

# TECHNE

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**SCHOOL OF TECHNOLOGY**



**BRAIN SIGNAL MAPPING PROTOTYPE  
IS CREATED AND PROGRAMMED  
BY STUDENTS OF SCHOOL OF TECHNOLOGY  
WOXSEN UNIVERSITY.**



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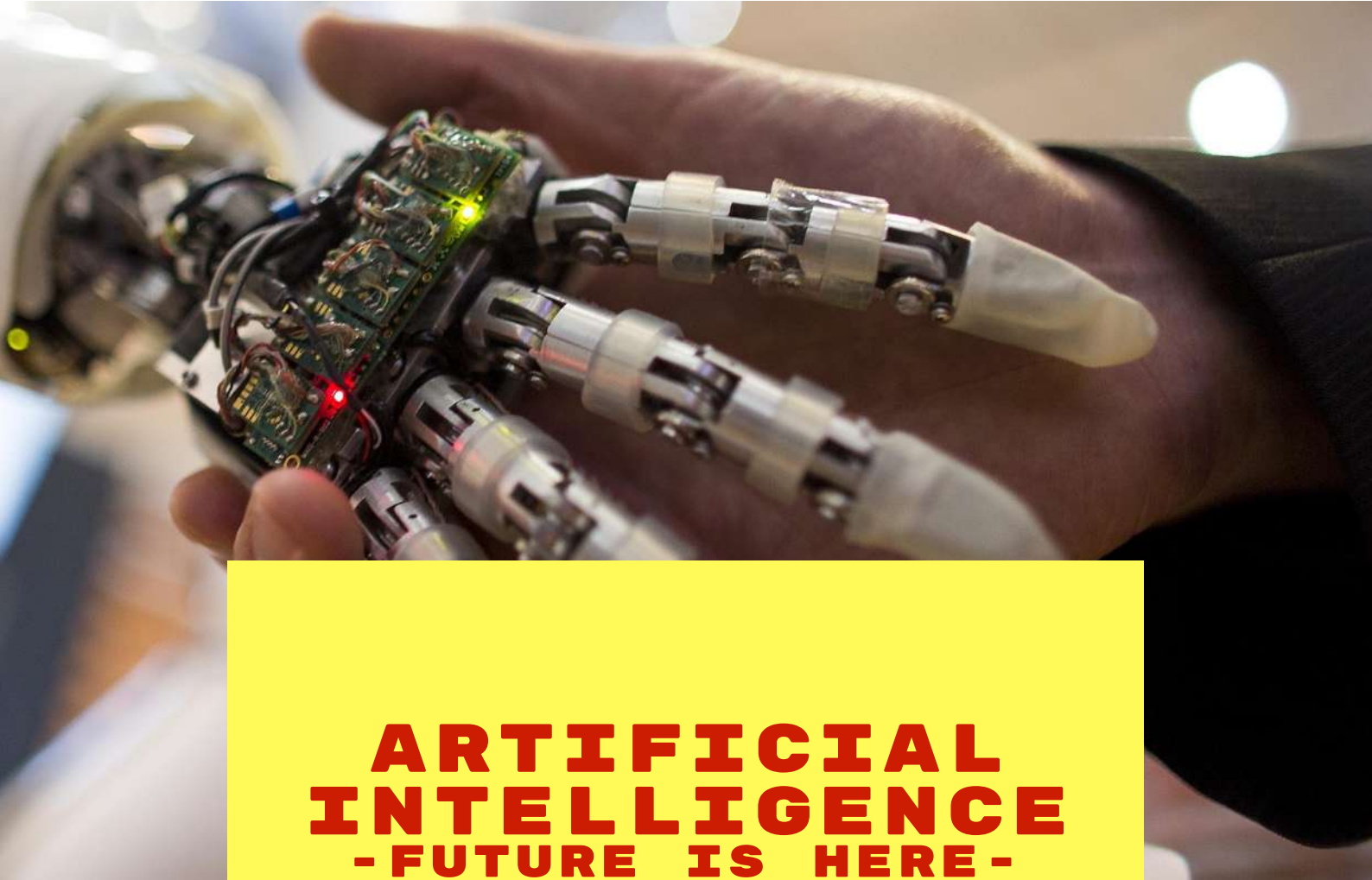


Technology plays an important role in our lives especially during times of difficulties where it becomes difficult to survive without innovations. TECHZONE hopes to inform you about some of the excellent developments different industries are undergoing, and also about the people behind them. We wish these stories inspire and motivate you to achieve your aspirations and provide an insight into the changing world around us . This magazine gives a brief presentation about the activities and Tech talks and much more about technology . This magazine is a platform where students exhibit their skills.

So we sincerely thank all my editorial board members for designing this magazine and making it look so attractive and meaningful and I also thank all the authors for contributing their articles to this magazine

**THANK YOU ALL**  
**EDITORIAL BOARD TECHZONE**





# ARTIFICIAL INTELLIGENCE - FUTURE IS HERE -

**BY SATWIK**

**Artificial intelligence** (AI) is a specific computer technology that emphasizes creating intelligent machines that work and respond like humans. If data are given to AI, it starts analyzing, makes changes on its own, and improves data. In the future, Artificial Intelligence may reach the intelligence of humans.

In Layman's terms, Artificial intelligence can be used as a part of computer science that can simulate actual human intelligence. AI is implemented in machines to execute tasks that want human being intelligence.

At the core of it, Artificial Intelligence is nothing but algorithms with specific sets of guidelines. AI systems could study the iteration of tasks where the device learning algorithms are given to the system. This is how machine learning could get better at doing their specified jobs without external disturbance.

