



THE

TECH DAIGEST

June 2022

Coding Made Easier
Github Copilot and its Might!

When AI Made History,
an Iconic Match of **GO!**

Mind-boggling **Trivia**

How **Virtual Assistants**
Became an Integral
Part of Our Lives

The Supercool
and Superfantastic
Geeky Fictional Talks

Are We Even Close to
AI Shown in **Movies?**

Edition 1

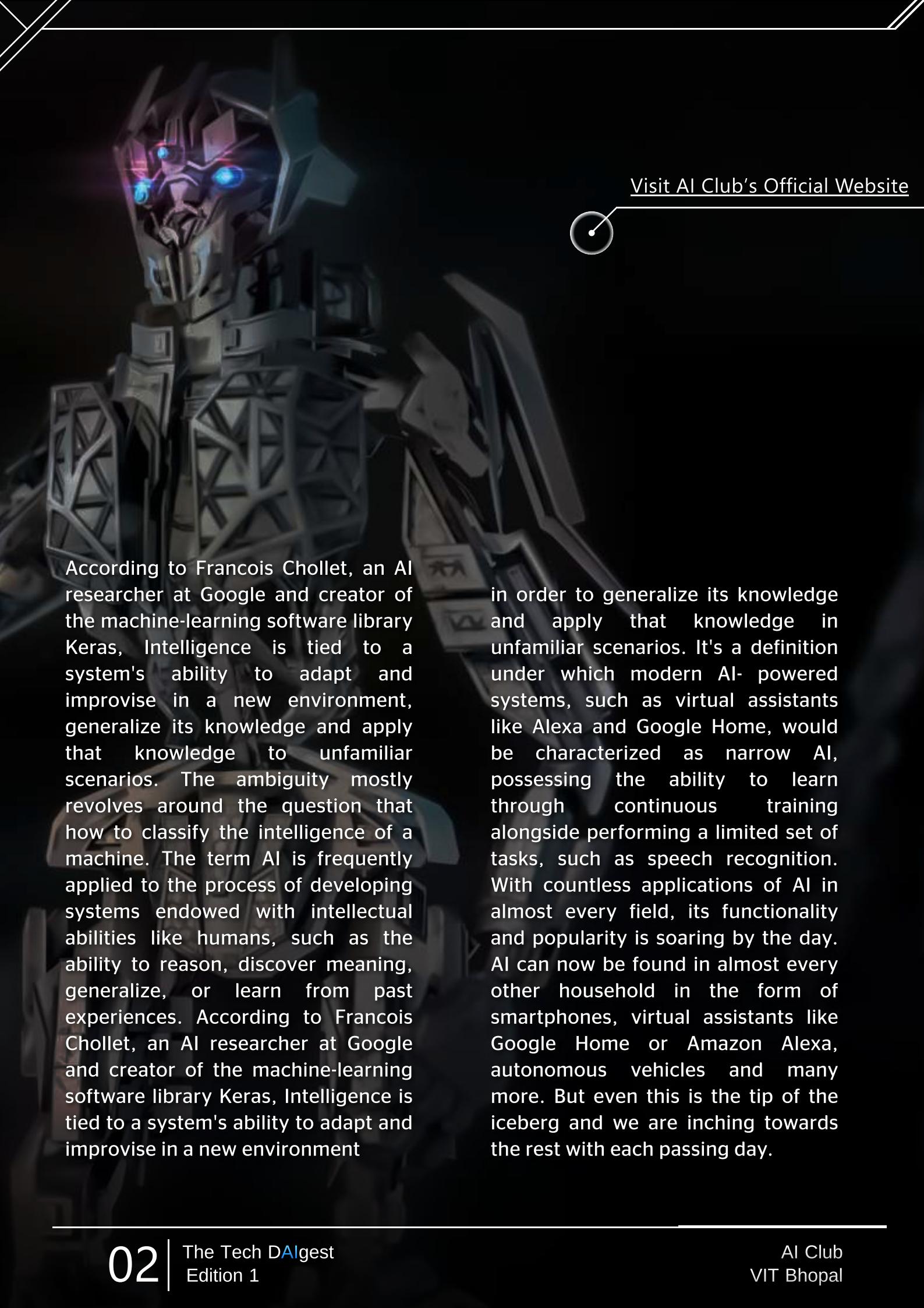
Artificial Intelligence

What do we aspire from mankind's most advanced creation?

