

# CITY ENGINEERING COLLEGE



## Tech Samachar

*Expand your mind; change your world.....*

**MAY-2021**

**Volume I, Issue-02**

*"Ideas are the beginning points of all fortunes"*



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Department Monthly Newsletter Issue-02

# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

## VISION

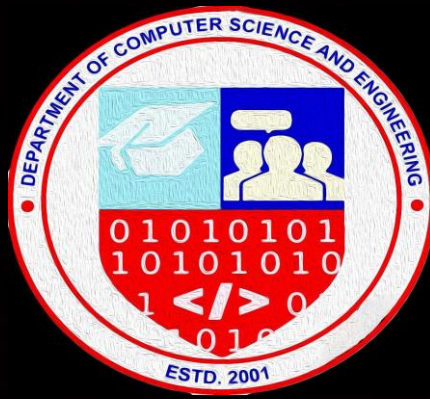
**“To contribute to Global Development by producing Knowledgeable and Quality professionals who are Innovative and Successful in advanced field of Computer Science & Engineering to adapt the changing Employment demands and social need “**

## MISSION

**M1: To provide Quality Education for students, to build Confidence by developing their Technical Skills to make them Competitive Computer Science Engineers.**

**M2: To facilitate Innovation & Research for students and faculty and to provide Internship opportunities**

**M3: To Collaborate with educational institutions and industries for Excellence in Teaching and Research.**



## *About the Department*

The Department of Computer Science & Engineering was started in the year 2001 is known for imparting Quality education and carrying out cutting edge research. In addition to the UG program, PG CSE program and Research facilities for Ph.D. The department offers undergraduate program and has a comprehensive curriculum on topics related to software and hardware with an emphasis on theoretical and practical learning. It has well equipped, state of the art laboratories supported by highspeed Internet and wireless networks.

The students of CSE Department deliver value to the department with a dynamic character and active culture towards learning and delivering through assigned projects guided by faculty. The faculty members are highly qualified experienced and dedicated. All faculty members are masters, some doctorates and few are pursuing their Ph.D. from various reputed universities. All are inspired in delivering top class education blending their research in the area of information technology. The infrastructure of the department provides the student and staff a conducive learning environment.

The Department regularly organizes industrial visits, conferences, workshops, technical talks, project exhibitions for the faculty and students training by using in-house resources as well as industry experts. This helps in effectively bridging the gap between academic and industry.

# Editorial Committee

## ***Faculty Members***

*Prof. Vivekavardhana Reddy, HOD CSE*

*Dr. Sowmya, Professors, CSE (Alumni)*

*Prof. Ambika P R, A.P. CSE*

*Prof. Deepika R, A.P. CSE (Alumni)*

*Prof. Archana Bhat, A.P. CSE*

*Prof. Laxmi M C, A.P. CSE*





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## Chairman's Message

*Tech Samachar is particularly important as it encourages the students to share the knowledge they have acquired. Writing articles for the Newsletter also improves the communication skills of the budding engineers of the Computer Science and Engineering Department. It is common knowledge that representation of an idea is as important as, if not more important, than the idea itself.*

*Tech Samachar aims to inspire and nurture upcoming Engineers to bring a revolution in this ever-evolving world of Technology. The Newsletter captures the current Technological advancements.*

*To conclude I would like to congratulate the faculty and the students of the editorial team on bringing out this Issue of Tech Samachar. I am glad to see that they have lived up to the high standards and my best wishes to the students for a bright future.*

**Dr K. R. Paramahamsa**

**Chairman, AMC – CITY – BROOKLYN – CAMBRIDGE Group of Institutions**





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## *Principal's Message*

*Congratulations to the students and faculty associated to Newsletter committee for successfully publishing this Issue of Departmental Technical Newsletter Tech Samachar. Tech Samachar is creating platform which provides an opportunity to the students and staff to express their original thoughts on Technical topics.*

