

BYTESTREAM2019



csipce

INVIGORATING TECHNOLOGY SINCE 2010



Computer Society of India (CSI) is the first and the largest body of computer professionals in India. It was started on 6th March 1965 by a few computer professionals and has now grown to be the national body representing computer professionals. Under the pristine leadership and flawless guidance of Professor Rangaswamy Narasimhan, the first President, CSI has been in close liaison with International Federation for Information Processing (IFIP). CSI was established with a vision to create a platform for the IT professionals to come together and exchanges ideas, views and information. It was built as a non-profit organization and to date, it proudly continues to be one.

Today, CSI has spread across the nation and holds its place in 74 chapters, having above 551 student branches, nearly 220 corporate members and a magnificent number of active and enthusiastic student members with the total approximating to 150000.

PCE

**PILLAI COLLEGE OF
ENGINEERING**

Pillai College of Engineering (PCE) seeks to develop in its students a sound technical foundation and to enhance the natural curiosity of its engineers. We believe that a successful engineer is one who complements his deep theoretical knowledge with an intuitive practical approach. It aims at providing high end educational facilities, opportunities and platform to students as well as the faculty in charge along with keeping in mind the respect for the environment and make them responsible citizens in technological development both from an Indian and global perspective.

Pillai College of Engineering (PCE) was formerly known as Pillai Institute of Information Technology, Engineering, Media Studies and Research (PIIT) from 1999 to 25th April 2016.



Established in 2010 with a small committee of dedicated individuals, **CSI-PCE** has been flourishing tremendously year after year. It is the largest and most active student body in the entire Mumbai chapter, catering to 350 plus members of Pillai College of Engineering alone in the year 2018-19.

Till date, under meticulous and enthusiastic management and organization of will-driven people, this committee has managed to establish itself as a platform for all engineering students to share the most invaluable and priceless possessions of all times, and that is knowledge and experience.

Information Technology is a field of rapid growth. Over the years, CSI-PCE has organized a plethora of workshops and seminars for the enrichment of students who are getting groomed to be a part of the ever expanding and demanding IT industry. Each and every event held under the CSI-PCE banner facilitates the mission over which the prestigious organization of CSI has been founded upon. Apart from conducting advanced sessions on subjects of the engineering curriculum, this committee mainly focuses on providing the members with topics that are currently buzzing in the evolving industry. All the events are conducted by well established and experienced professionals, giving the members of this committee not only an opportunity to learn something new but also a personal touch of interacting first-hand with the speakers.

Bytestream happens to be the most awaited event of CSI-PCE. It is the committee's annual technical magazine's launch which is graced by the presence of renowned industrial tycoons who share their insights with budding engineers of this generation. The magazine itself is a collection of amazing technological articles and interviews of successful industrial personas of the IT sector. CSI-PCE has also managed to introduce out of the box concepts like study circles, apart from Bytestream, for students to showcase and hone their technical abilities among their peers.

With up and coming years, the goal of this committee is to evolve into a versatile platform which benefits and guides the future youth of India in hopes of advancement of the IT industry.



Hon. Dr. K. M. Vasudevan Pillai

Founder & CEO, Mahatma Education Society

Dr. K. M. Vasudevan Pillai is many things to many people, but at his best he is a pioneer, an entrepreneur and a social reformer who believes that education is the only means to large-scale transformation, the only language of change. A belief that saw him venture into areas of little or no development and start schools and colleges against all odds.

We would like to express our immense gratitude for your generous support.

GREETINGS



Dear Campus community,
I am delighted again to send a new message to the readers of **BYTESTREAM**. Students of PCE have reached new levels of achievements. They have won multiple first place in the national level hackathon conducted by All India Council of Technical Education, have reached finals of the state level Avishkar competition and many more. We have nurtured and launched 6 new startups in the past 2 years from our college and hope to launch many more in the years to come.

The magazine **BYTESTREAM** is another platform for our students to shine. It provides our students a new avenue to demonstrate their skills in scientific and technical writing, art as well as administering and publishing a state of the art magazine. Pillai College of Engineering (PCE) has become one of the leading colleges in Mumbai partly due to the talent, dedication and hard work of its students and we, the management wish the magazine and its creators the best of luck for the future.

Regards,

Dr. Priam Pillai

COO of Mahatma Education Society (MES).



CSI PCE has a major contribution in enhancing the skills of students along with concentrating on the regular curriculum. I've myself witnessed a small student body originate and extend to what it is today and I'm extremely gratified with the change. I'm glad that we have such an active and promising student body in our college. Professional bodies help in enhancing an individual and grab opportunities at the right time.

CSI, being one of the most senior association for IT/ Computer professionals has always assured

that the CSI membership tries to fulfil the technical skills that aren't included in the curriculum. I'm happy to know that CSI PCE has their own technical magazine along with the technical activities organised by them. I would like to congratulate the entire team of the success of CSI PCE and I hope they touch new milestones every year.

Warmest Regards,

Dr. Sandeep Joshi

Principal, PCE

The past 9 years of CSI PCE have been a delight to watch and be a part of. In each and every year passing by, the team has done a wonderful job and provided a splendid stage for all the enthusiastic and aspiring students. The team has exceptionally achieved heights and have made sure that they bridge the gap between the industry and campus. My heartiest congratulations to each member of the team who has worked hard to make this magazine an extraordinary one.



With extreme pride and honour, I would like to appreciate the entire team for the success of the launch of their fourth annual magazine. Keep up the hard work and I wish you all the luck for all your future endeavours.

Warmest Regards,

Sharvari Govilkar

HOD, Computer Engineering



We are all proud that CSI-PCE has completed nine years and enriched the students academically . We can humbly claim to have added to the professionalism of the IT industry in these years and will continue to do so in the years ahead. I take this opportunity to congratulate the team of committed students for their commitment towards every event and unstinted efforts put in to ensure that each student is cared for in the college.

I would like to congratulate each and every member of the CSI-PCE committee to successfully launching their fourth Edition of the CSI-PCE's Bytestream Magazine and making it grand one in a true sense.

Warmest Regards,

Satish Kumar Varma

HOD, IT Engineering



It was quite inspiring to watch and witness the potential of students in this committee unfold at various stages and situations each day. Trying and testing times during the hectic semester have elicited our students to put forth their best. The faculty members have always been supportive of the various activities that were undertaken by the students in view of helping them reach the pinnacle of perfection and professionalism in whatever task they took on, thus strengthening our journey of achieving excellence.

Heartiest congratulations to the entire CSI-PCE team and I truly appreciate their efforts for putting their heart and soul into the most auspicious occasion of the ByteStream Magazine Launch.

Warmest Regards,

Varunakshi Bhojane

Student Branch Co-ordinator

Since its foundation in 2010, CSI-PIIT has only conquered new heights year after year to evolve into this strong and powerful committee of CSI-PCE. It is a legacy in the running whose firm belief lies in providing a platform to share knowledge and experience for all inquisitive minds. It gives me utmost pride to present to you our annual magazine Bytestream 2019, which is a culmination of immense hard work, dedication, perseverance, creativity and the never ending support of many.

I would like to heartily thank our Principal, Dr. Sandeep Joshi, for his continued support and encouragement. My extreme gratitude to Prof. Varunakshi Bhojane, our Student Branch Co-ordinator, who has always been with us like a steel backbone and helped CSI-PCE reach at the zenith.

I effusively congratulate our Magazine Team Head, Mr. Gaurav Joshi, Creative Team Head, Mr. Pranay Sharma and their entire team for their commendable work.