### **Different Types of Artificial Intelligence**

Artificial intelligence can be additionally classified based on its complexity to replicate the intelligence that is a person. These qualities relate to their particular real-world usage, together with the technology involved. The Different types of AI are the following:

**Artificial Narrow Intelligence (ANI)**, often called Narrow AI or Weak AI, maybe just the realistic man or woman AI accomplished. This approach towards AI is goal-oriented and certainly will perform only designated jobs. Several slim AI samples include face recognition, sound assistant, and similar things that will perform just specified tasks.

**Artificial General Intelligence (AGI)** is also popularly known as Deep AI or powerful AI. This is a conceptual idea where AI can mimic intelligence it is personal that is real. AGI gets the ability to study on its tasks that are iterative help out with problem-solving.

**Artificial Superintelligence (ASI)** is just a hypothetical scenario that machines could become fully self-aware, even surpassing the famous brand's real human cleverness. As of this moment, Superintelligence only is present in dystopian science-fiction.

### **Artificial Intelligence Vs. Machine Learning**

Artificial Intelligence may be the umbrella term used to mimic human intelligence. Machine Learning (ML) is a subset of Artificial Intelligence (AI) that permits a machine to imagine separately and make alternatives without impacting; this is certainly additional.

Usually, AI was programmed by way of a set that certainly is based on how they could work. Simple. if-else statements create these. But ML allows these devices to behave in line with the data they gather.

At the core of it, Artificial Intelligence is nothing but algorithms with specific sets of guidelines. AI systems could study the iteration of tasks where the device learning algorithms are given to the system. This is how machine learning could get better at doing their specified jobs without external disturbance.

## Few Examples of Artificial Intelligence

### Smart Cars and Drones:

Tesla automobiles are an instance that is prime of this AI is affecting our day-to-day life. Did you know all of the Tesla vehicles are linked; therefore, the plain items that your vehicle learns are provided across most automobiles? This means, when they are updated, if you needed to take an unanticipated hard kept on a crossroad, all the Tesla vehicles know just how to steer that turn.

Companies like Amazon and Walmart extensively buy drone delivery programs, which will undoubtedly become a reality sooner than you expect. All over the globe are usually using successful drone programs if you think that's far-fetched; militaries worldwide using drone programs successfully.

### SMARTPHONES:

well, whether you understand it or not, you might be getting together with AI if you work with a smartphone. It's Google Assistant, Alexa, Siri, or Bixby, and you more or less understand that these assistants are derived from AI whenever you are using an intelligent associate. However, as soon as we are using an attribute, for instance, the portrait mode result while shooting an image, we never consider that AI might be behind. Have you ever before believed that the way the Google Pixel phones or iPhones can capture such a portrait is certainly great? The solution is Artificial intelligence.

### Social Media Feeds

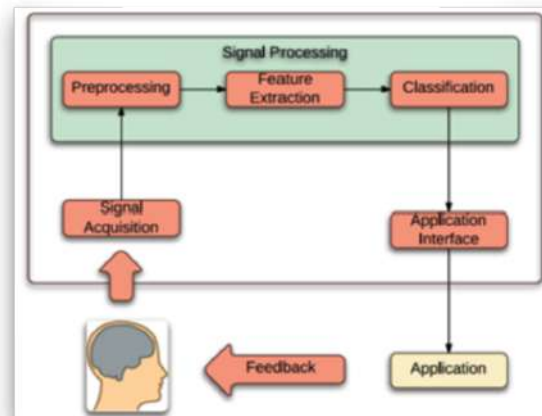
if you use news that is personal much of your alternatives are progressively becoming impacted by Artificial intelligence. Things that you see in your schedule, notifications, and feeds you get from each of these applications tend to be curated by AI. AI takes all of your past behavior, internet queries, communications, and the rest you're on these internet sites and tailors the knowledge only you will do whenever for you personally.



# BRAIN-COMPUTER INTERFACE

BY ER.SUDARSHAN MANDAL, ER.ROUNAK B SANGHVI, ER.VISHAL KR SHARMA

The Brain-Computer Interface is a computer-driven system that acquires the brain's signal, analyzes it, and converts those signals into some output by which the system carries out some desired actions.



The Brain-Computer Interface is carried out in 4 steps :

## Signal Acquisition

In signal acquisition, the brain signals are recorded using electrodes with the help of some electronic circuits. Generally, the electrodes are EEG(Electroencephalography) sensors that record the brain signals, and a microcontroller device is used to convert the brain waves into very low electrical signals.

## Signal Preprocessing

The signals recorded from the brain are very weak to be processed, and they can change even with the blink of an eye. By applying complex algorithms, the strength and quality of the signals are enhanced so that further processing can be done and the brain waves can be extracted accurately.





### Specifications of Cyton Biosensing Board

- Power with 3-6V DC Battery ONLY
- PIC32MX250F128B Microcontroller with chipKIT UDB32-MX2-DIP bootloader
- ADS1299 Analog Front End
- LIS3DH 3 axis Accelerometer
- RFduino BLE radio
- Micro SD card slot
- Voltage Regulation (3.3V, +2.5V, -2.5V)
- Board Dimensions 2.41" x 2.41" (octagon has 1" edges)
- Mount holes are 1/16" ID, 0.8" x 2.166" on center

### Decoding/Encoding

Modern machine learning algorithms are applied in the preprocessed signals to identify the brain patterns derived from the mind's imagination.

