an undeniably ingenious invention – the brainchild of a person or group of people known by the pseudonym, Satoshi Nakamoto. But since then, it has evolved into something greater, and the main question every single person is asking is: What is Blockchain? By allowing digital information to be distributed but not copied, blockchain technology created the backbone of a new type of internet. Originally devised for the digital currency, Bitcoin, (Buy Bitcoin) the tech community is now finding other potential uses for the technology. Bitcoin has been called “digital gold,” and for a good reason. To date, the total value of the currency is close to \$112 billion US. And blockchains can make other types of digital value.

Blockchain technology is like the internet in that it has a built-in robustness. By storing blocks of information that are identical across its network, the blockchain cannot:

- Be controlled by any single entity.
- Has no single point of failure.

Balanced innovations

There are going to be more and more advancement in the technologies but parallelly there are going to be hackers who try to exploit these devices and try to gain access of the data. So accordingly, the liability and the innovations of new technologies or IOT devices must be balanced.

Technology is a word that describes something that doesn't work yet.

– Douglas Adams



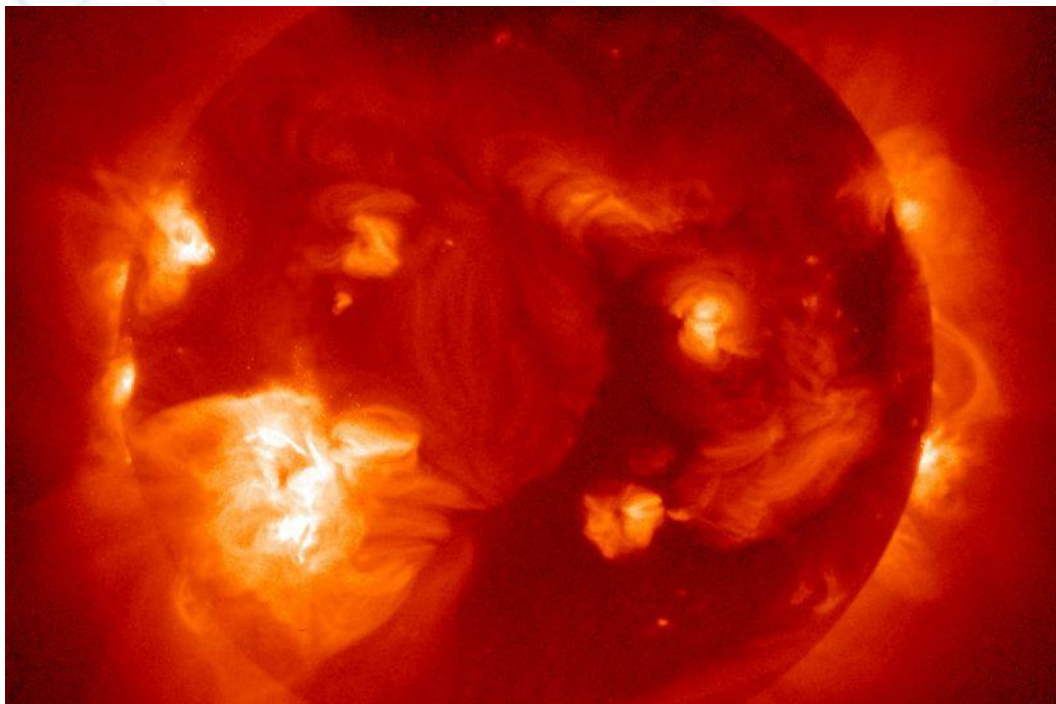
Artificial Sun

Akshay Shetty
.Y.B.Sc.IT-



China is all about the artificial celestial bodies at the moment. Just weeks after we learnt the country was making a fake moon we're learning that its earth-based sun simulator is producing temperatures of 100 million degrees Celsius.

The core of the actual Sun reaches around 15 million degrees Celsius so this artificial sun is considerably hotter. But scientists believe that this is around the minimum temperature needed to create conditions suitable for nuclear fusion.