*The Newsletter plays an important role in providing exposure to the students to develop written communication skills and command over the language. It is a step towards building professional and ethical attitude in them. The entire journey of creating Tech Samachar is an outcome of rigorous effort made by students and faculty. Students not only gain the knowledge about the latest technological developments and advancements through reading and writing articles but they also develop verbal and written communication skills.*

*On concluding note, I would like to thank all the stakeholders for their involvement and encouragement and wish All the Best for their bright future.*

**Dr. V. S. Ramamurthy**

**B.E(Mech), ME (Metal Casting), Ph.D. (Composites), MISQE, MISTE, FIE(India)**



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## *HOD's Message*

*This is the Second Issue of the Computer Science and Engineering Department Newsletter. Tech Samachar is all about the technology that motivates students to do something, that leaves an eternal mark on the world of Technology. Thus, it was our job to ensure inspiring technological developments are being brought to the students of CEC, by the students of CEC itself.*

*The work was performed in an organized, almost professional manner and credits to my entire Tech Samachar team, for their admirable job.*

*I would also like to Thank every member of the Tech Samachar team, without whose contribution, this issue would not have been possible. I hope you enjoy reading this Newsletter as much as I enjoyed working towards its creation and more importantly, I hope that the articles in this magazine inspire you.*

**Mr. Vivekvardhana Reddy**

**HOD, Computer Science and Engineering**





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## Editorial

*At the outset, on behalf of the entire Computer Science and Engineering Department and all the readers we extend our whole hearted gratitude to our beloved Chairman, Dr. K. R. PARAMAHAMSA, to the honorable principal Dr. V. S. RAMAMURTHY, and also to our HOD, CSE Mr. VIVEKAVARDHANA REDDY for their dynamic, inspirational, enthusiastic contribution and motivation towards our department also boosting our confidence for the publishing of second Issue of the Monthly Newsletter TECH SAMACHAR. This technical newsletter named 'TECH SAMACHAR' signifies an giving out of current technical datum. Team 'TECH SAMACHAR' will always remain grateful for the massive support and interest shown by you all.*

*Computer Science and Engineering is an ever-expanding field and the power what technology holds today is definitely beyond one's imagination rendering impressive set of ideas. This second Issue is full of exciting new technologies and Department achievements. This Newsletter is intended to be published once in a month. Finally, quoting our special thanks to the departmental faculty members and also to all our team members without whom this Issue wouldn't have been possible. We hope all the readers will enjoy this issue as much as we enjoyed creating it.....Happy Reading!*

**AMBIKA P R**

**DEEPIKA R**

**A.P. CSE**



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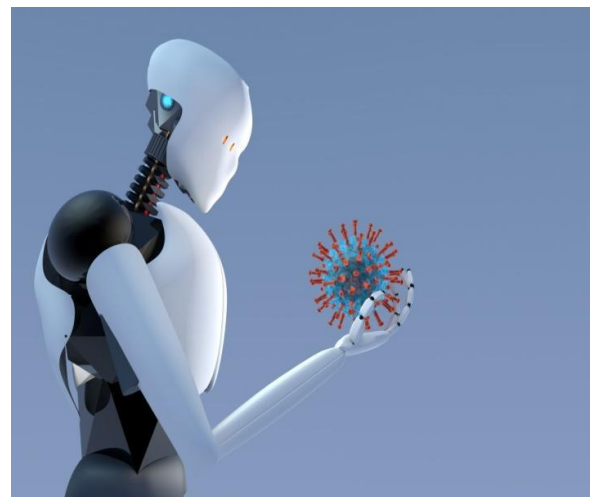
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# How can Artificial Intelligence contribute to controlling COVID-19 Pandemic?