### Control and Feedback

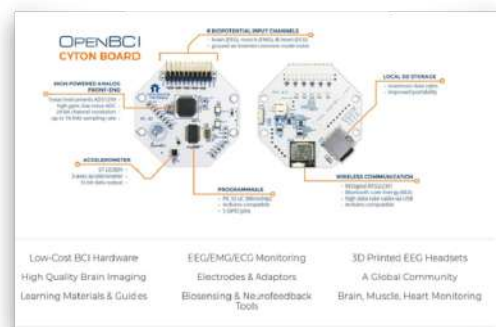
The processed signal then can be used to perform any specific task using any controller. But, of course, the brain generates any work a human performs in each case a different signal, so to study and make the machine learning algorithm more efficient, feedback is essential.

For Brain-Computer Interface can be done using the Open BCI kit.

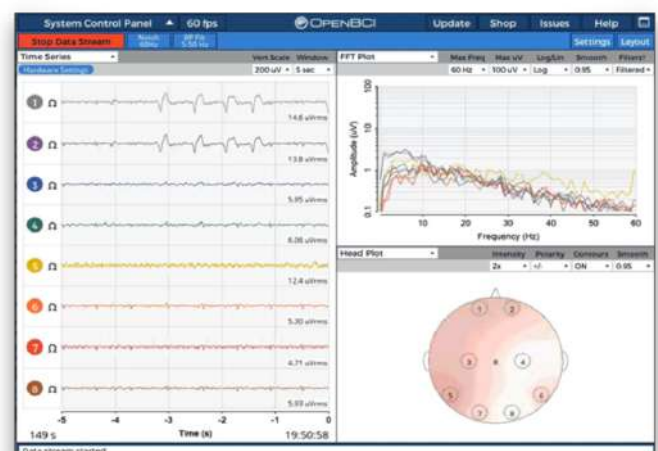
Ultracortex mark IV print-It-Yourself Headset is printed by a **3D printer in Woxsen University 3D Studio**.

The Pack consists of the following components:

- Cyton Biosensing Board (8- channels)
- Earclip Electrode
- Cyton Dongle
- EEG (Electroencephalogram) Sensors
- EMG (Electromyography) Sensors
- ECG (Electrocardiogram) Sensors



There are 8-channels in the Cyton Biosensing Board in which individual sensors are connected to these channels. These signals are displayed on the monitor. Further, we can apply Machine learning Algorithms to these signals, and hence this process makes the brain signal perform some specific tasks or control some equipment.





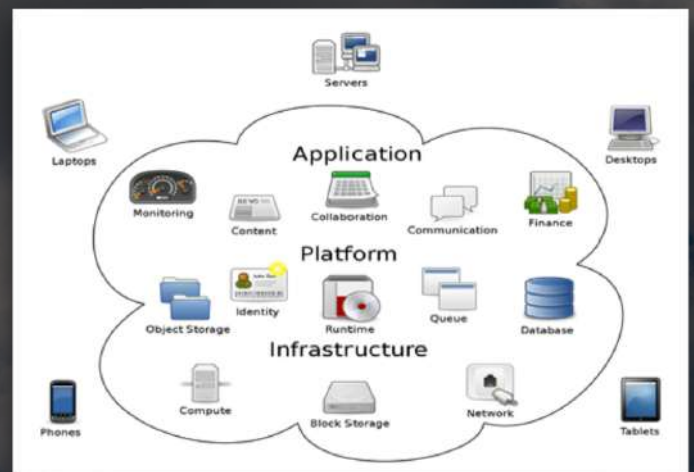
# CLOUDS

## THE POSSESSOR OF ALL DATA

BY VAIGRAI

Clouds are a mass of condensed water vapor floating in the sky, which causes rain. We all know this. But what does cloud computing mean? And why is it becoming a common term in the technological world?

Cloud computing is described as the on-demand availability of mainframe system supplies, particularly data storage (cloud storage) and computing power, without direct live supervision by the user. This expression is usually used to represent data centers open to many users across the internet. The cloud data could be confined to a unique organization, in which instance they are called enterprise clouds, or they can be open to various parties and are termed as public Cloud. In cloud computing, the collection of networked components rendering services need not be separately addressed or maintained by users; rather, the complete provider-managed set of hardware and software can be imagined as an amorphous cloud. The availability of high-capacity interfaces, low-cost computers, and storage media has driven the extension of cloud computing.



Though cloud computing was generalized by Amazon when they released their Elastic Compute Cloud merchandise in 2006, attributions to it have been made as early as 1996 in a Compaq internal document. Most cloud computers operate a Linux-based operating system. Cloud computing aims to provide the user to retain the advantages of many technologies without the necessity to be a specialist in each one of them. There are multiple types of cloud computing, Private Cloud, Public Cloud, and Hybrid Cloud being the most common. As the name suggests, a Private Cloud is an infrastructure that is administered solely for a unique organization. Public Cloud services are transported over the public internet, and they may be awarded as part of a paid agreement or free of cost. A Hybrid Cloud is an aggregate of both Public and Private cloud infrastructures, which remain distinguished but are secured together, offering the interest of multiple deployment models. An example of a hybrid cloud in use would be an organization collecting delicate consumer data in-house on a private cloud reinforcement but interconnecting that application to a business intelligence reinforcement given on a public cloud as software assistance. Other cloud types such as community cloud, distributed Cloud, multi-cloud, and poly cloud are also used.

Cloud computing has revolutionized video streaming services and led to the foundation of corporations such as Amazon and Netflix. YouTube is also a platform that has vastly improved on the Cloud. This also plays an important part in the gaming industry's future, with companies preferring this system as the most efficient. Companies such as Microsoft intend to capture a bigger portion of the gaming market by using the Cloud to provide Xbox users. Even Amazon and Google are following this route, and other companies are expected to follow.