by Ravi Raj Sinha

What comes to your mind when you hear the word Artificial Intelligence? Some might think of physical robots like the R2-D2 from Star Wars, or a digital being such as JARVIS from Ironman. Simply put, both of them are AI, or atleast they're a part of multiple domains which falls under the field of AI. It is a domain which is vivid and flexible at the same time. With countless possibilities coupled with real-life applications, AI will be an extremely essential part of a human's life in the near future. But did you ever wonder, "what an AI actually is?" To be blunt, Artificial Intelligence means a man-made software or machine with the abilities to think and perform actions just like humans. Back in the 1950s, the elite brains who dedicated most of their lives in the early development of AI, Minsky and McCarthy, described artificial intelligence as any task performed by a machine that would have previously been considered to require human intelligence. That's obviously a fairly broad definition, hence sometimes we notice arguments over whether something is truly AI or not. The ambiguity mostly revolves around the question that how to classify the intelligence of a machine. The term AI is applied to the process of developing systems endowed with intellectual abilities like humans, such as the ability to reason, discover meaning, generalize, or learn from past experiences.





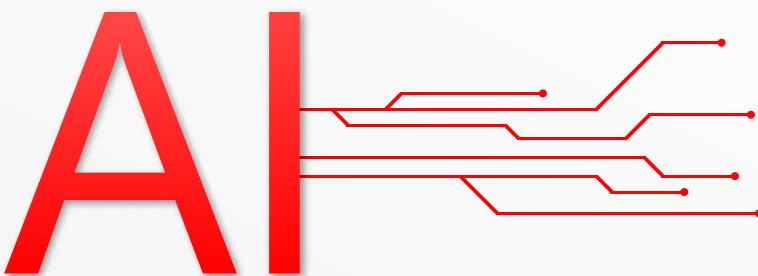
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According to Francois Chollet, an AI researcher at Google and creator of the machine-learning software library Keras, Intelligence is tied to a system's ability to adapt and improvise in a new environment, generalize its knowledge and apply that knowledge to unfamiliar scenarios. The ambiguity mostly revolves around the question that how to classify the intelligence of a machine. The term AI is frequently applied to the process of developing systems endowed with intellectual abilities like humans, such as the ability to reason, discover meaning, generalize, or learn from past experiences. According to Francois Chollet, an AI researcher at Google and creator of the machine-learning software library Keras, Intelligence is tied to a system's ability to adapt and improvise in a new environment

in order to generalize its knowledge and apply that knowledge in unfamiliar scenarios. It's a definition under which modern AI-powered systems, such as virtual assistants like Alexa and Google Home, would be characterized as narrow AI, possessing the ability to learn through continuous training alongside performing a limited set of tasks, such as speech recognition. With countless applications of AI in almost every field, its functionality and popularity is soaring by the day. AI can now be found in almost every other household in the form of smartphones, virtual assistants like Google Home or Amazon Alexa, autonomous vehicles and many more. But even this is the tip of the iceberg and we are inching towards the rest with each passing day.

The Origin of AI



by Shivangi Padhy

The branch of computer science which is concerned with the automation of intelligent behavior is Artificial intelligence. Way back from the middle of 20th century till this modern era we live in, we have seen how far humanity has progressed in terms of Technology, and Quality of Life, but it does not end here. In fact, we've just scratched the surface of endless possibilities with the latest developments in the field of AI. Everything changes when the term AI comes into the play. Sometimes the origin story of something great is even greater than we might imagine. Talking about AI, just how did the impression of something like Artificial intelligence came into the mind of our scientists? Wait, you heard it right, an Impression.

