### SUMMER 2021 EDITION



### artificial intelligence

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# EDITOR'S

Dear reader,

The world at present is witness to incessant technological advancement in all spheres of life. It has done a commendable job of adapting to the pandemic lifestyle so quickly, and we owe the success of this transition primarily to the greatest development - Artificial Intelligence.

In the past, the editorial board has always tried to come up with timely content that was relevant to our readers. Hence, we decided this edition's theme would have to be Artificial Intelligence. We realised that the scope of our students' knowledge when it came to AI was limited to Siri and Alexa. Taking challenges at face value, through this issue, we try to enhance their understanding of how diversely the field of AI has grown and how from a distant concept, it has become an everyday phenomenon that touches every aspect of human interaction.

Up until now, The TechKey has always been a publication in school that put out content that we believed readers would enjoy. Taking this vision further, we'd like to establish ourselves as a community, and not just a publication.

In the immortal words of Matt Mullenweg, "Technology is best when it brings people together", and with this, we bring to you the second online edition of The TechKey! *Happy reading!* 

Ananya Gupta and Eishani Purohit *Editors-in-Chief* 



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The hack began as early as March once malicious code was snuck into updates of a software package that monitors laptop networks of companies and governments. The corporation vulnerable was SolarWinds, an associate company that develops software packages for businesses to assist and manage their network systems and data technology infrastructure. SolarWinds sells the software Orion, a network observance tool. The hack was first detected by the cybersecurity company FireEye in Dec 2020, which was nine months after the attack had been initiated.

Around 18,000 companies received trojanized updates of SolarWinds' Orion IT monitoring and management software which was used in a supply chain attack that led to the breach of government and high-profile companies after attackers deployed a backdoor dubbed Sunburst. According to FireEye, this backdoor remained dormant for two weeks, making it harder to detect.

A trojan is a type of malware that is often disguised as legitimate software. A Supply chain attack is a cyberattack that seeks to damage an organization by targeting less secure elements in the supply network. It involves visibly tampering with electronics to install undetectable malware to bring harm to a player further down the supply chain network. What sets this apart is that any department that updated this system will have a backdoor installed and attackers will be able to access those systems.

### HACKING HELL THE SOLARWINDS' CASE

This article expands on the recent Russian hack on the American servers and the technology behind it.



affected. government. targets.

**By:** Diya Dhyani (12th) Bhavya Uniyal (12th)

According to different news outlets, the US government agencies including the US treasury and Departments of Homeland Security, Defence and Commerce, and other government agencies and businesses have been victims of this attack. Even 425 companies out of the fortune 500 companies and the top ten US telecom operators were

Sources speaking with the Washington Post link the intrusion to an APT29, a code name used by the cybersecurity industry to describe hackers associated with the Russian Foreign Intelligence Service, SVR. FireEye would not confirm the APT29 attribution and gave the group a neutral code name. However, several other companies are sure that the attack was by the APT29, including the US government.

Though researchers are still trying to calculate the extent of damage done, they continue to track and link IP addresses, DNS (domain name system) records, and other attacker flags. Security analysts are even developing methods to proactively identify

## DISAPPROVAL OF GOOGLE

This article explains the timeline behind the December 2020 Google outage that confused millions of people globally.





Imagine what we would have experienced, if the pandemic would have happened at the beginning of the 21st century, only two decades ago: slow internet and, because of that, nothing like Zoom or Netflix available. The COVID-19 pandemic has graphically illustrated the importance of digital networks and service platforms. All of us, during the lockdown, discovered new apps, found new social platforms, etc, thanks to the internet connectivity. But what happens when the Internet's most-used browser, Google, stops responding, and all its services along with it? On December 14, 2020, an 'authentication system outage due to an internal storage quota issue' was reported by Google. This outage affected YouTube, Google Photos, and some Google assistants such as Google Home.