We live in an advancing digital age where there is so much data around us that it becomes impossible to know how much data there is, let alone store it. It is situations like this where cloud computing offers a great solution. This ever-growing field is a specialized field of study in today's world, which finds its mention in courses ranging from computer science and engineering to physics to chemistry. With more businesses going online and the environment being such that it becomes impossible to function without being online, cloud computing seems to provide a bright answer to a future overflowing with data





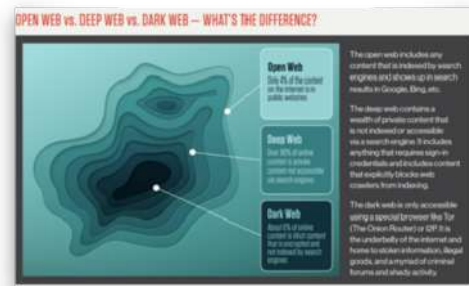
# DARK WEB

BY SADHANA

The Internet is massive, like the open ocean with only a portion available to see just below the surface. Search engines can only reach a certain percentage of the Internet but can't access most websites hidden from everyday users. This part of the Internet is called the deep web, and it is estimated that it accounts for 90% of all websites accessing the dark web, which requires encryption services like Tor I2P and uses a random path of encrypted service, also known as nodes. Theoretically, this allows users to connect to the deep web without fear that their actions are being tracked and remain anonymous. Most of the deep web is harmless despite sensational online stories—everything from blog posts and web pages. Still, in testing academic journals and private directories, websites can also choose not to be crawled by search engines for various benign reasons. Strange but ultimately harmless websites are also found on the deep web. However, more illicit content is also learned by this part of the deep web, usually referred to as the dark web or darknet. Sometimes Financial secrets are found on

the dark web. This could include hacked bank accounts that are being sold to cybercriminals. Illegal pornography is also common on the dark web away from the prying eyes of law enforcement hackers often congregate on the dark web trading secrets and offering their services to the highest bidder. Perhaps one of the most famous websites on the dark web was the Silk Road which sold everything from illegal drugs to weapons. These websites have since been shut down, but many other websites have taken their place because sites like these are heavily encrypted. Tracking down the person responsible is extremely difficult. Dark web technologies guarantee a high level of privacy but can be bad in the wrong hands. To stay safe, use reputable protection software with VPN functionality that would protect your private information, even on the deep web.

People aren't using it to buy shoes; they're buying drugs, weapons, anything you can imagine, and untraceable with consequences that can be deadly. People may also be familiar with silk road or its history, the online marketplace where you could buy narcotics with absolute anonymity. Still, the dark web is part of something much bigger, the deep web, making up 90% of the entire web through our Internet searches in our daily lives. We only see the tip of the iceberg with both the deep web and the dark web computer and T.V.; for starters, let's take a look at some basics. The web can be defined into three categories; first, there's the surface web, and that's everything open and available, everything that can be found through Google search following this is the deep web. This is the portion of the Internet hidden from conventional search engines and contains unindexed websites. Here you can find personal information like your payroll and medical records or a corporation's private data. Finally, the dark websites, which are intentionally hidden from search engine size and the dark web, can only be accessed through special browsers that use masked I.P. addresses to hide the identity of the visitors. So, where did this dark web come from? In 1969 a couple of university students sent the world's first computer to computer message. It was sent on ARPANET, an early ancestor to the Internet. The concept of connecting computers together was a radical idea at the time and set in motion the progression to the modern Internet. But ever since there has been the Internet or any form of Internet, people have used it for illegal online activity. One of the first-ever e-commerce transactions was a drug deal in 1970. It was done between two students at MIT and Stanford in the 1980s. People also attempted to create data havens in small countries with relaxed laws. These early examples were nowhere near as sophisticated as the modern dark web.



However, they illustrate the point that there have always been people who wanted to use the web to escape the eyes of the authorities or everyone's eyes for that matter in the mid-1990s. Things started to get interesting. Tor was the new technology invented. Tor stands for the onion router and is a browser that allows users to exchange information anonymously. Online peer-to-peer networks like Tor are the backbone of the dark web for the dog to exist, and it needs anonymity. Tor manages this by hiding the identity of the user by bouncing the connection through three different servers around the world, adding a layer of encryption each time. Hence the name onion, it would be logical to assume that a group of anti-establishment code invented all as a criminal trying to evade government control looking at the illegal activity of the dark web. This makes sense; however, quite paradoxically, Tor was invented by E.U. S naval research laboratory to allow intelligence personnel to transfer information securely. Another agency of E.U. S Department of Defense called DARPA further developed all, and in 2002 they made it available to the public to this very day. Tor is still funded in part by the U.S. government. But why would the U.S. government fund and allow the general public to access the tool? The idea was to make it difficult for anyone to decipher which intelligence officers created information on the dark web. It is easier to remain anonymous in a sea of anonymous users. The more users there are, it's important to note that Tor would still exist without the darknet. If Google Chrome browser