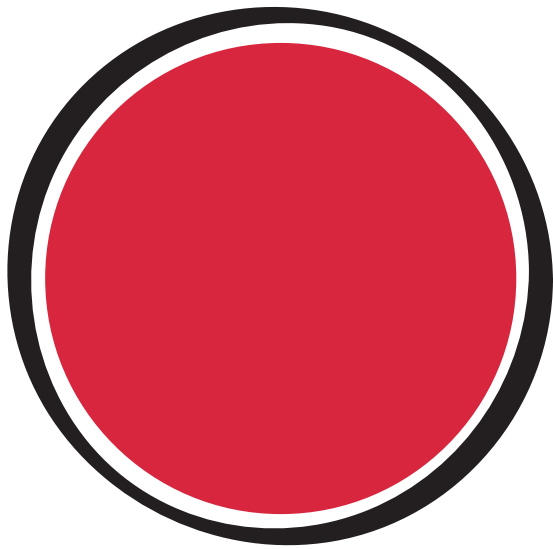
Lastly, I would like to thank every member of our committee who has worked day in and day out to make sure this event endows another stamp of success for CSI-PCE.

Regards,

Bhargavi Acharya

Chairperson





From a small student body to creating its presence in the entire Mumbai Chapter, CSI-PCE has flourished immensely. The diligence and zeal of this team has been our biggest strength. The love of each and every committee member for CSI-PCE holds utmost importance in the success of our magazine launch. Bytestream is what it is because of the support of the team members. More than work, it's the sincerity and respect that we have for our committee. CSI-PCE has blossomed in every sense because of the innovative minds of each and every committee member.

I am extremely grateful to our Student Branch Coordinator, Prof. Varunakshi Bhojane for her conviction and faith in us. CSI PCE in its true sense is a family more than just a committee and this would not have been possible without our team members. I hope that every year our team does something extraordinary and keep the tradition alive.

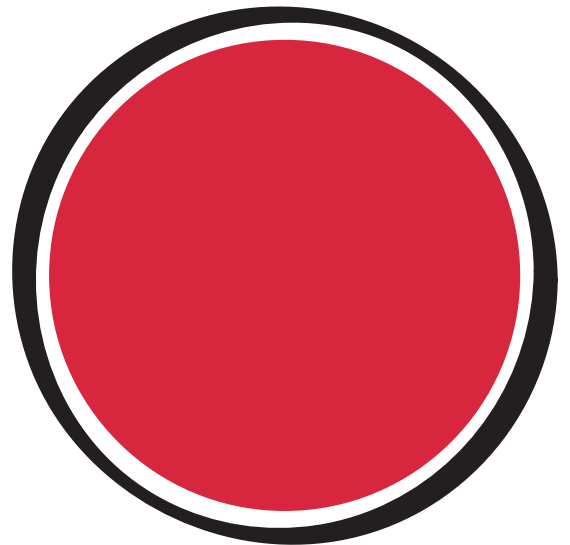
Regards,

Viddhi Rajput

Secretary

With Bytestream 2019, it humbles me to be a part of a process that entails 9 long years of diligence. This is the fourth annual event of CSI-PCE's very own magazine, an idea that has only seen growth since its birth. I graciously welcome the readers to another successful publication of Bytestream.

"You must look within for value, but must look beyond for perspective." ~Denis Waitley



Every technology has its own pros and cons, and one of the biggest debate in this sector today is whether Artificial Intelligence is a boon or a curse. I believe that it all depends on which side of the coin a person chooses to look at, and so, this year's theme 'Perspective' stands for that.

I congratulate our Magazine Team Head Mr. Gaurav Joshi, our Joint Creative Team Head Mr. Vaibhav Adsul and all the team members for believing in this vision. I hope that this legacy continues to shatter the glass ceiling in many more years to come.

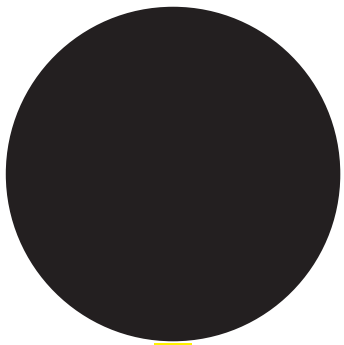
Warm Regards,

Pranay Sharma

Creative Head

EVETIC PDRM

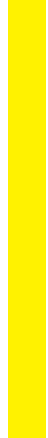




Questionnaire



Google Duplex



Quantum Computer

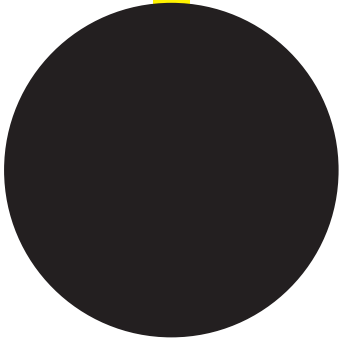
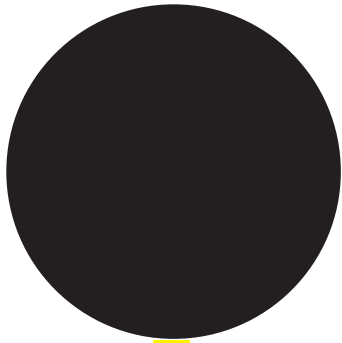
State Of AI



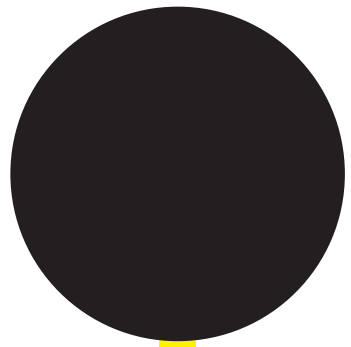
Alpha Go

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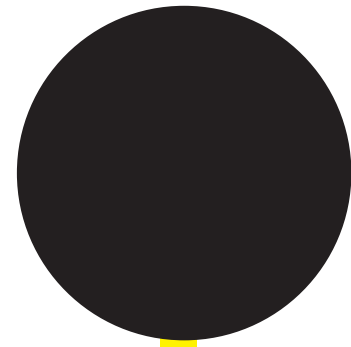


Amazon



**Peek Into the
Future**

**Where to, Sir?
Self Driving Car**



Tech Youtuber

Wishlist





“

AI has the potential to deliver additional global economic activity of around \$13 trillion by 2030.

”



What does the phrase ‘Artificial Intelligence’ signify?

In order to understand what Artificial Intelligence signifies, the term intelligence needs to be comprehended. The ability of acquiring and applying knowledge and skills is termed as Intelligence.

The term Artificial Intelligence, thus can be defined as an ability of a machine to imitate intelligent human behaviour, which can assist humans to carry out the task in a productive form. The most common illustration of AI in today’s world is, presence of Siri in an iPhone, an AI – powered Smartphone, or creation of a humanoid - Sophia Robot – which has completely revolutionized 21st century

What are the objectives that need to be considered while developing an AI system?

The human brain, even though is the most developed organ in the human body, it has its own limitations.

- A.** An AI system which stores data in an organized and efficient manner. This results in an easy and faster access of data.
- B.** Data inconsistency and redundancy can be reduced by designing system which provides error free control.
- C.** Unlike humans, AI – Systems needs to be designed in a manner, which makes it capable of learning by itself.



What are the pre-requisites of building an AI System?

The pre-requisites for an AI System are:

Basic Computer Science:

It include having a knowledge of hardware and software.

Basic / High Level Programming:

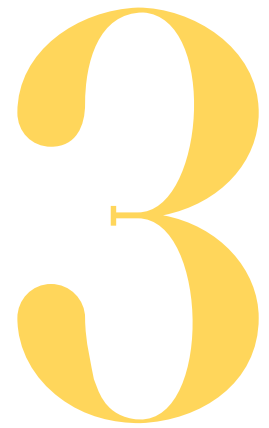
Languages like Python, R, and Perl must be known as they are required in Artificial Intelligence. Python is highly preferred for AI because of its high availability in terms of frameworks and consistent support of community.

Few of the frameworks are:

- TensorFlow
- Scikit-Learn

Mathematics Basics:

Developers must have a basic concepts of Calculus, Probability, Matrices



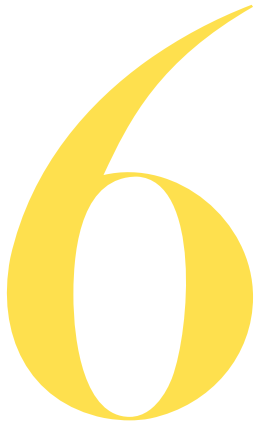
Can the concept of partial answering in humans be incorporated in an AI-system?