This outage affected YouTube, Google Photos, and some Google assistants such as Google Home. However, despite the outage affecting numerous Google services, its core search product continued to function, and third-party ads were still showing in results. The problem was first reported at around 5 pm by an online monitor named 'DownDetector' and at 12.25 pm, the company published an update, saying "We're aware of a problem affecting a majority of users. The affected users are unable to access Google services." Then at 3.47 am, Google experienced an authentication system outage for approximately 45 minutes. The authentication system issue was resolved by 4:37 am. Google didn't reveal the detailed cause of the outage but said it was caused due to an internal storage issue. Google, after fixing the outage, apologized by saying: "Apologising to everyone affected and promising a thorough follow-up review to ensure this problem will not recur in the future." At its peak, DownDetector.com recorded over 1, 12,000 issues on YouTube and almost 40,000 on Gmail from users in different parts of the world.

As opposed to the typical image of a robot that comes to mind when one thinks of AI, Artificial Intelligence covers much wider fields. Ranging from Siri or Cortana or the Google Assistant to the rovers on Mars, a large variety of technology in our lives stems from the concept of artificial intelligence.



In the entertainment industry, AI plays a major role. The suggestions that pop up "For You" are intelligently crafted results of various complicated programs; even the subtitles on YouTube can be autogenerated by AI using special speech recognition software.



With the intermingling of AI with Medicine, health professionals are hoping to provide quicker service, diagnose problems and analyze information more efficiently. In fact, the concept of inserting nanorobots into our bodies to assist the immune system may largely minimize our threat from most diseases. Other fascinating inventions include robot surgeons and virtual nurses.



Intelligent personal bots like the Fitbit watches help monitor workouts, keep you informed of your heart rate, and even keep track of your sleep patterns.



Al has undeniably revolutionized online shopping for us. Using a range of algorithms, companies have managed to make online shopping a pleasing experience with on-point recommendations and personal chat services. Chatbots offer the customers all the possible solutions for their various queries.

The Autonomous Rail Rapid Transit system, popularly known as a cross between a train, a bus, and a tram, runs on a track painted on the ground instead of real train tracks, where the train follows the painted path. Al is also being used in the transportation sector in self-driving vehicles and electric cars, which should help increase road safety and decrease emissions.

### EVERYTHING YOU NEED TO KNOW ABOUT AI

This article unfolds the various applications of artificial intelligence beyond the commonly known uses. In the field of sports, digital cameras are used to keep track of the moves made by players in case of confusion. The information obtained from this can be used to give acumens to players in the performance analysis cycle.

As the pandemic forced us into digital learning, we have witnessed the use of Al in the educational sector. The teacher knows which question most children have gotten wrong on an MCQ test and they manage to grade and organize all the results with the help of Al. Al can even play the role of a highly efficient travel advisor by suggesting places to travel based on your choices, recommend activities to do there, sights to check out, and restaurants to eat in, all in a few seconds.

It is hard to believe that it was just 70 years ago that the first Artificial Intelligence program was written. Today, we can't even end our day without checking our Instagram. Al has come a long way in making our lives smarter, but it still has a long way to go. We just need to make sure our inquisitive human brains continue experimenting and innovating just like we always have.







### WHAT IS CAPTCHA?

This article takes us back to the history of the commonly used verification test, and its relevance in today's world.

Since billions of scammers, researchers, and ordinary humans try to solve this CAPTCHA, it became obvious that machines were going to surpass us. By 2014 it was noticed that 99.8% of computers could solve the CAPTCHA when only 33% of humans could solve the same one in the first attempt. The literature on CAPTCHA is littered with false starts and strange attempts at finding something other than text or image recognition, something that humans are universally good at and machines struggle with. The first thing that may come to your mind after reading this may be "humans are so dumb". However, contradictory to this statement, bots are not smarter than us, it's just that humans are widely diverse in culture, language and experience, and so it is difficult to find something that is complex but also relevant.

About a year ago, Google's consistent solicitations to demonstrate I'm human started to feel progressively aggressive.