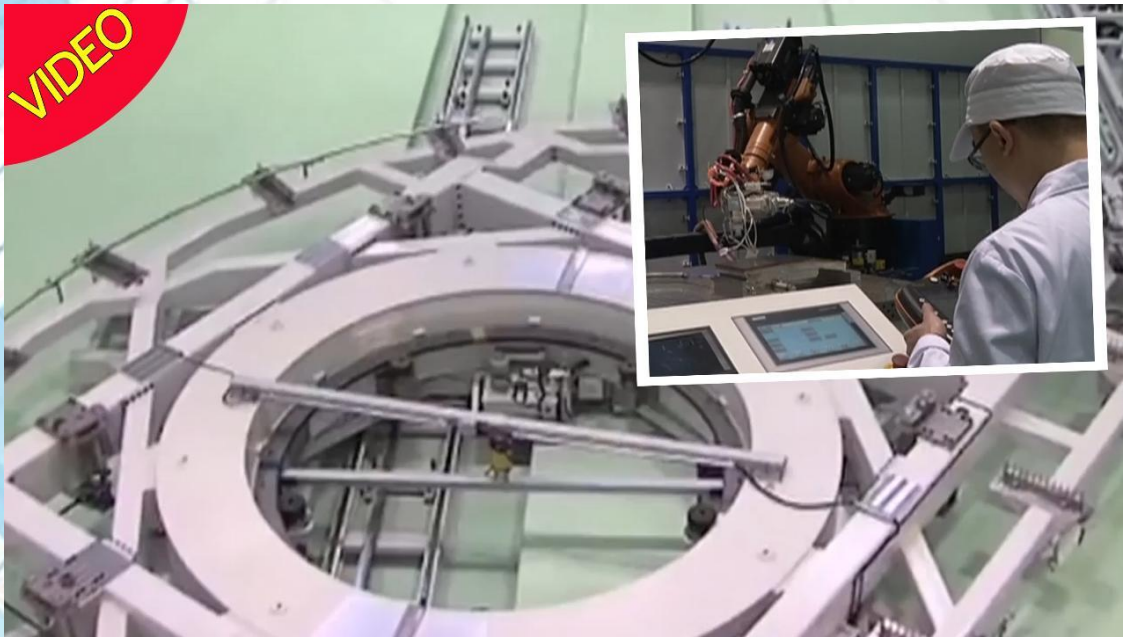
At 100 million degrees Celsius it's possible to force charged deuterium and tritium particles together to get them to fuse. Usually these particles repel each other, making fusion impossible without massive internal temperatures.



Deuterium and tritium are isotopes of hydrogen and there's a plentiful supply available to use. One company Tokamak Energy claims that it's possible to create fusion reactors for power generation by 2030.

The goal of the Experimental Advanced Superconducting Tokamak (EAST) is to understand nuclear fusion and one day use it as an alternative source of power on Earth.





Nuclear fusion could create enormous amounts of power without the risk of a meltdown and with very little dangerous waste creation. Fusion relies on combining two nuclei instead of splitting an atom in the way nuclear fission reactors do.

The difficulties of sustaining a reaction on Earth are considerable. EAST needs to be able to survive the massive temperatures and it needs to do so for extended periods of time to be practical for energy generation.

We are stuck with technology when what we really want is just stuff that works.

– Douglas Adams



What Is Data Privacy? Why Is It Important?

V Sharanya
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What Is Data Privacy?

Data privacy has always been important. It's why people put locks on filing cabinets and rent safety deposit boxes at their banks. But as more of our data becomes digitized, and we share more information online, data privacy is taking on greater importance.

Data privacy relates to how a piece of information—or data—should be handled based on its relative importance. For instance, you likely wouldn't mind sharing your name with a stranger in the process of introducing yourself, but there's other information you wouldn't share, at least not until you become more acquainted with that person. Open a new bank account, though, and you'll probably be asked to share a tremendous amount of personal information, well beyond your name.

In the digital age, we typically apply the concept of data privacy to critical personal information, also known as personally identifiable information (PII) and personal health information (PHI). This can include Social Security numbers, health and medical records, financial data, including bank account and credit card numbers, and even basic, but still sensitive, information, such as full names, addresses and birthdates.

For a business, data privacy goes beyond the PII of its employees and customers. It also includes the information that helps the company operate, whether it's proprietary research and development data or financial information that shows how it's spending and investing its money.