As, AI aims to imitate human intelligence, the implementation of partial answering is essential, hence a logic known as the Fuzzy logic has been developed and implemented. Fuzzy logic is defined as a system which produces an acceptable but definite outputs for an incomplete, distorted or inaccurate fuzzy inputs. Fuzzy logic, hence works on the range of possibilities between YES or NO for inputs, to produce a definite output and is generally implemented on hardware or software or combination of both. Even though Fuzzy logic does not give accurate reasoning, it does give an acceptable reasoning hence, used for commercial & practical purposes.

With advancements being made in AI industry, is AI slow poison for humans?

As one of the goals of AI suggests, self-programming, which is a system adapts and grasps the improved skills present in the market. It as such is not dangerous, but when in wrong hands could potentially threaten to destroy every single living being on this planet. For instance, an AI device could be programmed to do something harmful. Autonomous weapons are AI systems which are designed to kill. It is designed for the army. But, if this technology falls in the wrong hands, it could potentially lead to mass casualties.





At present, which country in the world, has the potential to become an AI Superpower?

The contribution China provides currently could soon bestow it with the rank of AI superpower. This is due to its population and hypercompetitive business landscape, which decisively supports China.

Alibaba, Baidu&Tencent, the top 3 leading companies in China with estimates \$1 trillion USD has the resources and the capital for competing with the current US Giants to gain AI Superpower. Largest companies in China using AI for smart technological advancement are :

Alibaba, Baidu and Tencent

These 3 companies not only focus on increasing its profits but they also have an immense impact in the field of AI.

What does 21st century hold for Artificial Intelligence?

From science fiction to reality, AI has grown exponentially and will continue to flourish as it is still in its developing phase. In terms of contributions of AI in 21st century, there are various day to day life examples like Alexa, Siri, Tesla Cars, etc. which have been implemented. The upcoming innovations in AI could for the 21st century to witness could be:

Automated Transmission:

Automated transmission refers to self-driving cars, is something which 21st century could witness.

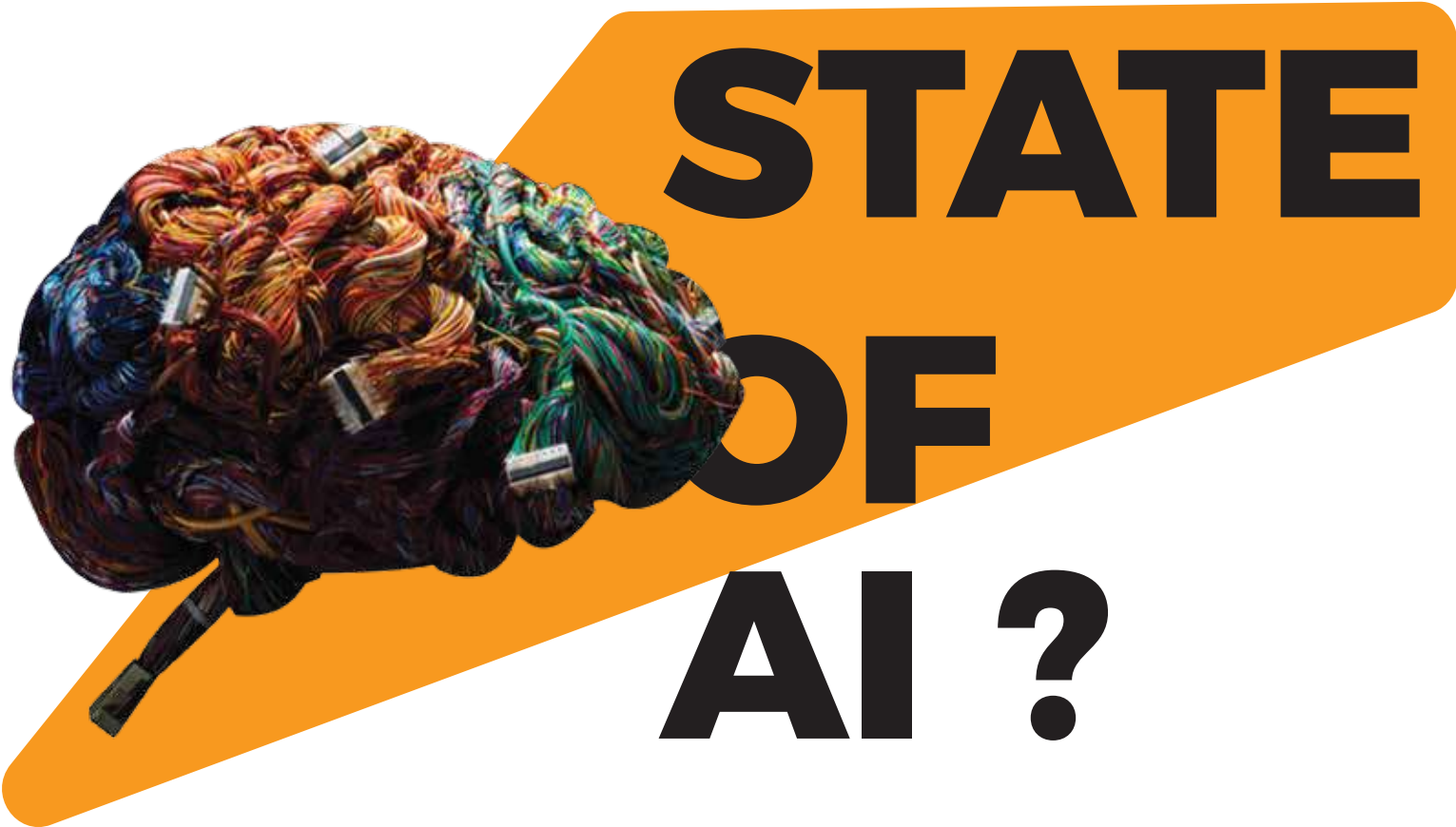
Artificial General Intelligence:

It is the intelligence of a machine that could successfully perform any intellectual task that a human being can.

Even though we are in the initial stages of AI development, but with the tremendous increase in its research, it is quite evident that interaction of humans with AI will soon be an everyday activity.

The more we study about Artificial Intelligence the more clear it becomes with **“Great Power Comes Great Responsibility”**.





From having antenna phones at home to having highly functional, pocket-sized smartphones, we have come a long way in the field of technology. Today, we can have Google assistant spell out the scrambled eggs' recipe for us. It's a real thrill is to explore what's beyond the current version of imagination and cohere to that. Can we have a version of the future where a wise-cracking robot maid 'Irona' from Richie Rich comes to life? Alternatively, maybe have an 'Anywhere door'? Is it indeed possible to fabricate a pristine dimension or a space-age filled with elaborate robotic contraptions, holograms, and whimsical inventions? The hustle is in ideating and actualizing those ideas into reality. Science Fiction familiarized us when we were kids with the concept of artificially intelligent robots. Ever since, we have read stories about Frankenstein or the 'heartless' malware and so much more.

AI commits to having a vast impact on the world than some of the most ubiquitous innovations in history. Leading personalities have broadened realms of Artificial Intelligence by analysing different flavors of AI perspectives. Google's COO, Sundar Pichai describes AI more profound than electricity or fire, while Tesla's boss Elon Musk says AI is more dangerous than North Korea. Famous physicist Stephen Hawking says AI could be the "Worst event in the history of our civilization" whereas Sam Altman likens AI to nuclear fission. So what do AI evaluations entail?

TURING MACHINE

Sir Alan Turing, a man ahead of his time, fosters our motivation with his revolutionary formalization of Ultra Intelligence and invention of Turing Machine, a theoretical construct which is an abstraction of every computer we have today, a simple machine that could compute anything that is computable, and could be modified by reading a program code. This British polymath explored the mathematical possibility of artificial intelligence and suggested that humans use available information as well as reason in order to solve problems and make decisions, so why can't machines do the same thing? Hence, instead of simply executing commands, researchers stored commands and derived intelligence. Today, AI pulls off the most impressive feats like driving, predicting emotions and results, running simulations, curing and detecting malware and so much more.