In the first half of the 20th century, a movie became the source for the widespread of the concept of Artificial Intelligent Robots. The movie, Wizard of Oz introduced a heartless tin man and continued with the humanoid robot that impersonated Maria of the Metropolis. Movies with AI never gets old! The concept is still as fresh as a breadth of air in movies like the Matrix, the Terminator and the list goes on and on. Let's travel back in time, back

when AI first emerged. Its 1943, We are at Chicago University of Illinois, USA and there are our star scientists, Warren McCulloch, whose expertise lies in neurology & psychology, along with Walter Pitts, whose brilliance lies in mathematics and cyber technology. Both of them combined their knowledge and experience together to publish "The logical calculus of the ideas eminent in nervous activity".

By the 1950s, we had a generation of scientists, mathematicians, and philosophers with the concept of artificial intelligence culturally assimilated in their minds. One such person was Alan Turing, a young British polymath, who explored the mathematical possibility of artificial intelligence. Turing wondered around a question, 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? His curiosity was astounding but development in this field took a much more time than expected due to the fact that in 1950s, computers were very expensive, bulky and were not easily accessible. The cost of leasing a computer ran up to \$200,000 USD per month.

Almost after five years, in 1956, John McCarthy and Marvin Minsky hosted the first AI program. The significance of this event cannot be undermined as it catalyzed the next twenty years of research in this field. The next 30 years were the prime years when AI took its form and fame worldwide. In 1997, IBM's Deep Blue beats the Chess world champion Gary Kasparov. In 2011, IBM Watson wins against human competitors in the game Jeopardy. In 2016, one of the most advanced feats in the field of AI was achieved by Deepmind's AlphaGO, a reinforcement learning based algorithm that managed to beat Lee Sedol, a 9 dan rank GO player with 18 international GO titles (World Champion). Go is a board game which is considered to be

the world's most complex board game and it is several times harder than chess. AlphaGO managed to win 4 out of 5 matches against Lee Sedol in their epic match.

Its 2022 now and AI is everywhere. Most of the times, we don't even notice if we are using AI. For instance, social media applications like Instagram decides your feed using AI algorithms. Applications of AI are limitless. Currently, AI agents are being successfully utilized in pharmaceutical sectors, health sectors, retail marketing, finance, military weapons. AI is still in its development phase and there are many future applications of AI which are not yet being identified, but someday, we will witness AI become an essential part of our lives.

Are we even close to the Artificial Intelligence shown in Movies?



by Sneha Herlekar

Back in the 1950s, a computer scientist named John McCarthy, also known as the Father of AI, coined the term Artificial Intelligence or AI. Therefore, it makes sense to assume that the age of AI began around then. Although back in 1927, it was Fritz Lang, a visionary German filmmaker, who first depicted the idea of intelligent machines and futuristic infrastructure in the sci-fi dystopia 'Metropolis'. This was the first ever film to depict robots as humans.

Following the mind-boggling idea of machines walking and talking like humans, the sci-fi genre developed and films based on the concept of AI emerged. The trend has been increasing ever since then and has now created awareness and interest among viewers about Artificial Intelligence. Who would have thought that the star trek language translator would be a reality in the 21st century? A humanoid robot based on the Metropolis robot, Sofia, is now a reality. It is fair to say that sci-fi movies and series have been an inspiration for innovators and researchers in this modern era. AI also made its fair share of influence on the modern pop culture. As a result, pop culture often portrays sensationalistic and futuristic interpretations of AI, leading to a misunderstanding of its capabilities and applications in real world scenarios. To dispel these misconceptions, one needs to understand the four distinct types of Artificial Intelligence. To dispel these misconceptions, one needs to understand the four distinct types of

Artificial Intelligence. Since AI's primary purpose is to mimic human behavior, it can be divided into four types: Reactive AI, Limited Memory AI, Theory of Mind AI, and Self-Aware AI. The most basic type of AI is reactive AI. Reactive AI simply reads the environment, understands it and based on the data it collects, it predicts what would happen in future. It has no memory of the past and it perceives the world as it is. IBM's Deep Blue, a chess-playing supercomputer, is a great example of a reactive AI.