A year on, and we are at the beginning of 2nd wave of corona virus, one thing is certain; the COVID-19 pandemic has had an irreversible effect on the world. Artificial intelligence (AI) is being used as a tool to support the fight against the covid-19 pandemic. AI technology has been working side-by-side with us, humans, to stop the spread of the dreaded Novel Corona Virus. It has been used to make new inventions or inculcated with the existing ones making them technically more advanced tool to identify early infections due to corona virus and also helps in monitoring the condition of the infected patients. It can significantly improve treatment consistency and decision making by developing useful algorithms. AI is also helpful to facilitate the research on this virus using analysing the available data. It can help in developing proper treatment regimens, prevention strategies, drug and vaccine development.

Artificial Intelligence (AI) is an innovative technology which is helpful to fight the COVID-19 pandemic. This technology is helpful for proper screening, tracking and predicting the current and future patients. The major applications of this AI are for early detection and diagnosis of the infection. AI is used for the development of drugs and vaccines, and the reduction of workload of healthcare workers. Healthcare organizations are in an urgent need for decision-making technologies to handle this virus and help them in getting proper suggestions in real-time to avoid its spread. AI works in a proficient way to mimic like human intelligence.

COVID-19 has accelerated the adoption of artificial intelligence in health care. AI-based tools and solutions can work quickly, be deployed at scale, and respond to the dynamic nature of the crisis. Use cases span all facets of responding to the pandemic, from diagnosis and triage to treatment and combating new transmission.



## **Artificial intelligence for COVID-19: saviour or saboteur?**

As the COVID-19 crisis continues to develop, researchers around the world are attempting to find the most effective treatment to combat the poorly understood virus behind this disease. AI could be the saviour of the COVID-19 pandemic in the coming year; we just need to prove it.

The pandemic has forced health-care providers and governments around the world to accelerate the development of artificial intelligence (AI) tools and scale up their use in medicine, even before they are proven to work.

An untested AI algorithm has even received emergency authorization from the US Food and Drug Administration. But will the use of untested AI systems help or hinder patients with COVID-19? If AI tools cannot be proven to discern one pneumonia from another, premature use of such technologies could increase misdiagnosis and sabotage clinical care for patients. If allowed to scale, mistakes like this will slow future use of potentially life-saving technologies and compromise clinical and patient trust in artificial intelligence. Clinical trials are essential to understand how AI can support Covid-19 patients in the real world to assess AI tools' correct accuracy for Covid-19.

### **Unexpected Scientific Insights into COVID-19 From AI Machine Learning Tool:**

AI has helped us to identify the pattern of spread and potential cases of the Covid-19 infection, first reported by a Canadian organization known as "*Blue Dot*", which has created a program that uses AI to forecast the spread of diseases along with their location.

Another benefit reaped from using Artificial Intelligence was the use of "smart glasses" by security guards that were full driven by AI technology. This helped the guards to scan many people without making any contact. Artificial intelligence played a crucial part in merging two different technologies of taking heat measurement combined with optical vision.

"*AI programmed Robots*" can provide us is the reduction of contact between the infected and those trying to treat them. Robots can also be programmed to spray disinfectants on streets, parks, hospitals, and other places where there is a high concentration of people.

A Chabot by the name of "Clara", is based on Microsoft's Azure services and is intended to guide people to identify if the symptoms they have are valid and what steps they should take next.

"*Kara*," which is designed for iPhones. It is an AI-based voice-enabled application that can guide doctors and patients with concerns related to Covid-19. It also acts as a voice to text app, saving them time for doctors to update all records manually

***Fighting the Fake News:*** In these trying times, people are relying on the news to stay updated about the current happenings around COVID-19. However, the circulation of fake news on social media and other platforms is marring the governments' efforts to curb the panic that is already there. AI is helping verify news and its credibility. For instance, Cornell University researchers have developed an automated system, called *CoronaCheck*, that uses machine learning, data analysis, and human feedback to automatically verify statistical claims about the new corona virus.

Artificial Intelligence is a boon and has done humankind a great favour in dealing with this Covid-19 Pandemic situation. With all the new developments and advancements listed above, one can consider Covid-19 to act as a trigger on all the innovations making all the researchers and scientist work harder and faster.