was shut down tomorrow, the Internet would still exist. In 2014, Dr. Garth Olin provided a breakdown of the sites on the dark web by using classification in his research. He found that drug marketplaces were by far the most common type of sites. This was followed by other marketplaces, including fraud sites and Bitcoin sites, mainly used for money laundering. OK, so let's take a deeper dive and take an interesting look at the deep and dark web; firstly, it's huge, and its size is overgrowing. In 2001, the University of California discovered that the dark web had 7.5 petabytes or 7500 gigabytes of information in just two years. This number increased to over 91,000 petabytes today. Combining both deep and dark web is over 96% of the entire web to give you more of an idea of the scale. Sixty of the largest deep websites collectively exceed the size of the entire surface Internet by 40 times. When you do an Internet search, you only searching 0.03% of the entire web. The dark web is such a dangerous place that you can get scams based around murder. In one case, the people kept falling for an elaborate scam to hire him, and a website called Bester mafia claimed to offer the toughest Albanian Hickman services. Still, in reality, it was two Eastern European men tricking people into handing over their money to pay for their jobs that didn't happen after getting their initial payment. The fraudsters often strung customers along, lying to them and making up stories about why the killing hadn't happened, yet they even started a fake moral panic around the issue. They started false campaign groups and petitions calling for the best mafia website to be shut down.



This was a convoluted effort to make it look legitimate. It said that you could find anything from an AK47 to a rocket launcher on the dark web if you look hard enough. Criminals have also been discovered selling fake degrees, certifications, and passports. People have also hired hackers to break into university systems to change their grades. Stolen identity is up for grabs on the dark web passwords for individual bank accounts cost around \$160, and your full identity about \$1200 on the dark web. There's also a hidden Wikipedia which contains Wikipedia articles that are immune from censorship. One of the most infamous sites on the dark web is the marketplace Silk Road. The name comes from an ancient network of trade routes that connected European parts of Africa, Asia, and the Middle East. The name was borrowed by Ross Ulbricht in 2011 when he set up the first Silk Road marketplace under the alias dread pirate Roberts. Here Bitcoins could be used to purchase many things but, most illicit drugs and fraudulent documentation, such as passports being mostly anonymous bitcoin among other cryptocurrencies, were instrumental in allowing silk road and any anonymous marketplace to run. Russell bridge was arrested in 2013 and charged in a high-profile case with money laundering, computer hacking conspiracy to traffic narcotics, and arranging an assassin to murder six people. However, he was not prosecuted for the attempted murder charges. In October last year, the FBI swooped on Ulbricht. He was sitting at his laptop in the science fiction section of a San Francisco library but, to ensure they got the evidence they wanted, the federal agents had to grab Ulbricht before he had time to shut down his computer. Prosecutors in the case essentially wanted him online and the computer unencrypted. He was arrested and sentenced to double life in prison plus 40 years without parole, approximately 170,000. The U.S. government seized Bitcoins from Silk Road and Ulbricht his personal account. At the time, this was roughly 100 million U.S. dollars sold at the peak of bitcoins price in 2017, which would be worth approximately 2.8 billion U.S. dollars.

Russell bridge had a staunch libertarian philosophy believing that he was doing the ultimate good for the world. His rules for Silk Road outlined that only products that do not cause harm to innocent people may be listed. He fundamentally believed that he was giving power to the people against the government. It could be argued that the flight reduced violence in society as Silk Road provided a means to purchase narcotics without the violent nature of cartels, gangs, or local drug dealers. Russo bridges heavy prosecution had caused a stir.

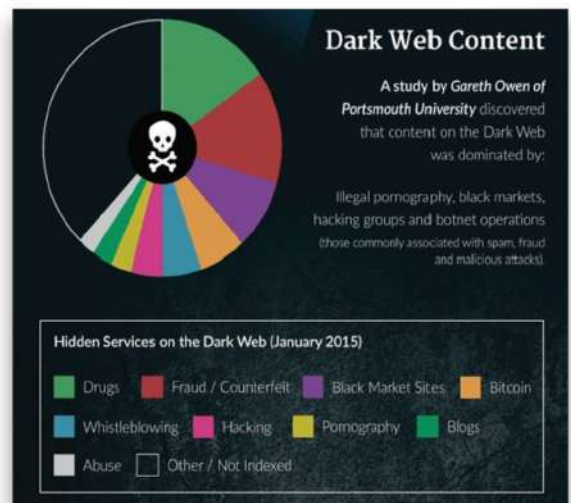
There have been arguments about how much Silk Road was built by Aldridge in the online community as he had limited programming knowledge. Some claim that this was the work of a group. New versions of Silk Road and other drug marketplaces keep reappearing perhaps as long as there is demand. There will always be another Silk Road, and the dark web has also been crucial to whistleblowers. The New York Times and other news outlets have open onion sites to allow people to submit information anonymously. So the dark web isn't a place to surf. It's a place that will enable you to do specific things, and people should know what they're getting into before accessing it.

Many sites need invites, and a lot of people provide particular services. Stumbling upon a website by accident may even be a criminal offense. It is recommended that you don't mess with the dark web. There have been reports of people getting strange phone calls after browsing through forums. People's webcams being hacked and then being put on live stream for all to see. People being followed around in public and being horrified to see photos themselves while doing their daily activities appear on their computers. Many people regard the dark web as an underworld, an illegal and dark place where criminals meet. There is indeed a lot of this type of activity, but the other argument is that it gives people freedom. It can stop governments from overreaching their boundaries. It can keep people and their ideas safe.

How do we control the parts of the dark web that shouldn't exist right now? It seems like an unanswerable question. But people such as our staff are working on it when all of our information is online, and our identity follows us on every post and search. Perhaps we need something like a dark web to keep our freedom, so I'll pass the question off to you. Do you think we need something like a dark web for privacy reasons? On the other hand, it might be the case in the future that intelligence agencies compromised the system without even telling us it's an exciting debate.