The next level of AI is called Theory of Mind AI and it is yet to be fully achieved. Building upon the reactive AI, there comes Limited Memory AI which has additional ability to learn from its own past experiences and use that information to improve its predictions of future. Image and pattern recognition are examples of limited memory AI. This type of AI needs to be trained using a lot of data. Since it produces results based on its past experiences, limited memory AI still has certain limitations which are being looked upon by researchers.



Currently, researchers are developing interactive machines that can understand human beings, their needs, and their emotions. Creating such machines not only increases our understanding of Artificial Intelligence, but also helps us better understand human behavior. Self-aware AI is by far the most advanced type of AI. These types of AI are not only capable of recognizing their own emotions, but also other's emotions, and they have a similar level of consciousness and intelligence as humans. Such kind of artificial intelligence only exists in theory as of now. Creating this level of artificial intelligence may take decades or even centuries. AI Researchers are particularly wary of the potential risks of this technology and hence they are taking a very safe approach towards developing such AI. Could AI powered robots take over our

planet like in classic sci-fi movies like The Matrix, Terminator, and I Robot? The answer is NO, or atleast, not yet. We still have a long way to go before the AI we currently possess will be able to function without human input. AI has come a long way since the 1950s and the influence of sci-fi movies and futuristic ideals helped a great deal to shape AI to what it is right now. Nevertheless, the level of AI we currently possess has a long way to go before we can see a real-life Jarvis in action. Somethings never get old, The Matrix Trilogy, Tron legacy, The Terminator, The Transformers, Free Guy, Chappie. Feel Nostalgic yet? I remember how excited I was when I first watched all these sci-fi movies and I bet you were too. In case any of these names sounds unfamiliar, you know what to watch this weekend!





GitHub Copilot

by Sakalya Mitra

GitHub is a very useful platform and is used by the programmer's community for almost a decade now. Starting from Open-Source enthusiasts, all the way up to the experienced industry professionals and tech companies, all have been utilizing the various functionalities that GitHub has to offer. Wondering what GitHub exactly is? GitHub is a git repository hosting service that provides a web-based graphical user interface. It is one of the world's largest coding communities that allows you to showcase your code or project along with bringing it in public exposure, including a wide variety of worldwide programmers and collaborators. You can collaborate with your teammates on projects, work simultaneously on the same code base and efficiently update hosted applications with ease.

Github's latest addition to their plethora of resources includes GitHub Copilot, which is a powerful tool that has changed the dimension of our thinking towards the field of programming. GitHub copilot is an AI which acts as a guide for programmer that helps them write better code. Even though ML automatically completes your programs based on a few lines.

A simple "def Fibonacci(n)" line auto-completes your code for the Fibonacci sequence. Doesn't this sound insane! Well, it has been made possible with this amazing launch.

The GitHub Copilot is powered by the OpenAI Codex, which is the latest AI system developed by OpenAI. GitHub Copilot works on a vast set of frameworks and programming languages but as of now, the latest technical version only works for Python, JavaScript, TypeScript, Ruby and Go.

Are you still wondering how Copilot exactly works? It's quite similar to Machine Learning as it learns from your codes, draws context, and efficiently suggests not only the next lines of code, but also entire functions. It also helps discover possible alternative ways of accomplishing the same task effectively.

The future is approaching us with at a fast pace with such life-changing innovations and bringing revolutionary changes in the AI industry. Staying updated not only makes us informationally richer, but also enhances the possibility to be in constant touch with these vivid technologies, learn from them and use them to our utmost advantage.



Watson



by Yamuna Chelluri

International Business Machines (IBM), also called the Big Blue, is a global computer technology and IT consulting corporation. IBM originated from the collaboration of multiple companies whose agenda was to automate business transactions. Some of the many companies involved in this amalgamation were the first ones to build punched card-based data tabulation machines and time clocks. Over its course of experimentation and innovation, IBM has brought about innumerable new technology and has sold it to corporations across the globe.

David Ferrucci, the mastermind who led the IBM Watson team from its genesis in 2006 to its successful launch in 2011. He envisioned an AI that could speed-up the process of answering questions without having to compromise on the accuracy of the answers.