Data Privacy Principles

Cavoukian, the former Information & Privacy Commissioner of Ontario, Canada says, "Privacy forms the basis of our freedom. You have to have

moments of reserve, reflection, intimacy, and solitude.” It is only through the freedom of play and experimentation that innovation and new ideas can emerge.

You don't want to be the company to be described as creepy in the way that you leverage your customer's personal data – whether it is with passive location tracking, apps secretly absorbing your personal address book, or websites recording your every keystroke.

Instead, employees should be regularly trained in security and privacy, so they understand the processes and procedures necessary to also ensure proper collection, sharing, and use of sensitive data.



Why Is It Important?

When data that should be kept private gets in the wrong hands, bad things can happen. A data breach at a government agency can, for example, put top secret information in the hands of an enemy state. A breach at a corporation can put proprietary data in the hands of a competitor. A breach at a school could put students' PII in the hands of criminals who could commit identity theft. A breach at a hospital or doctor's office can put PHI in the hands of those who might misuse it.

Few people care about privacy in their Social Security Numbers for its own sake or because of autonomy or individuality. Nearly every American has been assigned such a string of numbers, which makes the fact perfectly mundane. The numbers themselves are mundane too.

The aim of limits on SSN use is a functional benefit of "privacy": crime control. Keeping identification and account numbers from the general public is analogous to keeping car keys in one's pocket or purse rather than in the ignition. Such measures make it practically more difficult for criminals to steal our cars or access our accounts.

What is DATA PROTECTION?

Data protection is about safeguarding our fundamental right to privacy, which is enshrined in international and regional laws and conventions.

An infographic on a teal background. At the center is a white smartphone with a red shield and a chain-link lock icon. Surrounding it are various icons connected by dashed lines: a thumbs-up, a play button, a document, a gear, a clock, a camera, an envelope, a globe, a speech bubble, and a mail slot.

Few Tips To Protect Personal Data

Since data privacy is such a prevalent issue, many government organizations and corporations spend millions of dollars each year to help protect their data—which could include your PII—from exposure. The average consumer probably doesn't have that kind of money to spend. But there are inexpensive steps you can take to help protect your data. Here are a few suggestions:

- At home, use a mail slot or locking mailbox, so that thieves can't steal your mail.
- Before discarding, shred documents, including receipts and bank and credit card statements, that contain personal information.

- Make sure to secure your home Wi-Fi network and other devices so that criminals can't "eavesdrop" on your online activity.
- Don't automatically provide your Social Security number just because someone asks for it. Determine if they really need it and, if so, ask how they'll help protect it.
- Use strong, unique passwords for all of your online accounts.
- One final recommendation to help you keep your data private: Regularly assess the privacy settings on your social media accounts. If you don't, you may be sharing a lot more than just your name with people you've never met—and a savvy criminal could use that information to steal your identity.



The Facebook and Cambridge Analytical scandal

Cambridge Analytical, the political consulting firm that did work for the Trump campaign and harvested raw data from up to 87 million Facebook profiles, is shutting down.

There is a complicated web of relationships that explains how the Trump campaign, Cambridge Analytical, and Facebook are tied together, as my colleague Andrew Prokop explains in this excellent piece.

Facebook exposed data on up to 87 million Facebook users to a researcher who worked at Cambridge Analytica, which worked for the Trump campaign. Cambridge Analytica was created when Steve Bannon approached conservative megadonors Rebekah and Robert Mercer to fund

a political consulting firm. Bannon became vice president of Cambridge Analytica, and during the 2016 election, he reached out to the Trump campaign to introduce the two sides.

The more important part of this story is how Cambridge Analytica got its data from Facebook.

Zuckerberg is scheduled to appear before a joint hearing of the Senate Judiciary and Commerce committees on Tuesday. It is one of two Capitol Hill appearances for the Facebook founder and CEO this week, with Zuckerberg due to appear before the House Energy and Commerce Committee on Wednesday.

In prepared remarks, Zuckerberg said: "Over the past few weeks, we've been working to understand exactly what happened with Cambridge Analytica and taking steps to make sure this doesn't happen again."

Communications tools don't get socially interesting until they get technologically boring.

– Clay Shirky





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