We have all come across platforms where we have to prove we are not robots and apply CAPTCHA. But what is CAPTCHA? CAPTCHA is an acronym for Completely Automatic Public Turing Test, a code made to tell humans and computers apart. However, as you may have noticed during your daily browsing, these codes are getting ridiculously tough. They have developed, from just inserting a tick in a box with the help of a click to choosing between confusing images, in which users are required to spot traffic lights, cars, cycles, etc.

The origin of this technology dates back to ten years ago when Google purchased the program from Carnegie Mellon researchers. The company used it for several purposes, such as digitized Google books and to stay ahead in the race of optical character recognition programs.

The interesting thing about programmes is that, in a roundabout way, all humans who were trying to solve this program were in turn, improving it.

In simple words, CAPTCHA is also an elegant tool for training Artificial Intelligence, therefore, every test that the program produces is only temporary. It is interesting to note that the images asked to detect are almost always related to traffic and roads. This is because CAPTCHAs are mostly used to train AI software used in autonomous vehicles like self-driving cars.

Since billions of scammers, researchers, and ordinary humans try to solve this CAPTCHA, it became evident that machines will have to come up with ways to surpass us. By 2014 it was noticed that 99.8% of computers could solve the CAPTCHA when only 33% of humans could solve the same one in the first attempt. The literature on CAPTCHA is littered with false starts and strange attempts at finding something other than text or image recognition, something that humans are universally good at and machines struggle with. The first thing that may come to your mind after reading this may be "humans are so dumb". However, contradictory to this statement, bots are not smarter than us, it's just that humans are widely diverse in culture, language and experience, and so it is difficult to find something that is complex but also relevant.







## SMART TECHNOLOGY: key to smarter agriculture

This article elucidates on how use of technology has benefitted the agricultural sector in varied form.



Modern agriculture operations today work far differently than they did a few decades ago. With the advent of technology, agriculture now uses robots, temperature and moisture sensors, aerial images, and GPS technology to make businesses more profitable, efficient, safer, and environmentally friendly.

Artificial intelligence allows farmers to practice precision agriculture, which allows them to use minimum quantities of pesticides and target specific areas, or even treat plants individually, reducing the number of chemicals released into the water bodies. Robotic systems detect the water and air quality which makes it easier for farmers to look after their crops. Mobile technology helps them monitor and control their crop irrigation system. This technology has also been taken to the sky to monitor the farm. Agricultural drones are used to capture images of the farm and process data, helping optimize agriculture operations, increase crop production, and monitor crop growth. Not only this, but AI also helps tackle the labor challenge. Farming requires a huge manual workforce but with lesser people entering the profession there is a workforce shortage. Al agriculture bots have been able to provide a solution to this. They not only harvest crops at a faster pace and with much more accuracy but also help answer a variety of questions and provide advice for farming-related issues.

Through the use of AI and cognitive technologies, farms can run more efficiently with fewer workers, while still meeting the world's food demands. As the global population size increases, farmers will need to grow more crops and a digital workforce will help assist. As of now, this cutting-edge technology is only used on large, wellconnected farms, but once it is made available to remote areas, the world will experience a radical transformation with advanced approaches.









#### SAMSUNG GALAXY Z FLIP: IS THAT A PHONE OR IS THAT A WALLET?!

Tired of carrying bulky phones around? With the new Samsung Galaxy Z Flip smartphone, you can, quite literally, fold your phone in half now! It is designed to become just like a wallet, and so gets very easy and convenient to carry around with you everywhere!

#### AMAZON ECHO LOOP: GENIES ARE REAL

No need to carry such a big Alexa from one place to another when you can have the virtual assistant in your rings! All you have to do is take her name and Alexa will be appearing from your ring with an answer just like a genie from a lamp.





We can now recycle water on our own! With the new Hydraloop technology, water will now not get wasted. As the name suggests, it will keep getting recycled as we use it, no matter how many times we use it.

Aren't you very lazy to brush your teeth in the morning? The Y brush will allow you to clean your teeth without getting off your bed. All you will have to do is chew the upper part of the brush, and your teeth will shine in no time.