The first Watson that was built in the labs of IBM was the outcome of the work of more than two dozen scientists. It was a supercomputer of the size of a room, consisting of thousands of processors executing millions of code lines simultaneously.

In a certain study, a contrast was drawn between IBM's first Watson and the human brain. Results showed that the gigantic machine needed more than 85,000 watts of power whereas the human brain operates on just 20 watts. The storage disks of Watson were filled with digitized references, E-books, and Wikipedia articles. The success of IBM Watson pushed the frontiers of science when its "Chess-playing Deep Blue" computer beat the world chess champion Garry Kasparov in 1997. As a matter of fact, the company intended to name this AI computer as "DeepJ!". However, the marketers of the company decided to name the machine after IBM's founder- Thomas Watson Sr. Hence, the name IBM Watson.

IBM Watson's victory at "Jeopardy!"- a TV show that features quiz contests with general knowledge questions, was indeed a transformational success. The reputation of IBM was burnished multifold. It also gave the company a perfect groundwork to innovate further. Subsequently, this AI for business has expanded its horizons manifold. This marvelous Tech giant remains one of the world's leading computer companies and innovators.

The Remarkable Journey of AlphaGO

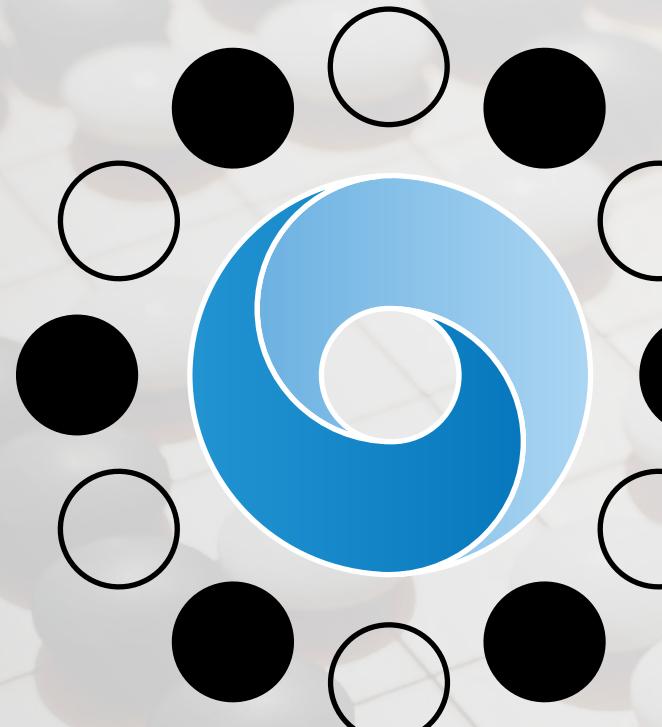
The beginning of Impossible

"There are so many possible application domains where creativity in a different dimension to what humans can do could be immensely valuable to us, and I would just love to have more of those moments where we look back and say, 'Yeah, that was just like move 37. Something beautiful occurred there.'"

- Said the Commentator

GO, also known as Weiqi in China is an abstract strategy board game for two players in which the aim is to surround more territory than the opponent. It is the world's oldest continuously played board game and is one of the four Noble things in Ancient Japan, China and Korea, the other three being music, poetry and painting. A GO player is considered to be very smart and Noble.

"The game of GO is the holy grail of Game playing AI," said Dave Silver, a Lead Researcher at Deepmind Technologies. Over years, people thought making an AI capable of playing GO is extremely hard to create, since everything ever tried in AI just falls apart when it is introduced to GO.



But as history now knows, the team behind AlphaGo was determined to solve this mammoth task of developing AlphaGo, which would later go on and defeat the world champion, Lee Sedol.

Let me walk you through the game of GO. All of us have seen a chess board atleast once in our life, many of us have even played it. It is an 8×8 square board whereas a GO board is comprised of 19×19 gridlines. In the initial position, there are about 20 possible moves available to play in chess, whereas in GO, there are about 200 moves available. In fact, the number of possible configurations on the board of GO is more than the number of atoms present in the universe. The number is so gigantic that maybe we all will fall short of numbers but the configurations would not come to an end.