**Prof. AMBIKA P R**

**A.P CSE**

*"The question of whether a computer can think is no more interesting than the question of whether a submarine can swim."*

**— Edsger W. Dijkstra**



# DIGIPREDICT: Edge AI-deployed Digital Twins

**“Edge AI-deployed DIGItal Twins for PREDICTing disease progression and need for early intervention in infectious and cardiovascular diseases beyond COVID-19”**

Digital twin technology is one of the emerging technologies which is slowly stepping into different application fields such as manufacturing, automobile, aerospace, construction, smart city, healthcare and so on. A digital twin is a replica of a system, device, place and people which is continuously fed with data from embedded sensors and software which will give an accurate real time status of the physical entity.

In healthcare system a digital twin can be defined as a dynamic digital replica of the patient. DIGIPREDICT is one such on-going project proposes digital twin to predict the progression of disease and the need for early intervention in infectious and cardiovascular diseases.



The DIGIPREDICT combines the latest advances in digital biomarkers, organ-on-chip (OoC) and artificial intelligence at the edge. It will consist of a smart patch with integrated technology for collecting a range of medical data, such as blood oxygen levels, breathing rate and body temperature.

The patches will also include nano sensors linked to an artificial-intelligence program in order to continually track specific biomarkers that indicate a dangerous condition. These biomarkers, located in a patient’s body, give an indication of the route that the disease will follow.

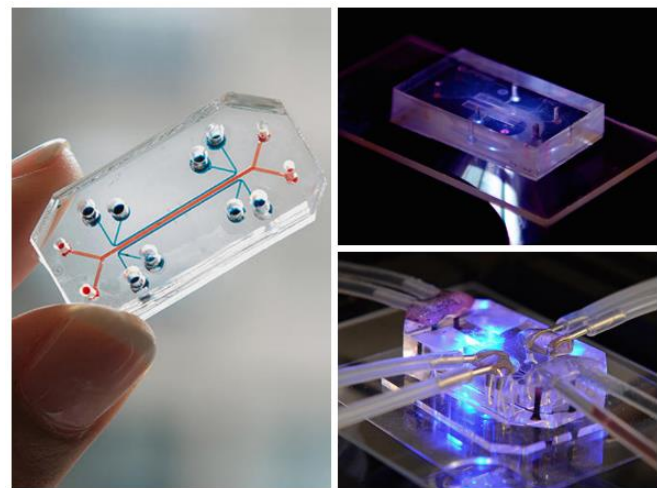


Fig: Organ-on-chip

Digital twin will use organ-on-chip technology to select the right biomarker combination for generating an accurate picture of how the disease is progressing in a patient and how well the chosen treatments are working.

With data collection devices and AI algorithms, it can give doctors an objective, quantitative information for making clinical decisions with as little error as possible. The digital twin will be designed to follow minute-by-minute snapshots of patients' conditions, helping doctors select personalized treatment protocols.

The developed system will provide medical doctors with a unique digital tool for early prediction of potential serious complications in COVID-19 patients. Beyond COVID-19, the system promises to also improve the prevention, diagnosis, monitoring and treatment of cardiovascular disease and detect the potential onset of inflammatory disease.

**Prof. ARCHANA BHAT**

**A.P CSE**

## THIS MONTH IN HISTORY

WHAT HAPPENED IN MAY...