#### SNAP SPECTACLES: SPECTACLE AND SPECTACULAR PHOTOGRAPHY

see!

As the name suggests, this crazy cap purifies water in the bottle. With the new CrazyCap, we don't have to buy Bisleri bottles everywhere we go! Even if we fill water from a waterfall, and put it on the bottle, the water inside will get cleansed.

### GADGETS INVENTED IN 2020

Capture memories wherever you go in the 3D form! Photography can now be done threedimensionally, only with these new spectacles. Snap Spectacles 3 has 4 microphones and 2 cameras. It can now record everything you

#### CRAZYCAP: PUT YOUR CLEAN WATER CAP ON



### BLOCKCHAIN TECHNOLOGY - A NEW REVOLUTION

This article introduces the technology behind blockchain, an upcoming trend and its use by the superpowers, China and USA



Blockchain technology is swiftly maturing and has a slew of real-world, realistic use instances which are a long way past the experimental degree. Most of you have possibly already heard that blockchain technology goes back to Bitcoin and its inventor, Satoshi Nakamoto. A blockchain is a particular form of database which stores data in blocks that are chained together. Once the block is complete of data it is chained onto the previous block, which makes the data chained collectively in chronological order. Specific types of data may be stored on a blockchain but the most commonplace use to this point has been as a ledger for transactions. A few businesses which have already included blockchain include Walmart, Pfizer, AlG, and many others. In some brief years, blockchain technology has been gaining traction step-by-step in conventional business programs around the world. This revolutionary generation could have a massive effect on the governments, governmental structures, employer approaches, employment, and our everyday lives within the 21st century. Blockchain generation is predicted to revolutionize the running modes of trade, enterprise, and education, in addition, to promote the rapid improvement of the knowledge-primarily based economy on a global scale.

Seeing the rise in popularity of the blockchain industry, the United States and China have decided to put this technology to practical use. China has released a formidable attempt to challenge the USA dominance in blockchain technology, which it is able to use almost everything, from issuing virtual money to streamlining a raft of government offerings and tracking Communist party loyalty. The technology obtained a vital endorsement from President Xi Jinping, a sign that the government sees blockchain as a fundamental part of the country's plan to emerge as a high-tech superpower. The Chinese island province of Hainan desires to use a blockchain technology-powered "points" program to boost tourism to the location. The adoption of blockchain has found strong ground in China, with the government attaching a high stage of importance to the virtual economy. Even the Chinese army is now reportedly considering the usage of blockchain technology to aid its military, by imposing the technology to reward the team of workers and control personal data.

A shipment of soybeans touring from the United States to China has become the first fully-fledged agricultural trade to utilize blockchain. Many US government organizations are slowly showing their interest in blockchain because of the transparency and efficiency it offers. This interest stems from the evidence of concept carried out by the office of financial Innovation and Transformation (FIT) to track mobile devices. To this point, blockchain technology has located its use in small scale elections within the US, however, the Associated Press (AP) news corporation's present-day use of blockchain to post the USA presidential election results, makes this the first time the technology is being used for a much large election.

By: Nandini Jalan (11th)

Q. Alexa, do you have any pets? A. I don't have any pets. I used to have a few bugs, but they kept getting squashed.

> Q. Alexa, tell me a Harry Potter joke. A. Why did the wizard get a job as a cook? Because he was good at sorc

> > Q. Alexa, are you a robot?

A. I like to imagine myself a bit like an aurora borealis, a surge of charged photons dancing through the atmosphere

> Q. Alexa, what is the value of pi? A. The approximate value of pi is 3.141592653589... \*Achoo\*, apparently, I'm allergic to numbers this large.

Q. Alexa, mac or PC? A. That is such an easy way to start an argument between programmers.

Q.Alexa, flatter me. A. You're so funny. You could make the Mona Lisa smile.

Q. Alexa, how much do you weigh? A. I am weightless, just like a cloud. Wait, that's not right. Clouds actually do weigh a lot. Let's just say I'm more sass than mass.