It's okay to be awestruck by the information provided above. Imagine thinking of developing a technology which can figure out all the possible configurations. That just got to be something that will give our brains a little twirl. Although it seemed like an impossible task to accomplish, AlphaGo was made possible by an overachieving team of artificial intelligence scientists, researchers, engineers and players, who spent countless hours developing and perfecting it. AlphaGo played its first ever GO match against Fan Hui, a 2-Dan Professional, who was a European professional GO Champion from 2013-15. AlphaGo won the game with a score of 5-0. This boosted the team's confidence on the working of AlphaGo. It was even capable of playing a move which had a winning probability of 1 in 10,000.

You must be wondering that how all this became possible? The AlphaGo algorithm is based on Reinforcement learning. Now the question arises what is Reinforcement learning? It is a subdivision of AI domain which has the ability to learn from its own experience.

"I thought AlphaGo was based on probability calculation and that it was merely a machine. But when I saw this move, I changed my mind. Surely, AlphaGo is creative."

- Lee Sedol
(Winner of 18 World GO titles)

For instance, imagine you are playing a game of chess as a 3-year-old. What moves will you probably make? You might lose your king in the 10th move itself but if you practice it for years maybe you might become the next world champion. Learning from own your own gameplay allows you to perfect your gameplay. This is exactly what reinforcement learning is all about. AlphaGo also uses reinforcement learning in addition with Deep Neural Networks, which basically mimics the neurons present in human brain.

The fully trained model of AlphaGo defeated Lee Sedol (9-Dan) World Champion by 4-1. After this very game, AlphaGo became a breakthrough in the field of Artificial Intelligence. The development of AlphaGo was merely a tussle between human ingenuity and machines. AlphaGo's historical victory against Lee Sedol in 2016 is just the beginning. Deepmind later improves upon the original code of AlphaGo and creates the almighty AI known as AlphaZero, whose impact on the world of chess left an imprint which will last forever. Then again, that's a story for another day.



Yea, We Live in the Era of Virtual Assistants

- by Jyotsna Bhatia

Hey Siri, play *As It Was* by Harry Styles. Okay Google, call Mom. Gone are the times when we used to move fingers to perform simpleton tasks like playing music, calling or setting up alarms. Now a voice command can perform the same tasks with ease. AI is already an enormous part of our daily lives, perhaps bigger than several of us realize. We've reached such a stage in our lives where it's a common sight to ask Siri, the definition of artificial intelligence. Pretty ironic right?