**The pros and cons of the dark web:**

Much of what's known about the dark web is negative. It's a simple digital version of an underground economy that creates traps for human interaction. This is its biggest selling thing: the criminal underground tends to conduct most of their behavior from a cyber perspective. Because software provides complete anonymity, criminal groups have thrived in the hidden part of the Internet. Whether it is illegal drug weapons, money laundering & so on, the dark web is full of black market products and services. There will be many others to come. It is used for making a huge amount of money out of this. Unfortunately, there is a high demand for the goods trade. They can't stop, so the dark web's downside has made itself loud and clear but overshadowed those negative implications. Most people use the dark web for illegal activities. However, many security experts say it has advantages that are key to open society without searching the Internet. Enormous fear over privacy and mass surveillance only gets worse.







# Data Analytics Demystified

**BY VASIREDDY BINDU HASITHA**

Many terms get thrown around when it comes to data, and some of them are Data analytics, big data, machine learning, data science, AI, automation, business analytics.

Since 2005 massive amounts of data are being generated on a scale that we have difficulty in understanding. We have got internal data, external data. We have structured data from sales information, also unstructured data from search engines, forum discussions

This big data continues to escalate as we scramble to make sense out of it. This is where data analytics comes in.

Data Analytics is the process of exploring and analyzing large data sets to make predictions and help data-driven decision-making. The major steps of Data Analytics are to analyze the data, make a decision, and predict the outcomes

The four components of data analytics are as follows:

- Descriptive
- Diagnostic
- Predictive
- prescriptive



**Descriptive analytics** handles raw data from various data sets and tells us what happened in the past, it just tells us whether something is right or wrong, but it doesn't tell anything about why it happened. The procedure offers crucial information about past performance.

For instance, when data analysts deal with an e-commerce marketing team to examine sales data to uncover sales trends and patterns, you will notice an increase or reduction in sales from the previous year, particularly for which area and how much.

**Diagnostic analytics** tells us the exact reason behind the outcome, which is made by descriptive analytics. Diagnostic analytics goes deeper into the findings of descriptive analytics to discover the root cause. Key performance indicators are looked at to see why they have improved or deteriorated.

Using statistical and machine learning methods in **predictive analytics**, we can predict what will happen in the future. These techniques use past data to identify the trends and determine the prone to reoccurrence. These techniques include neural networks, regression, and decision trees.

The next step after predictive analytics is to decide what to do, answered by prescriptive analytics. These data-driven decisions can be achieved through predictive analytics' insights. Machine learning tactics are used in predictive analytics approaches to discover trends in massive datasets.

The chance of various outcomes can be calculated by studying past decisions and occurrences.

Let's have a glance at how we can **analyze the data using python** by importing different libraries. Import a CSV file that contains all the data of a variety of cars that a company owns.

```

1 # Import the necessary libraries
2
3 import pandas as pd
4 import numpy as np
5 import seaborn as sns
6 import matplotlib.pyplot as plt
7 %matplotlib inline
8 sns.set(color_codes=True)

1 # Load the car.csv dataset
2 car = pd.read_csv('C:/Users/rkera/OneDrive/Documents/5implilearn/Python/Data Analytics using Python/car.csv')
3 car.head()

```

Import necessary libraries like pandas, NumPy, seaborn, and Matplotlib. It prints the top 5 cars in the showroom with the number of engine cylinders, their performance, size, etc.

```

Out[10]:

```

#	Model	Year	Engine Fuel Type	Engine HP	Engine Cylinders	Transmission Type	Drive_Wheels	Number of Doors	Market Category	Vehicle Size	Vehicle Style	highway MPG	city mpg	Popularity	MSRP
1	Series	2011	premium (unloaded (inspired))	335.0	6.0	MANUAL	rear wheel drive	2.0	Turbo/Luxury/High-Performance	Compact	Coupe	29	19	3910	40135
4	Series	2011	premium (unloaded (inspired))	300.0	6.0	MANUAL	rear wheel drive	2.0	Luxury/Performance	Compact	Convertible	28	19	3910	45650
1	Series	2011	premium (unloaded (inspired))	300.0	6.0	MANUAL	rear wheel drive	2.0	Luxury/High-Performance	Compact	Coupe	20	20	3910	30000
4	Series	2011	premium (unloaded (inspired))	230.0	6.0	MANUAL	rear wheel drive	2.0	Luxury/Performance	Compact	Coupe	29	18	3910	19450
1	Series	2011	premium (unloaded (inspired))	230.0	6.0	MANUAL	rear wheel drive	2.0	Luxury	Compact	Convertible	28	18	3910	34500

Analyze the data regarding the number of cars per brand

```

1 # Plotting a Histogram for number of cars per brand
2 car.Make.value_counts().nlargest(40).plot(kind='bar', figsize=(10,5))
3 plt.title("Number of cars by make")
4 plt.ylabel("Number of cars")
5 plt.xlabel("Make");

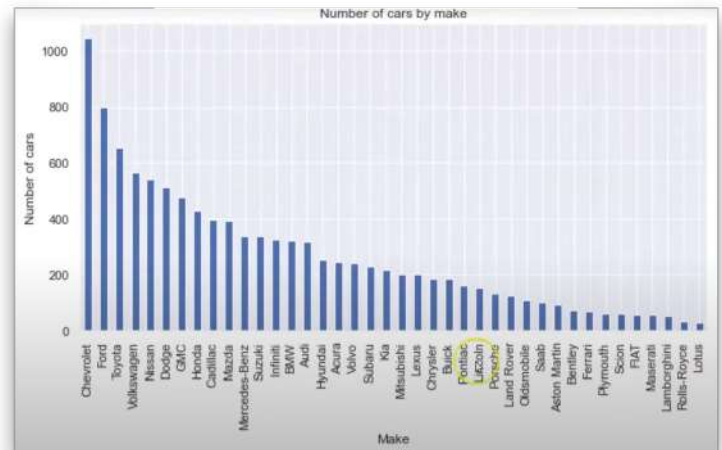
```



We get a histogram as an outcome, which portraits the number of cars per brand. Such sorts of data analytics provide corporations the information they need to make informed decisions. They give a well-rounded view of a company's demands and prospects when used together.