AI is probably the most important thing humanity has ever worked on.

AI commits to having a vast impact on the world than some of the most ubiquitous innovations in history. Leading personalities have broadened realms of Artificial Intelligence by analysing different flavors of AI perspectives. Google's CEO, Sundar Pichai describes AI more profound than electricity or fire, while Tesla's boss Elon Musk says AI is more dangerous than North Korea. Famous physicist Stephen Hawking says AI could be the "worst event in the history of our civilization" whereas Sam Altman likens AI to nuclear fission. So what do AI evaluations entail?

Google's CEO, Sundar Pichai asserts AI as fire. However, fire kills people, he reiterates. "We have learned to harness fire for the benefits of humanity but we had to overcome its downsides too. So my point is, AI is really important, but we have to be concerned about it."

Pichai said that new AI tools — the backbone of innovations as driverless cars and disease-detecting algorithms — require companies to set ethical guardrails and think through how the technology can be tackled. Google's release in 2015 of its internal machine-learning software, TensorFlow, has helped accelerate the wide-scale development of AI, but it has also been used to automate the creation of lifelike fake videos that have been used for harassment and disinformation. Image processing algorithms are over-trained to detect secret defense bases and military missiles which pose a threat to rival nations.

Andrew Ng describes AI as the new electricity, underpinning the fact that AI will pave a way to revolutionizing industries such as Medicine, Agriculture, Weather Forecast. While the robot/bots have immense computational power, the shortcomings include lack of reasoning and rationality along with robots replacing skilled labor.

**AI is the new
electricity.**



The industrial revolution has been changing since decades and progressive advancements have been made, wherein today we can incorporate augmented reality in artificial intelligence. The sixth sense, driverless cars, homeostasis barometer, the diabetes curatives are some of the newest innovations of today's time. However, technical advancements will seem to flourish which means the industry shall continue to change, thereby changing demands with respect to technology.

Even today, despite the advanced training and computational abilities, the AI poker machine forfeits to mathematical experts and numerologists. The advanced sentiment analysis and sarcasm detection, human analysis supersedes the humanoid evaluations and lastly, critiquing and media strategists deliver a far more critical analogy than machine outcomes.

Hence, we ought to utilize the truest potential while restricting the psychological code and principles put forth so as to extract beneficiaries.

Google



Duplex

Got bored of talking, making appointments or perhaps business related calls? In this era of fast-pace living, the use of machines to do trivial tasks to preserve human efforts, is taking precedence. Google has now succeeded further on its way to eradicating these lines between virtuality and reality by introducing the latest Assistant-Google Duplex. Duplex allows transmissions of two signals simultaneously in opposite directions, irrespective of whether either one is a machine. And that's not just it!

The kernel of Google Duplex is the AI which has reached the apogee in the domain of Natural Processing Language, involving the facets of deep learning, text-to-speech (TTS) systems. In the most recent event of Google I/O 2018, the demo of Google Duplex showed how the



Hi, how can I help?



AI could make calls on your behalf, schedule appointments, or call to check the hours of operation at a business on your command. The demo further showed how the AI was able to understand the contexts and nuances as well, concurrently replying exactly in a human’s voice involving intricate details like breathing, lip sounds and filler words too!

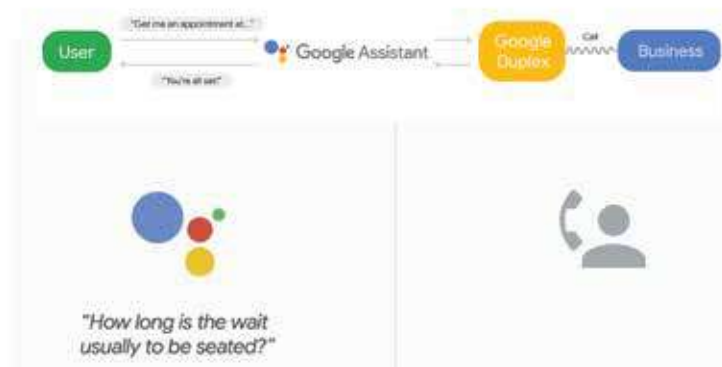
It’s a Deep Neural Network that has been abstracted off WaveNet Technology. WaveNet, created by Google Deepmind in 2016, is a speech synthesis program that works by joining very short units of sound to create speech. Previous virtual assistants had voices that were distinguishable from a live human being. Most of the systems consist of large library of speech fragments, recorded from a single speaker that are then concatenated to produce complete

words and sounds. The result sounds unnatural, with an odd cadence and tone. Thus, WaveNet became a major breakthrough in Natural Speech Synthesis (NSS).

Duplex is another neural network developed one step ahead of WaveNet. The core of Duplex is a Recurrent Neural Network , which mathematically means a massive multiplication matrix function where each part of the matrix is built up of artificial neurons called nodes. Each node contains a mathematical formula and are arranged in layers. Also, each node has an input and output. After receiving the inputs, irrespective of what they may be, the ultimate goal of the entire matrix is basically to find out how to reduce the amount of error, i.e, in a superficial context

meaning the differences in human and machine produced voice. These type of networks have small internal memories that allows to remember specific inputs to filter and understand the context more easily.

The main challenge was to get an AI to robustly understand natural language and reply in a realistic manner since people tend to talk with so many interruptions and different speed. Therefore, Duplex was built using a machine learning platform called TensorFlow Extend(TFX). It was trained on a lot of phone conversations. The conversations start as an analog speech and this speech in the form of audio is fed into Google’s automatic speech recognition. From this point onwards, the speech is understood as text and then converted into an understandable format of the neural network, which is fed into the system. Other metadata and wider context of information from the calls such as the correct time for the appointment, schedule in question, all time of the day is also fed into the system. In conclusion, when the neural network listens to a whole lot of phone recordings as inputs, it eventually learns how to reduce the amount of error it has, denoting that it has better responses to speakers.



The Google Duplex AI demo has already passed the Turing Test and has even outperformed some of the current AI assistants like Alexa, Cortana and Siri.

AI has indeed come a long way, but every light has its shadow. Is reaching something in such close proximity dangerous? There have been numerous claims about how AI having human voices are raising ethical concerns, and that it is deceitful to have an AI talk to someone over phone without their knowledge. Google then made a statement that they are going to be transparent, letting the person on the other end acknowledge that they’re talking to Duplex.

We are now in a new era where even a vague idea may seem possible after much input. Weighing the real time necessities and technological advancements, if it is reasonable to trust these instincts for mild inconveniences is something that only time will answer.



AlphaGo

Almost two decades ago, on 10 February 1996, history was created when the first computer chess playing system created by Deep Blue won against world champion, Garry Kasparov and defeated him in a six-game match. After that, player versus computer became common for the general populace. Now two decades later, a Google algorithm beat the world's best player in the ancient Chinese game of Go. This algorithm was none other than **AlphaGo**.

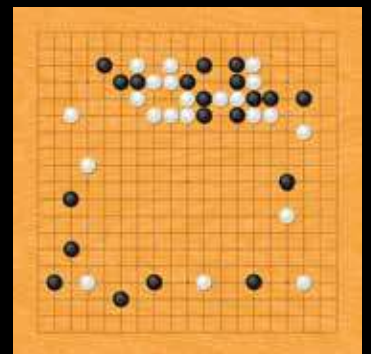
What is AlphaGo?

AlphaGo is an Artificial Intelligence program specialized to play GO. AlphaGo is the first computer program to defeat a professional human Go player, the first program to defeat a Go world champion, and arguably the strongest Go player in history. The first official game was against 19-year-old Ke Jie who, after the match was concluded, declared AlphaGo as the new 'Go God'. This is no ordinary feat as this has fuelled visions for the new era, where AI can be a more active part of the society. Soon artificial intelligence will not only be limited to Siri and Tesla but also be able to tackle complex technical and medical problems as it has now proven to be better than a human in so many cases.

What is Go?