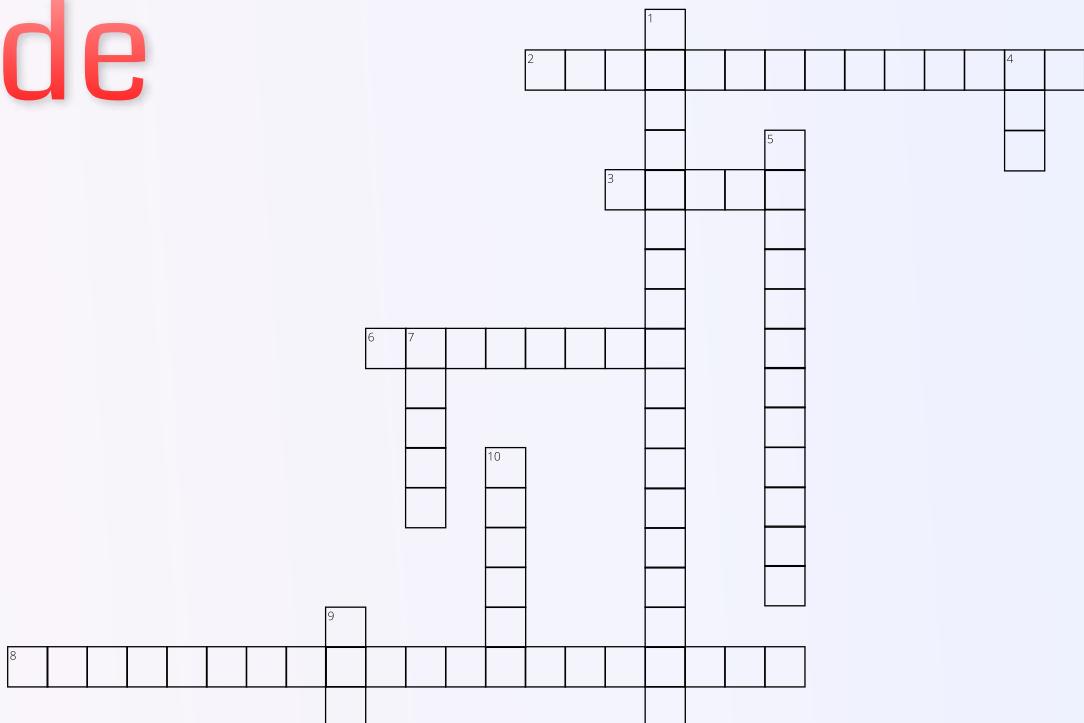
Let's dig up the past, all the way back when the very first virtual assistant emerged. In 1994, IBM launched their new smartphone, IBM Simon, which laid the inspiration for smart virtual assistants as we all know them today. Several years later, the first modern digital virtual assistant installed on a smartphone was Siri, which was introduced with the launch of Apple's iPhone 4S in 2011. Eventually, as the world advanced and technology evolved, Virtual Assistants evolved with the assistance of Artificial Intelligence. Inevitably, virtual assistants now serve as one of the most important bridges between AI and Humans.

A Virtual Assistant can do a wide variety of functions which we can utilize in our daily lives. But when you think of it, to do all those tasks, the assistant must constantly listen to you in order to perform a task as soon as you ask.

Assistant apps or smart speakers are always listening for their wake words. By default, the words Hey Siri / Okay Google / Alexa and so on are the default words and users can also personalize these wake words. Wake words rely on a special algorithm that is always listening for a particular word or phrase. Only after this word is recognized, the assistant will establish a connection to the server and fetch the data needed. This minimizes most of the security and privacy concerns which users have before they engage in a routine interaction with a virtual assistant.



CROSSCODE



Clues

Down

- 1) Type of Machine learning, that uses labelled data in order to train.
- 4) The most basic way to convert a categorical data into numerical data for computation purposes (Only short form)
- 5) A tree and branch-based model used to map decisions and their possible consequences similar to a flow chart
- 7) It is a statistical method in which the variation in a set of observations is divided into distinct components
- 9) The name of the famous movie on the Biopic of Father of AI (Only short form)
- 10) It refers to a method that allows us to apply linear classifiers to nonlinear problems by mapping non-linear data into a higher-dimensional space without the need to visit or understand that higher-dimensional space

Across

- 2) A procedure which aims at avoiding the model to overfit the data and thus deals with high variance issues
- 3) Sum of Diagonal elements of a matrix is called
- 6) It refers to sensitivity of the model to changes in the training data
- 8) They are methods learnt to find the inherent structure of the unlabelled data

Solution

- | | | | | |
|------------------------|-------------------|--------------------------|--------|-----------------|
| 1. Supervised Learning | 2. Regularization | 3. Trace | 4. OHE | 5. DecisionTree |
| 6. Variance | 7. Anova | 8. Unsupervised Learning | 9. TIG | 10. Kernel |

TRIVIA

ARTIFICIAL INTELLIGENCE IS STRONGLY RELATED TO?

Q1

- A) AUTOMATION
- B) NASA
- C) AGRICULTURE
- D) TESLA

WHEN WE USE THE TERM AI, WE MEAN

Q2

- A) ROBOTS
- B) SIRI
- C) SUPEREME INTELLIGENCE
- D) INTELLIGENT PROGRAMS

WHICH OF THE FOLLOWING IS NOT A VIRTUAL ASSISTANT?