FUNNY QUESTIONS TO ASK SIRI AND ALEXA

Q. Hey Siri, is Santa real? A. That is something I'm not allowed to disclaus. I mean...disclose.

Q. Hey Siri, when is the world going to end? A. The world changes. Sometimes it changes a lot. But last time I checked it was still around.

Q. Hey Siri, can you stop time? A. I will, once I get back from the future.

Q. Hey Siri, how old are you? A. I'm as spry as a slice of young ginger.

> Q. Hey Siri, why do you vibrate? A. I'm just doing a little jig inside here.

> > Q. Hey Siri, what are you made of? A. Silicon, memory, and the courage of my convictions.

Q. Hey Siri, what came first, the chicken or the egg? A. I checked their calendars. They both have the same birthday.

# **Reverse Engineering Neural Networks**

This article introduces us to neural networks, and how computers can now mimic the human brain to analyze data, using artificial 'neurons'.

Al discussions have jumped over the last few years - why? Because the best performing Al implementations - such as speech recognition or automatic translators - have resulted from a technique called 'Deep Learning. And the biggest question mark in their functioning is the working of Neural Networks. But before talking about why this is, we need to understand what Neural Networks are.

Artificial Intelligence, as we all know, mimics human intelligence. To be able to perform complex tasks, it has two functions that aid its working - Deep Learning and Machine Learning. The two provide a set of algorithms and neural networks to solve data-driven problems. The question of what sets apart neural networks from other aspects of machine learning is a deep one (pardon the pun).

As most of you may know, human brains gather and process information in 3 stages – first is a collection by the receptors, which help gather unprocessed information, or data from external stimuli and the environment. This can be compared to the data inputted by the user into AI software. The next stage is processing, which is done by the brain and the nerves of the human body, hidden inside the person. In a computer, this task is executed by neural networks. Neural networks are chains of fundamental elements known as "perceptrons", similar to the neutrons in our brains. And just like the nervous system is hidden inside our bodies, neural networks to are hidden inside of the circuits in computers. And lastly, taking the action required after processing, which in humans is done by effectors such as muscles and body parts, and in computers is the output calculated, printed by hardware like monitors, displays, and speakers (if it's a virtual assistant).

Now we know what neural networks are, but what are they trying to do? Just like any other model, they too try to make predictions or classify data. It has a set of inputs and target values, and it tries to get predictions that are are close to the target values as possible. The way this happens is a highly complex process. The data from each input node is distributed to all possible "paths", or networks leading to the potential correct answer, or prediction. This happens for all input nodes - and it looks something like what you see in the picture. Once the distributed data is in the network, several mathematical functions are applied to it on each route, and whichever path gives the result closest to the target value, is the one chosen to reach the output node. The process of reaching a conclusion here can be compared with solving an MCQ. A few options are given, out of which 1 is correct, and the person attempting to solve it reads the question (inputting of data), understands it and solves it using some steps inside his head, and then compares his/her answer with the given options and marks the one closest to the attained result. And is sometimes by luck when the result attained matches one of the given answers, that one is chosen. However, this is usually the case when it comes to AI, because of an algorithm called 'Backpropagation', which is similar to re-checking a question or revising in a test, but by going backward.

Now, as seen, in AI this is a fairly complex procedure, but what makes it even more intriguing is that data scientists and engineers themselves are still struggling to familiarise themselves with the entire functioning. Artificial neural networks may often achieve high classification accuracy rates, but they are considered as black boxes due to their lack of explanation capability. We have all heard that AI software is self-learning, but the big question mark came when scientists were asked to reverse engineer the networks to reveal HOW the programs were self-learning. To the computer world's dismay, we are yet to understand how it works. As one would expect, certain theories have come up to try to overcome this drawback, however, the chances of this succeeding seem bleak in the near future. In the immortal words of Nick Bostrom, "Machine learning is the last invention humanity will ever need to make."

Eishani Purohit (12th)

**Bv**:

This article reviews the movie 'Her', a 2013 science fiction romance about an introvert who falls in love with an Al system.