Invented in China more than 2500 years ago, it is an abstract strategy board game, between two players where the aim is to capture more territory than the other. It is believed to be the oldest board game to be played to the present day. The stones are placed on the board-intersections, but if the stone is surrounded by the 'enemy', it is 'captured' and removed.

Despite the simple rules, it was found that Go had a larger scope for playing for long durations. The lower bound on the number of legal board positions in Go has been estimated to be 2×10^{170} . This is one of the reasons why Go was challenging for artificial intelligence because in spite of decades of hard work, the algorithm was only able to play at an amateur level.



The reason why this is a huge deal for the AI experts worldwide is because of its complexity. It requires the ability to learn and relies on 'human-like' instincts and intuition. Despite the thin margin by which it won, Ke declared that he never wanted to be subjected to such a horrible experience again, while a year ago he had proclaimed that he would never lose to artificial intelligence.

After the victory against Ke Jie, AlphaGo went on to play against several world champions producing surprising and outstanding results. These strategies, clashed with the wisdom and knowledge that were being passed among the generations and now are widely being used by the Go players at different levels. In the course of winning, AlphaGo somehow taught the world completely new knowledge about perhaps the most studied and contemplated game in history.

AlphaGo uses two sets of 'deep neural networks' and has improved drastically since the first match. In the initial stages it had learned playing the game of Go by facing thousands of Go amateurs and professionals. Still it could only play at an amateur level. After that programming the scientists took a new approach, it can be said that it was self-taught, as a result of playing millions of matches against itself. Thus, it became more effective without any external intervention.

But with this the question also arises whether this will have an impact wider than AlphaGo itself? Google has now started shifting its focus from AlphaGo to practical applications with AlphaGo Zero. The minds behind AlphaGo Zero put it most eloquently, "Our results comprehensively demonstrate that a pure reinforcement learning approach is fully feasible, even in the most challenging of domains. Because of its ability to improve and enhance its algorithm and not being trained to work, this could open a whole new branch in the field of AI.

"Currently we use code and marketing algorithms for analysis, but with reinforced algorithm it would completely rule out the need for marketing strategies and provide a targeted direction.

"Machine learning algorithms are very promising in the detection of diseases with the help of eye and skin scans. So many factors are used that humans have a hard time creating a training set. This algorithm will improve the original algorithm and might help us understand the how the diseases are present."

Initially this was just a fascinating game for the developers to beat. Then it was the one to follow a 'realist approach'. Nobody knows how yet, but with the help of this game, we could change the future of AI as we know it.



“

All technology is neutral, it depends how we as a society choose to deploy it. Transformational technology is needed and I believe this will be beneficial to humankind.

-Demis Hassabis
Founder & CEO, DeepMind Technologies



ANKI!

Robots of Mordern World

Artificial Intelligence has paved its way in almost every area but the toy sector in particular is seeing some amazing innovations. Within a short span of time, the number of toy creators bringing AI products has augmented. One such enterprise that has engrossed into this sector is Anki.

Anki is an enterprise which is a concoction of Robotics and Artificial Intelligence and targets to deploy this technology in products for kids. Headquartered in San Francisco, it was found by Boris Sofman, Mark Palatucci and Hanns Tapeiner officially in 2010.

Anki Cozmo

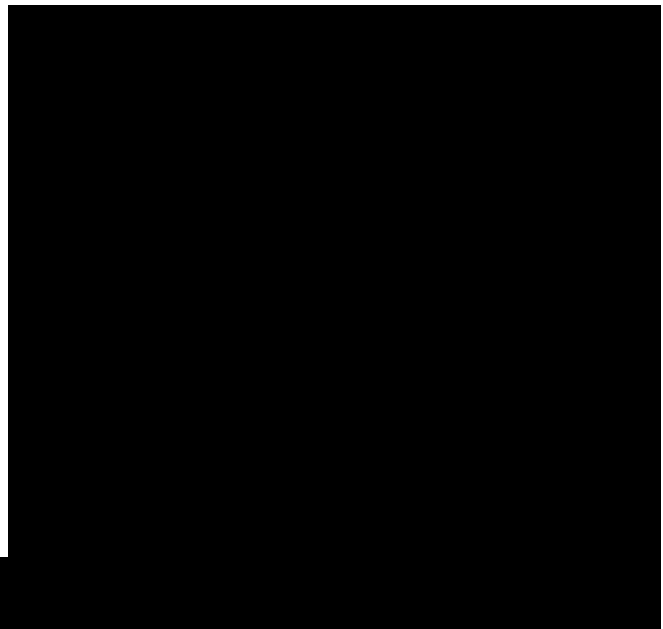
Anki gained real momentum in 2016 when it launched Cozmo, a dinky little robot with a mind of his own. Kids always want someone to frisk with and there could be no better accomplice than Cozmo with a crazy amount of fun. The little tech-bot is a joy to use and comes as a package with a self-aware robot, a charger and 3 interactive cubes.

Cozmo is a small gizmo competent of doing numeral things. It's not just a toy, it's a device that will help its users learn how to code. Confabulating about the

architecture of Cozmo, it has got a little LED on the front; four motors, a charging plate and sensor underneath it and a camera and another sensor in front of its face. The camera is delineated as Cozmo’s eyes with which Cozmo can perceive its environment. Cozmo can roam all around your table without plunging off: sheer intelligence. Cozmo’s eyes depicts its mood. He can even yawn, sneeze violently and shiver. Cozmo is moreover like a super-robot or a super-human conceivably.



Cozmo is software driven and Anki makes sure to keep it updated. It has a wifi of its own which helps one connect to it with his or her smartphone. As a further matter, there’s no data in the cloud, so Cozmo is secure. With advanced robotics, AI and computer vision, Cozmo has a brain proficient of processing more data per second than all Mars rovers combined. It’s nonetheless magnificent to have a pet with substantial amount of intelligence.



Anki Vector

After Cozmo, Anki launched Vector in September 2018 which has dimensions quite similar to that of Cozmo. In fact, Vector can be regarded as Cozmo for grownups. Vector is a home robot primarily designed to assist a person.

Like Cozmo, Vector needs to be tethered to a smartphone to get started. Vector seems to be more intelligent than its predecessor. Cozmo requires the app to pretty much do anything, whereas in case of Vector one needs the app only for customization of eye color, volume, set preferred clock,



time zone and for some basic tutorials. Else, Vector has a mind of his own. It's smart enough to get back to its charger when running low on battery. Vector's AI is randomized and conservative that makes it seem quite lively.

Vector embraces a Qualcomm 200 Platform, HD camera with 120 Ultra Wide FOV, Beamforming Four-Microphone Array, Infrared Laser Scanner, 6-Axis IMU, High-Res Color IPS Display and WiFi connectivity. It is cloud connected and can update automatically. One can actually prattle with Vector and it'll respond via its mic.

Vector is much of a real character who'll get scared, sad, enjoy being petted and will even get angry if one tries to shake or control it. Vector is scared of heights and like Cozmo, it has drop sensors which protects it from falling off. It's a companion which can forecast about weather stipulating it over its OLED screen. The fun part is that Vector won't act like a robot turning out to be monotonous. It will wander around looking for things to do. If it finds a person, it'll act excited and strive to gain attention. Vector had its first major update in December 2018 which allowed it to connect to Alexa. When you say, "Alexa," Vector shakes and a blue square replaces its eyes to let you know Alexa will be responding.

All in all, Vector is a perfect family pet with an intelligence of its own and though moody at times, it is extremely adorable.

Cozmo vs Vector

There's quite little to distinguish between the two bots at an inceptive glance. Apart from their paintjobs, the two endearing bots look very similar but few differences make them individualistic. While Vector is largely an autonomous, app-free bot, Cozmo is reliable on the app for pretty much everything. Cozmo can interact with objects to some extent but Vector seems more lively in this instance. In case of Cozmo there's no built-in microphone, but you can use your phone's microphone to give Cozmo voice commands. Irreconcilably, Vector has 4 built-in mics that makes it responsive to sound. Vector also evinces cliff sensors, something that Cozmo continually proved too much to reckon over. In concern with utility, Cozmo's three cubes juxtaposed to Vector's one is a no-brainer. Vector's companion app is more like a real-time journal, nowhere near the functionality of Cozmo Code Lab. As things stand by, Cozmo gazes to be more satisfactory coding option out of the two bots.