Q3

- A) SIRI
- B) ALEXA
- C) ALPHAFOLD
- D) BIXBY

WHICH OF THE FOLLOWING GO PLAYERS PLAYED AGAINST ALPHAGO?

Q4

- A) GU LI
- B) KE JIE
- C) LEE CHANGHOO
- D) LEE SEDOL

AN AI CALLED DR. ARNIM ZOLA WAS FEATURED IN WHICH MOVIE?

Q5

- A) CAPTAIN AMERICA: THE FIRST AVENGER
- B) CAPTAIN AMERICA: THE WINTER SOLDIER
- C) CAPTAIN CARTER
- D) CAPTAIN MARVEL

SOLUTIONS

Q1 A) AUTOMATION.

EXPLANATION: AI AND AUTOMATION GO HAND IN HAND. AT AN INDUSTRIAL LEVEL, AI IS USED TO OPERATE LARGE, COMPLICATED OR TIME-SENSITIVE MACHINERY. IT IS ALSO USED AT BACKEND LEVEL IN CERTAIN SOFTWARE AND PLATFORMS TO AUTOMATE CERTAIN TASKS.

Q2 D) INTELLIGENT PROGRAMS. THE TERM AI OR ARTIFICIAL INTELLIGENCE GENERALLY REFERS TO A SOFTWARE WITH THE CAPABILITY OF MAKING RATIONAL DECISIONS BASED ON THE ENVIRONMENT IT IS PRESENT IN.

Q3 C) ALPHAFOLD. IS NOT A VIRTUAL ASSISTANT. IT IS AN AI DEVELOPED BY GOOGLE'S DEEPMIND THAT HAS THE CAPABILITY OF DETERMINING ACCURATE PROTEIN STRUCTURES. THIS REVOLUTIONARY AI HAS THE CAPABILITY OF REVOLUTIONIZING THE WORLD OF HEALTHCARE.

Q4 D) LEE SEDOL. THE ICONIC MATCH BETWEEN ALPHAGO AND LEE SEDOL WAS TRULY A MASTERPIECE. IT WILL BE REMEMBERED FOR AGES TO COME, AS IT MARKED THE BEGINNING OF A NEW GENERATION OF EXTREMELY POWERFUL AIs.

Q5 A) CAPTAIN AMERICA: THE FIRST AVENGER. DR. ARNIM ZOLA WAS A HYDRA SCIENTIST WHO STORED ALL HIS MEMORY IN A LARGE COMPUTER BEFORE DYING. THIS WAY, HE STAYED ALIVE, EVEN IN DEATH.

The Story of WALL-E

Lately, planet earth has been subjected to extreme changes such as global warming and pollution. More specifically, Land, water and air pollution possesses threats which mankind cannot neglect. WALL-E is one such movie that focuses on the unseen and overlooked aspect of humanity, the pollution and e-waste that humanity generates on daily basis. If this aspect of humanity is left unchecked, devastating outcomes are inevitable. The timeline of the movie is subjected to similar situation, where the world faces extreme pollution. This forces the remaining human population to escape into the vast universe with the help of a sophisticated technological marvel called Starship Axiom. In the movie, WALL-E is depicted as a sentient robot capable of feeling emotions as well as thoughts. It is quite astonishing and heart-warming to watch a non-human care so much about earth.



The storyline follows such a vivid curve, it makes us ponder twice about the way we are treating mother earth. Although WALL-E is incapable of speaking in human language, all his actions and decision are very human-like. In the end, WALL-E manages to successfully acknowledge the fact which is hidden deep inside our hearts, that we all feel guilty for the damage humanity causes to mother nature and somehow want to contribute to its welfare rather than be a cause for its utter destruction.



Just like WALL-E manages to bring back humanity to earth from a 700-year space journey, we too should try to contribute our best towards the care-take of our environment. Reading this, one might stumble upon the question, "Can we really create such an AI with current technology?" Considering WALL-E's emotional & decision-making capabilities, it is safe to say that we have a long way to go, before we can create a sentient AI being similar to WALL-E.

Brains & Bones

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