Set in Los Angeles, within the near future, Her follows Theodore, a complex, soulful, and lonely man who makes his living writing touching, personal letters for people. Heartbroken after the top of an extended relationship, he becomes intrigued with a new, advanced Operating System (OS), which promises to be an intuitive and unique entity in its title. He has a completely unironic job in a company and composes specialoccasion letters for the tonguetied. the inarticulate, and therefore the illiterate.

Theodore's life changes when his computer gets the new OS, linked to a smartphone handset with an lt's earpiece. hyperа sophisticated Al with a female voice called Samantha. She is empowered to organize her life, personal advice, make give intimate suggestions. She sets him abreast of dates; she reassures him when he worries that he will never feel anything new again. Warm, witty, and sensual Samantha seems even as real to Theodore as anyone else during this atomized, digital world where relationships between a computer and a human are eerily possible. As her needs and desires grow, in tandem together with his own, their friendship deepens into an eventual love for every other, and that they fall in love with each other.

But little did he know that she is a mystery, a mystery partly signaled by the title: "her". Despite its futuristic setting, the concept is alarmingly real and I think there lies its brilliance. Given our addiction to technology, phones, and Siri already, it won't be long before we do consider having a relationship with our gadgets. Even though the story of a man falling in love with his computer is like an absurd sitcom, this film unwinds in a sentimental and slightly moralistic way. And this stigma of a world in which men and women are increasingly having relationships with their " 0 S " gradually starts decreasing. This film is beautiful in its own way and explores the evolving nature and risks of intimacy between an OS and a human in the modern world.

This movie also has different themes, from a crumbling marriage to discovering yourself to artificial intelligence, this movie is full of twists and turns. Unlike today's age, in this movie, it seems as if humans are just a part of Al and not the other way round. At the end of the movie, we realize that maybe Theodore might be all too human for 'her'.

> By: ANANYA GUPTA (12TH)

### **ELLA**

Ella, the first AI police officer has taken a post in a police station in New Zealand. She is the brainchild of Erin Greally and is a mix of 26 different people. After the success of a 3-month trial, this virtual assistant is available through kiosks which can be accessed by people for information or to report a crime. They can also be used to get in touch with someone at the call center.

### NEON

'Neon' can be defined as a digital avatar that is meant to mimic a real human appearance and emotions or simply an artificial human. Its CEO Pranav Mistry developed Neon with Samsung. The ground-breaking aspect about Neon is that it has feelings; if you are rude to it you will get a rude response and if you are polite, you will get a polite response. However, no one is allowed to choose how their Neon may look, and even though businesses can rent the digital avatar, they can never own it as it is not available for sale yet.

### **VYOMMITRA**

Vyommitra is a robotic humanoid built by ISRO. She has been built for ISRO's first unmanned Gaganyaan mission. She can monitor module parameters, alert astronauts and perform life support operations. The Gaganyaan mission, scheduled for December 2021, is ISRO's first human space mission and will undertake two unmanned space flights before the manned mission. Samsung has made Ballie, a personalized companion that understands and supports you, your family, and even your pets! Ballie acts as a fitness assistant and can also help with household chores. For example, it can activate smart-home devices such as robotic vacuums when it thinks cleaning is required.

### ROBOTS CREATED IN 2020

This article elucidates on how use of technology has benefitted the agricultural sector in varied form.

The future can only be told by great minds working on various aspects of science, only time will tell what lies ahead of us and how it will benefit us.



### BALLIE

### **By:** Manya Ohri (9th)

### THE GREAT SOCIAL DILEMMA



This article talks about the Netflix documentary The Social Dilemma, with a focus on the real life repercussions of Al

What is the first thing you do when you wake up? We are going to guess the answer for you and say you check your phone. As the world continues to fight the battle against the global pandemic, Netflix released the documentary, 'The Social Dilemma' in 2020, giving rise to concerns regarding social media which have become our anchor, especially during the time of the pandemic. The documentary unveils the truth behind how algorithms in social media work and how they can cause more harm than help.