**Your company needs Analyzing:**

Companies generate loads of data on a Daily basis. When I say data here, it refers to business information, customer data, product innovation, sales reports and profit-loss reports. Companies wisely utilize all of these data, they use all of this information to make crucial decisions either that can hamper or boost their business. "Data is the new oil," well it definitely is but only for organizations that analyze all the available data very well then this oil is precious.



**"Companies are on the lookout for professionals who can turn raw data into crucial insights. Hence, there is, and there will be a constant demand for professionals in this field."**



# "INTERNET OF THINGS"

BY VARUN

In the era of Internet technology, the Cloud or Internet-controlled automated systems are now the most popular devices. Today these devices are used everywhere and make controlling of devices easy with the help of the Internet.

These automated clouds and Internet-controlled systems are being developed significantly faster with the advent of the Internet of Things. Internet of things has been the most remarkable invention by Kevin Ashton. Kevin Ashton is the technology pioneer who also co-founded the Auto-ID at the Massachusetts Institute of Technology, which created a global standard system for RFID (Radio-Frequency Identification) and few other sensors. Kevin Ashton is known for coining the term IoT.


The IoT works on a straightforward principle. The connectivity of the network and the computing capability extends to the sensors, objects, and various devices, and day-to-day life objects to generate and exchange the data with possible minimal human intervention. The Internet of Things is nothing but the physical devices around the world connected to the Internet; with the help of the Internet, all collecting and sharing of data will occur. The arrival of IoT had made the super-cheap computer chips and the Ubiquitousness of wireless networks into a part of the IoT. Connecting up all these different items and adding sensors will improve the intelligence of the devices that would otherwise not be useful.

Furthermore, the sensors used in these items will enable them to communicate with real-time data without involving a human being. Thus, IoT is making the fabric of the world around us more intelligent and more responsive with faster growth, and it is also merging the world with the digital and physical universe.

Ubiquitous sensors play a significant role in IoT development, and these sensors are now being used in modern-day life. These Ubiquitous sensors offer the best-in-class abilities to measure. For example, it can measure the environmental factors with the help of IoT, which makes the environment smarter. It usually uses the sensor to help ecological protection by monitoring air quality and water quality parameters. Thus, it is used for a more intelligent environment, but many other intelligent systems are being developed faster with the help of the Internet of things. Other systems based on IoT are smart fire alarms, smart door locks, RFID, NFC, etc., which are few examples of IoT.

According to the 2020 survey, the growth of IoT is more than a 50 billion people are using the IoT devices, and these 50 Billion devices had generated 4.4 trillion Gigabytes of data in 2020. The global market growth of the Internet of things had grown up to 100 billion dollars by 2017 and 212 billion U.S. dollars by 2019. The global Internet of things market size was \$330.6 billion in 2020, and forecasts suggest that this figure will grow to around 1.6 trillion by 2025.





# Modern-day treasure hunt

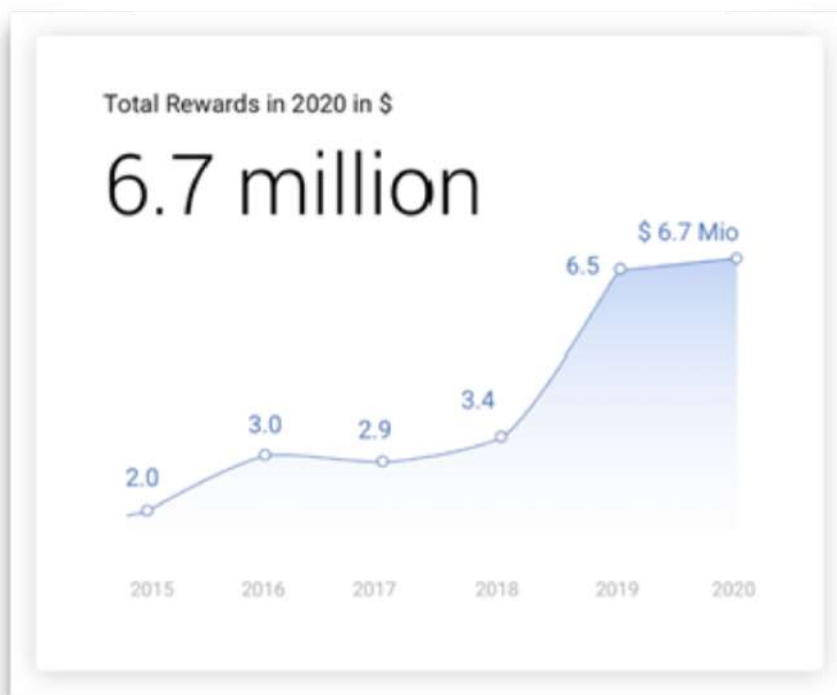
BY ARUN CHANDRA

Bug bounty or the title propound modern-day treasure hunting is a program held by the organizations, websites, and software developers where an individual gets recognition or pay for identifying a bug(vulnerabilities) and reporting them.