To conclude, it is strenuous to announce which bot among the two has proved worthy. But for time being, Vector seems to be the one we're aching for. However, it would be exhilarating to see the advancements Anki will put forth in the foreseen updates.



AMAZON INDIA



Market Share in India



Million Indian Customers use Amazon

The entirety 21st century is cognizant of the multinational company Amazon. It is a part of almost everyone’s daily life. Ranked one of the finest online stores in the world, Amazon is the world’s largest internet company when it comes to revenue generation but it was not an easy journey. This mammoth organisation is the culmination of jostle, dedication and perseverance in every arena.

Amazon was established in July 1994. Jeff Bezos, the founder of Amazon, originally wanted to give the company the magical sounding name “Cadabra”(as in ABRACADAB-RA), meaning “The Everything Store”.

GLOBAL SALES



Global
Marketplace
11

Countries
180

Statistics

Amazon is the leading e-retailer in the United States with close to **232 billion** U.S. dollars in 2018 net sales. The majority of the company's revenues are generated through e-retail sales of electronics and other products, followed by third-party seller revenues, subscription services and AWS activities.



Active Customers

320 Million

The name was changed when Bezos' lawyer misheard its original name over the phone as "Cadaver". He coined the name Amazon after the world's largest river and also for the fact that the letter "A" would help the company to show up at the top of alphabetical lists. The site was then launched online in 1995.

Amazon started as an online book store in its primal phase. The early employees of Jeff Bezos were expected to work 60 hours a week! The work-life balance didn't exist for these employees. A humorous fact about one of the early employee at Amazon is that he worked meticulously over 8 months, working from early morning to late night. He was so engrossed into his work that he forgot about the blue station wagon that he'd parked near his apartment. He never heeded to read his mail, and when he finally did, for his surprise -he found a handful of parking tickets. Not just that, he had received a notice that his car had been towed, a few warnings from the towing company. There was a final message that his car had been sold at an auction.

Since its existence, Amazon has enhanced and added quality to its business. This evolution would not have been possible without Bezos' sheer dedication. Dissatisfied customers can email Jeff Bezos directly and he'll forward the message along to the right person with one dreaded addition: "?". Each time an employee receives a mail from Bezos, they react to it as if they've discovered a ticking bomb. Such escalations are Bezos' way of ensuring that customers' sentiments are constantly reached to the company.



A brand for a company is like a reputation for a person. You earn reputation by trying to do hard things well.

- Jeff Bezos

This is one of the reasons of Amazon's success today. It reached a next level of triumph in 2007 when it released its very own product "Kindle" - an e-book reader which had a built-in wireless 3G connectivity feature that allows users to download a book within seconds. If we look at the most evolving technology today, Artificial Intelligence has marked its place on the top. And when it comes down to Amazon, after surpassing the entire market, it has managed to add intelligence to it too.

Amazon Web Services, a subsidiary of Amazon, uses the broadest and deepest set of Machine Learning and Artificial Intelligence (AI) services for its business. AWS was launched in July 2002 with

only a few disparate tools and services. Until 2012, AWS was a part of amazon.com. But with increasing profit out of AWS, Bezos described it as a fast growing \$5 billion business. In 2017, AWS comprised of more than 90 services spanning a wide range. Amazon has come a long way ever since its early beginnings in AI and machine learning. The company now sells its machine-learning approach through AWS to clients including NASA and the NFL. The list of high profile companies that use AWS is endless; including Netflix, Expedia, Samsung, Nokia, Adobe, Slack and more.

Have you ever noticed the suggestions or recommended products that Amazon imparts?

They are always to the point and match your necessity too. Wondering how did Amazon know what you're searching for? All credits go to the Machine Learning algorithm that Amazon use in real-time to provide swift and reliable predictions.

Amazon took a leap when it launched its first ever virtual assistant Amazon Alexa. It can also control smart devices using home automation system and even order food using Alexa, and that's absolutely splendid! Alexa uses natural language processing (NLP) which is a domain of AI to carry out its venture.

Amazon has marked its place as one of the world's largest e-commerce store. But the reason why it has reached this far is, it keeps going. It has an extravagant vision and Bezos is not done with surprises yet.

Drone delivery at a point of time sounded quite far-fetched but now it's happening and Amazon has made it possible. One has to wait for a long time in a line at the grocery store. How about a cashier-less store? No, that's not hyperbole. In January 2018, the company opened up its first ever cashier-less Amazon Go convenience store in Seattle to the general public. Amazon, via AWS, is planning to create the planet's first cashier-free department store in partnership with Hyundai in South Korea.



It was revealed in April 2018 about the top-secret project Amazon is working on. Vesta, the AI powered home robot is reported to be the domestic automaton being developed by Amazon Lab126. It is quite distinct from the Amazon Robotics and is aimed to be operated at homes. Vesta is planned to be deployed for testing by the end of 2019 and if all goes well, it might be unzipped in early 2020's.

However, success of these projects aside - the future looks very bright for the puissant company. It will be interesting to see how far Bezos can take this vision of his.

Where to, Sir ?

Self driving cars were a prospect that were in the mind of every engineer ever since the first vehicle was invented. A vehicle that drove itself would revolutionize the entire world and the people who are unable to drive would be benefited. It would make a person independent in a way that is not comprehensible by general public. Perhaps this need to help people was the factor that drove the minds of engineers towards this idea or merely a deep urge to build more, to make something bigger than the rest - something out of the box.

What are self driving cars?

A self-driving car also known as an autonomous car or a driver-less car, that is capable of sensing its environment and navigating without much human input. The experiments on automatic driving cars date back to 1970s and the trials began as early as in 1950s. The first truly automated car was developed in Japan in 1977, where the vehicle tracked white street markers, which were interpreted by two cameras on the vehicle, using an analog computer for signal processing. There were many attempts made to improvise the prototype. The prototypes kept getting better and better until in July 2018 Waymo announced that its test vehicles had travelled in automated mode for over 8,000,000 miles (13,000,000 km), increasing by 1,000,000 miles (1,600,000 kilometers) per month, setting the maximum distance.

But before going into a much detailed discussion, we need to clear out some terms. There is a significant difference between autonomous and autopilot. Autonomous means self-governing. Many historical projects related to vehicle automation have been automated with heavy reliance on artificial aids in their environment, such as magnetic strips. Autonomous control implies satisfactory performance under significant uncertainties in the environment and the ability to compensate for system failures without external intervention, which in this case is the guidance of a human. While in autopilot, a vehicle merely maintains a preset heading.

In 2009, Google started an initiative to make cars that drive themselves under the project name Waymo.

The challenge for driver-less car designers is to produce control systems capable of analyzing sensory data in order to provide accurate detection of other vehicles and the road ahead. Modern self-driving cars generally use Bayesian Simultaneous Localization and Mapping (SLAM) algorithms. This combines the data from multiple sensors and an offline map for current location estimation. Waymo has developed a variant of SLAM with Detection and Tracking of other Moving Objects (DATMO), which also handles obstacles such as cars and pedestrians.



Basically, driver-less cars have to be developed with some sort of machine vision to identify visual objects. Hence, they are being developed with deep neural networks. Though there are plenty of skeptics, many expect self-driving cars to fundamentally change how we get around, and fleet management is one of the hidden challenges that will determine whether autonomous technology succeeds or fails.

Waymo has developed a fleet of taxi for the people to traverse and with the advent of this technology we can also remove the focus from driving the car and spend it on luxury because there is no need for us to face the front of the vehicle anymore. Imagine travelling in a car without worrying about having a driver or the traffic, other drivers and various other factors that may cause bouts of road rage. No need to wake through the night on a road trip, or stop the vehicle to rest for the night and pause the journey, no need to sit stiffly at the wheel and exhaust yourself by driving the vehicle.