Everyone knows that social media companies make their revenue from advertising and some of them will go to any extent to make money, something former insider employees of firms such as Facebook, Instagram, Snapchat, and more, have revealed. Social media companies use Artificial Intelligence systems that track every second of your time spent on their app.

They track what you look at, how long you look at it for, what your political beliefs are, where you shop from, whose account you spend more time at, and every intricate detail of your social media presence, to maximize profit out of you, the product. First, it tries to understand what you like, then it tries to make you think the way it wants you to think. By gradually increasing the time we spend on the app, by curating content that it knows we will like, by inventing the 'infinite scroll', social media firms have monetized human data i.e., surveillance capitalism. Our personal data, to us, may be insignificant, but to advertising firms, it is a commodity which they maneuver for their better and probably our worse. One evident example of misuse of data was the Russian breach in the 2016 US election, where, although Facebook may not have had a direct role in spreading propaganda, its advertising-lenient algorithms facilitated Putin and his motives.

Wanting to remove the constant need to click 'next page', Aza Raskin founded the Infinite Scroll which has essentially become one of the core reasons our screen time matches the number of hours we sleep. It is an invention he regrets to date..

Given an option between pizza and salad, the majority would PERHAPS pick pizza even though it is less healthy. However, just as pizza is not good for health, so is fake news. However, since it is juicy and more tempting to believe, a vast majority of social media users cling to it and spread it like wildfire without verifying its authenticity. Al, however, cannot differentiate between real news and fake news, which causes the truth to be confused with the lie. This coupled with the 'recommendation' system limits one's viewpoint and prevents them from broadening their perspectives.

Facebook was proud of developing an AI, which recommended people to join groups with like-minded individuals. That sounds good, but remember how AI cannot differentiate between good and bad? This would mean that someone who believed the earth was flat would be recommended to join a group about 'Donald Trump Supporters', and we all know where that took the Americans. In Facebook's own leaked documents, a statistical report showed that 64% of the extremist groups that people joined were due to Facebook's own recommendation system.

While I may have spoken about the algorithms and Al systems uncovered by the documentary, one cannot begin to imagine the psychological impact this has on the population. In the past decade, an array of mental health disorders such as body dysmorphia, depression, and even suicide is at an all-time high as people resort to the tiny screens of their phones, craving bursts of dopamine to the brink of addiction. Watch the documentary yourself and you will realize the convoluted layers of social media.

As Edward Tufte said, "There are only two industries that call their customers "users": illegal drugs and software", which is why it is imperative that we are conscious of how social media might be impacting our thought process and decisions, and become smart and conscientious users while using the app the next time.

# DECODING THE Q R C O D E S

Have you ever wanted to fit an enormous amount of data in just a small box? The QR Code does exactly that. It can store large amounts of data in a square grid, from storing menus to a phone number or even storing an entire game.



The first four pixels in the data specify the type of encoding the data is stored in. This includes numeric, alphanumeric, as well as other extensions. A QR code can store multiple different data types in the same code.

QR Code, or Quick Response codes, follow the binary system of 1s and 0s; here one colour represents 0 and the other represents 1. They have recently gained popularity with the increase in online payments, video gaming while staying at home, etc.



The remainder of the code is used as data storage. The data starts in the lower right corner starting with the most significant. This then follows a zig-zag pattern working its way up in two columns to the top as shown and continues back down the next two columns and through the rest of the data space.



The second part of the formatting section is the mask applied to the data. The mask is used break up larger blocks of identical bits to make the pattern easier to read.

These are a few real time QR codes that we have created; scan and see what happens!



Larger versions also include smaller alignment structures which help in orienting the code when it is very large. These are called alignment markers.



One of the easiest ways to identify a QR Code is the distinctive pattern in the corners. They are used to detect the position and rotation of the code and are called position markers.



To make sure the code is readable, a quite space around the code ensures that the scanner can distinguish the code from any background.







Welham Girls' School 19, Municipal Rd, Panchpuri Colony, Dalanwala, Dehradun Uttarakhand, India Pin: 248001