Wonder how they do it. Usually, there are three types of people who do this, and they are called hackers. The first category of hackers is Black hat hackers. They are the ones who use the vulnerabilities to access data without the permission of the concerned organization and use it for the wrong cause. And the second category of people are those called white hat or ethical hackers; they are the ones who hack into the systems to which they have permission to test the security of the systems.

Finally, the third category of hackers falls in between the first two categories and are called grey hat hackers, this category of people hack into the systems without permission, but for a good cause, they intend to get paid for it or to build a secure world. Even though their ethical category differs, they use almost the same techniques to do their jobs.

Skills like web hacking and mobile hacking are useful for bug hunting when compared to others. Most of the bug bounty programs held are web-based. Websites with colossal web traffic like Facebook, Twitter, Reddit, and Google are desperate to avoid data breaches, so they often conduct bug bounty programs. They also reward those who find potential vulnerabilities in them. In 2020, Google paid \$6.7 million in the bug bounty rewards depending on the bug's impact on an average of \$50,000 for a bug.



Many geeks found it an opportunity to showcase their skills; the bug bounty hunting had boomed in recent years. Most penetrating testers (bug hunters) prefer bug hunting as their secondary source of income, but few choose it as a career. They have a lower hand over part-time workers, as the pay they receive depends on the organization or website they have reported. There are two possibilities: either they reward them with an amount, or if that organization doesn't hold any bug bounty programs, an organization decides to take legal action against them or thank them for reporting a bug.

In a country like India, where unemployment is a severe issue, bug bounty hunting had its impact. In the recent survey conducted by the Bugcrowd, it was found that the number of bug hunters from India in 2020 grew by 83% from the previous year, cementing the country's reputation as the world leader in information security research.



**The ever-growing IT sector needs skilled cybersecurity analysts and ethical hackers to build a safe and secure environment in the present virtual world.**



# SWARM INTELLIGENCE

BY SRIKUMAR

Swarm behavior is exhibited by animals, mostly of similar size, that comes together while migrating in some direction. Swarming is specifically used for insects, but it can also be applied to any other organism or animal exhibiting swarm behavior.

For Example, The term flocking refers directly to the swarm behavior in birds, herding to refer to swarm behavior in tetrapod, and schooling to refer to swarm behavior in fish.

## Humans and Swarm Behaviour.

All the other organisms use subtle connections to create tight loops among themselves known as feedback loops, just like how Fishes can predict tremors in the ocean of seas around them. Birds detect motions propagating through the flock. Bees use high-speed vibrations. Since we lack those connections that other species use, we do not have the inbuilt ability to create a Swarm Intelligence. But now, we humans can contact each other no matter where they are in the world using high-speed networking technology; all we need is the right set of brains and tech to turn those contacts into real-time working systems with a closed feedback loop among its members like a swarm.

### So how do we do that

To combine the insights, information, intuitions, thoughts, wisdom, and knowledge of different people into a single brain or a superintelligence, the Swarm technology provides the AI algorithms and the interface to enable "human swarms" to congregate online. In a recent study, real-time swarms were shown to extensively augment intelligence, predicting financial trends and sports or evaluating the efficiency of ads and movie trailers. So, what happens here is that a group of people with similar interests on a topic are connected on a common platform where they express their solution to the proposed question, and these solutions may all be different or same and based on the answers the computer comes with a solution which is most efficient and accepted by all, and this doesn't involve any internal biasing or peer pressure

### How is "swarming" different from surveys, polling, and voting?

Thus it is a prevalent doubt; Swarming may seem new compared to the conventional methods for collecting inputs from humans, which we have been following for centuries now. But we should consider that swarming is a natural process that has been around for longer than any other methods; the only thing is we are trying to apply that to our lives and reality. Polling considers each person as a docile source of data for statistical calculations. Whereas swarming treats the members as active members of a collaborating control system, with feedback loops, this enables the participants to study a new set of options and agree on choices that give solutions that maximize their opinion as a whole.

**The technology?** Until now, a company called Unanimous AI has developed a refined distributed structure that allows groups of people from anywhere around the world to access their Swarm platform and participate in real-time intelligence involving closed-loop feedback, which is regulated by AI algorithms.

#### Advantages of using swarm

- The colony can be from a few people or millions, and each agent acts independently of other network layers but responds to internal disturbances and external challenges.
- No central control affects the outcome, and the task is completed even if some agents fail.
- The swarm system can adjust to predetermined stimuli and new stimuli. Any changes in the network are propagated fast, and the agents who work need not work in a particular way.

#### Disadvantages of using swarm

- It is difficult to predict the behavior from the individual rules.
- The functioning of a single agent cannot tell us the functioning of the whole colony.
- The result will turn out to be different even if there is a small change in the rules.
- Agent behavior looks like noise as the action of choice is stochastic.

#### Future scope and comment

Yes, swarms are the future of AI; there is a slow revolution in progress, but it's not a revolution in technique; it is a revolution that deals with the way humans think about things. In general, it is far beyond just AI. What complicates matters here is that a typical digital computer can compute primarily data-driven and massively parallel systems. So, it's possible to create population-based systems like swarms inside a single computer if you think about it right. And many companies use this swarm technology for various purposes in their businesses. So, it comes down to how we THINK about this problem. The faster we think, the quicker we can act and the better our work becomes.



GURU WISDOM

**"EMOTIONS ARE  
ENMESHED IN THE  
NEURAL NETWORKS OF  
REASON."**

Antonio Damasio