Over 80% of the car crashes are caused by driver error. These cars will help provide a lot of accidents as there will no more be 'bad drivers'. Commute times could be reduced drastically. Because of this, speed limits could be increased to reflect safer driving hence shortening the journey time again.

Maybe these cars will turn out to be the luxury we have been waiting for, without even realizing that we required them, for an even better and easier future.

A Peek into the Future

In the realm of computer technology, which technology is reaching the approximation of reality is a huge debate. To begin with, the enigma lies in the purpose each reality serves. Virtual Reality is technology that takes us to an entirely different environment whereas Augmented Reality technology is a culmination of virtual elements brought to us.

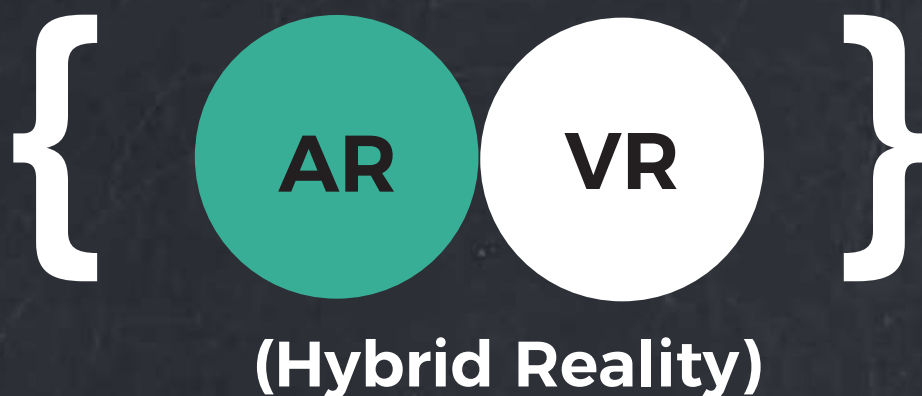
One can claim VR is mental teleportation, i.e., from the perspective of your brain you are somewhere else even if you're standing in a normal room. It's designed to fool your senses and is becoming more powerful with constantly refining user interface.



With the help of a head mounted device, one can reach 500 metres away from the vicinity of Jumanji!

VR has tremendous scope in many domains such as real estate agents and infrastructure development team prior to construction. It is also used by 3D artists and astronauts. In medical domain it's helpful for patients with PTSD and cognitive behavior therapy. It is also largely used for learning, training, maintenance and service purposes.

Augmented Reality, as the term briskly suggests, fits in the virtual component in real time, thereby enhancing reality. Think about Iron Man's armour, marching towards the head gear, the infamous holographic displays and conventional LCD monitors which appeared time to time Or J.A.R.V.I.S., The AI which shot up rockets on one command.



AR is more concerned with the augmentation of reality rather than its complete replacement. Pokémon Go released in 2016 is one of the most widespread and articulate work of AR.

AR is widely introduced in the form of an application software. It is profoundly taking charge of daily necessities, like if you want to know how you would look in some trending patterned jeans and a shiny t-shirt, you could use an AR based app and hopefully avoid a potential fashion disaster.

Furniture tycoons like IKEA have already introduced concept of IKEA Place through which you can virtually place their furniture in your house, office, etc. and see if it suits your taste. It has now become an inevitable sensation, being used in army, air force, navy for training, machine vision, object and gesture recognition. Phlebotomists are using AR to visualize or find the difficult veins by projecting the image on the patient's skin. At historical sites like Pompeii in Italy, AR can project views of ancient civilizations over today's ruins, bringing the past to life.

MISHOR 3D is an app in which driving directions are displayed on the dashboard window. Google translate for language translation, Volkswagen Marta app as service support tablet tool for technicians are also some examples. Google Glass displays information that overlays reality, allowing hands-free control of information.

In a nutshell, VR is just like 3D/4D movies which you catch in the theaters and AR is something which people can use daily, such as your Snapchat filters. But it's not stopping here. Blurring the lines between the physical and digital realms, with the addition of virtual data, comes Mixed Reality. Beautifully showcased in Keiichi Matsuda's short film - 'Hyper Reality' - are the downsides of it being too invasive in the digital world. Yet, research has already began in MR. It will be interesting to see how the webs of reality and virtuality weave with upcoming time.

The theories of quantum computation suggest that every physical object, even the universe, is in some sense a quantum computer.



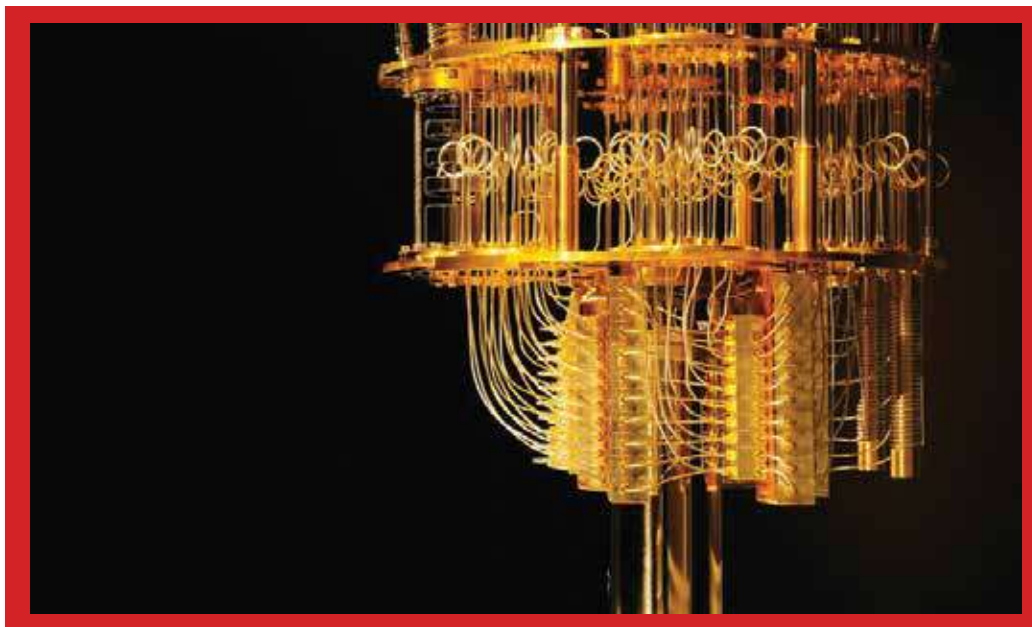
QUANTUM COMPUTING

We have seen a lot of changes and advancements in computing technologies during its revolution from room-sized computers to handheld tablets and smartphones. Now, after over 50 years of advancements in mathematics and material science, computer science has transformed quantum computing from theory to reality. Quantum computing is the area of study focused on developing computer technology based on the principles of quantum theory, which explains the nature and behaviour of energy and matter at the quantum (atomic and subatomic) level.

Common digital computing requires that the data be encoded into binary digits, each of which is always in one of two definite states - 0 or 1. Each piece of information and data gets stored in common computers in binary form but quantum computing uses a combination of both the states - 0 and 1 - or more scientifically it is a superposition of 0 and 1 which is called as Qubit . A Qubit is a short form for 'quantum bit' which has special properties and works on two main principles of quantum physics: superposition and entanglement. A Qubit can exist with some probability of being 0 and some probability of being 1.

IBM researchers wrote in their blog

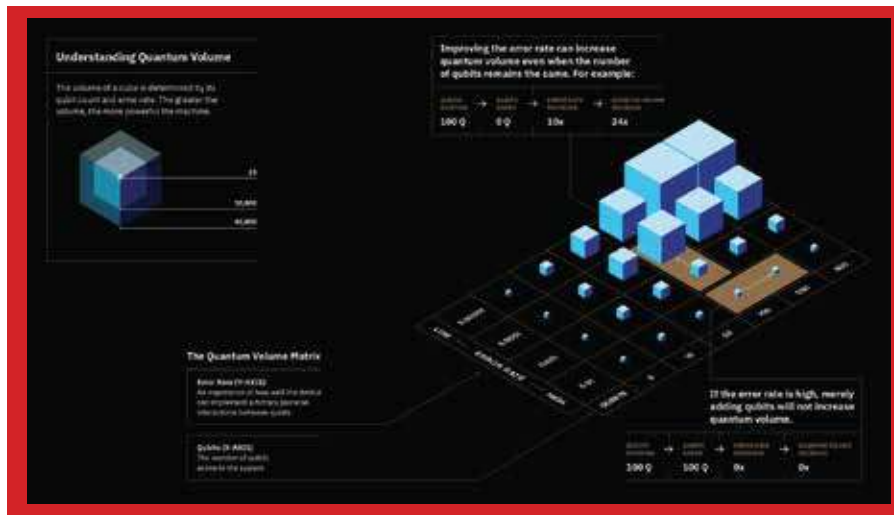
“There are some critical problems that conventional computers cannot solve. For example, a caffeine molecule in a cup of coffee is complex enough that no traditional computer would never be able to crack and understand its detailed structure and properties. This is of the challenges that quantum computers have the potential to tackle”



Advantages or Uses of Quantum Computers

With this facility, new medicines and materials can be discovered through this. It can take artificial intelligence to next level by making machine learning more powerful.

Many research groups are working on quantum communication systems where they allow a sender and receiver to agree on a code without them having met in person. The uncertainty principle is an inescapable property of the quantum world which ensures that if an eavesdropper tries to monitor the signal in transit, it will be disturbed such that the sender and receiver are alerted.



The expected capabilities of quantum computation promises great improvements in the world of cryptography but ironically the same technology also poses current cryptography techniques a potential threat. The implications of Shor's factoring algorithm in the world of cryptography is staggering. The ability to break the RSA coding system can render most channels of communication insecure.

According to Turing's work which says that all computers are functionally equivalent, computers should be able to model every physical process. This in turn suggests that computers will be capable of simulating conscious rational thought. Such theories provoke a minefield of philosophical debate, but on an optimistic approach, maybe the quantum computer will be the key to achieving true artificial intelligence.

Quantum computers are still in infancy. Although the future of quantum computing looks promising, we have only just taken our first steps to actually realising what a quantum computer is. There are many hurdles which we need to overcome before we can even appreciate the benefits it may deliver.



TECH YOUTUBERS

MKBHD (Marques Brownlee)



MKBHD is one of the most well known tech YouTubers who has over 8 million subscribers and he provides quality content at its best. There isn't a video that you leave without learning something new and his camera work and quality is extremely professional. If you want the best quality content in a few minutes per video, be sure to check him out.

Unbox Therapy

Lewis Hilsenteger is a Canadian YouTube tech guru who founded and hosted the channel Unbox Therapy which has earned over 10 million subscribers. He attended the Toronto School of Art where he studied digital arts, photography, and video editing.



Jerry Rig Everything



Zack Nelson is a tech reviewer who is widely known for his JerryRigEverything channel's content. He has gained popularity there for his intricate technology reviews. He is best known for his videos where he checks out durability of gadgets. One of his most popular videos there, "iPhone 7 Scratch test - BEND TEST - Durability video!," has earned more than 10 million views.

Dave2D

Dave Lee is also a Canadian YouTube tech guru who is widely known for his Dave2D channel. He has earned more than 149 million views there for his wide range of tech reviews, comparisons, and advice. He has amassed more than 2 million subscribers to his YouTube channel.



WISHLIST



If creativity is thinking up new things, innovation is actually doing those things. Over the course of ongoing technological revolution, a large number of mind-bending innovations have rocked the world. Here are some of the masterpieces:

MIND BOGGLING INNOVATIONS

Rocket Reusable Notebook

Running out of pages won't be an issue anymore as Rocket Reusable Notebook gives you an eco-friendly edge of reusing your pages. All you need to do is write, draw or simply scribble your content on the dot grid page format which feels absolutely like paper with a Pilot Frixion Pen, inculcating a thermo sensitive ink technology which erases due to friction without damaging the page. This notebook can put an end to deforestation as its pages are constructed from a polyester composite.



Compatible with Rocket Book app, you can simply blast your pages online to your favourite cloud services which are 7 of them embedded at the bottom of each page which just need to be striked off and simply scanned.

It's a notebook that extends to infinity.

PRICE : ₹4000



Tile Mate

Tile Mate has been incorporated with wireless key tracking devices, its light and sleek design being one of the most robust and powerful companion that helps you to find things. It has a two way finding feature with a 88 dB alarm which can be triggered from up to 75 feet. It can easily hook onto your keys or otherwise stick on to the things most prone to get out of your sight.

If you lose your phone, just press the button on the Tile and it will buzz even on silent mode. With the Tile’s global network, any user who comes within the range of your missing object be it a bike or something precarious, the Tile app will immediately alert you of its recent most location.

PRICE : ₹ 3200

Google Pixel Buds

Want to avoid that embarrassing moment in a foreign country where you just can’t understand what the lady at the counter is trying to say? You can now plug in Google Pixel Buds, which apart from all the other cool features strike most for its real time translation of almost 40 different languages. Just tap the buds on the go and the Assistant is at your command providing with daily news, weather and whatsoever. These wireless earbuds project by the Google has access to the Google Assistant, capturing everything from the time you tap to the time you speak which is 100-200 milliseconds. Connected by Bluetooth but using AAC, it has a high fidelity connection. Coming to its unique felt charging case which has a nice soft touch finish to it, it charges the buds in just 10 minutes lasting upto 24 hours and totally fits in your pocket.



PRICE : ₹ 2500



Skydio R1

Relishing the adventurous moments of your trip or rather capturing it on your film strip? Do both at the same time with the fully autonomous flying camera built around the most advanced tracking and navigation system ever. Powered with AI, it maps and interprets the world in real-time, letting it safely avoid obstacles as it films you using 13 cameras to build a 3D map of its surroundings that includes trees, people,

building and many more just launching it via app, and more by tell R1 who or what you want it to follow and you are set.

PRICE : ₹ 150K

Prynt Pocket

Polaroids were a thing before but who would buy a different camera for it now and what if the photo clicked didn't turn out well? Modularity is the new thing! Just attach the Prynt Pocket to your iPhone device and print photos instantly from your phone on the go. Remember the paintings in Harry Potter which came to life? You could bring your photos to life by adding videos into it and unleash it just by scanning over it with the Prynt app in your phone. So much for a Polaroid, right?



PRICE : ₹ 15000



Hexbot

Bringing Doraemon's gadget to reality with Hexbot, an all-in-one versatile robotic arm does it all from writing to engraving your phone cases. The 0.05 mm high precision and maximized speed ensures the ability to complete various projects and its unique drive circuit design completely eliminates the motor noise. The modular design allows you to change the end-effector within a click and thus obtain various functionality. Infact, you can design special module for your application and attach it onto the Hexbot.

PRICE : ₹ 21000

The only limit you can create with Hexbot is your imagination.

Circuit Scribe

Learning about circuits for some of us was quite hard to grasp since after a point there were just too many wires or too many pins and following each wire seemed like a headache. Circuit Scribe changes it all. It's the world's first ballpoint pen that draws electric circuit instantly. It is water-based, non-toxic conductive ink that writes on flexible smooth surfaces like paper. Schematic sketches can become an instant working prototype. The company has also developed a variety of magnetic components that snaps right into your circuit, which are buzzer, eight pin, LED, button, etc. without any hassle of gluing or soldering. At a conventional low cost and high quality, learning is just getting better.



Lorem ipsum

PRICE : ₹ 2000



ANTI Ordinary's A1

Comfort + Safety, now that's a formula for RAD. This A1 beanie is made of non-newtonian material which start off soft in their natural state but upon impact they turn hard as a rock, and then soft again. Yes, it is responsive to stimulus. Coming back to safety standards, this thing has surpassed all the

helmet standards in US and Europe. Keeping in mind that 88% of all snow sports related deaths are due to head injuries, this product has set some great milestones.

PRICE : ₹ 11000

The future indeed seems very promising with innovations like these hitting the market every now and then.

Yes, it might cost a mint but every luxury has a price. And with such cool gadgets at one's disposal, one surely wouldn't regret investing in those.