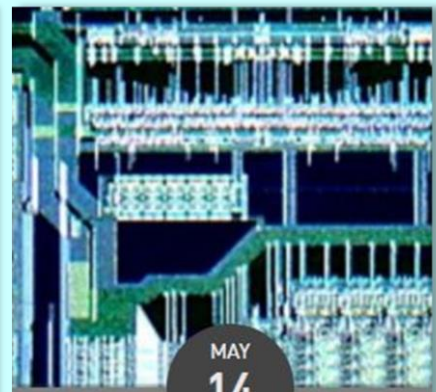
MAY  
01  
1964

Dartmouth Professors Launch "Timesharing" System



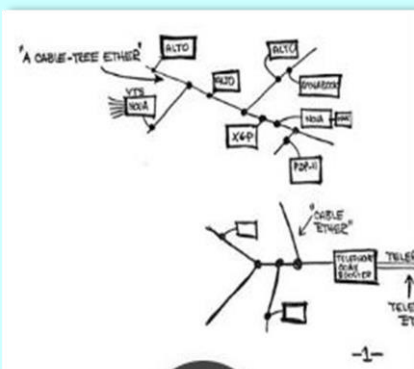
MAY  
02  
1983

Microsoft Introduces 2-Button Mouse



MAY  
14  
1992

Texas Instruments Announces Its Own 486 Microprocessor



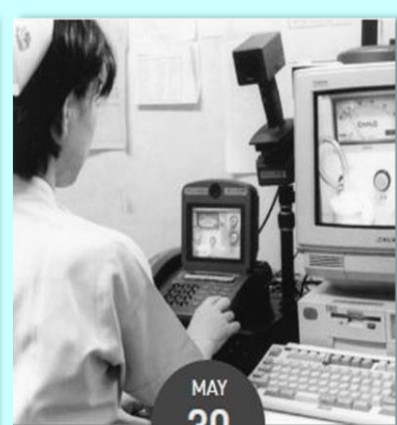
MAY  
22  
1973

Xerox Researcher Proposes "Ethernet"



MAY  
25  
1994

First International World Wide Web Conference



MAY  
30  
1996

AT&T Announces Video Phone Call System



# Kubernetes- Containerized Workloads and Services

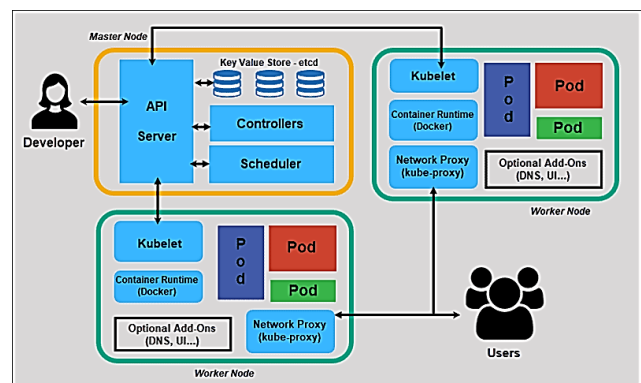


Kubernetes is a portable, extensible, open-source platform for managing containerized workloads and services that facilitates both declarative configuration and automation. It has a large, rapidly growing ecosystem. Kubernetes services, support, and tools are widely available. The name Kubernetes originates from Greek, meaning helmsman or pilot. Google open-sourced the Kubernetes project in 2014. Kubernetes combines over 15 years of Google's experience running production workloads at scale with best-of-breed ideas and practices from the community.

A Kubernetes cluster consists of the components that represent the control plane and a set of machines called nodes. The Kubernetes API lets you query and manipulate the state of objects in Kubernetes. The core of Kubernetes' control plane is the API server and the HTTP API that it exposes. Users, the different parts of your cluster, and external components all communicate with one another through the API server.

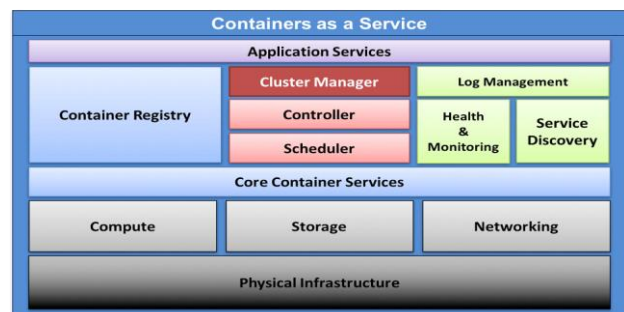
Pachyderm is an open-source framework system that does workflow management and data management. This is accomplished by creating pipelines of data and acts as a layer of versioning of data ahead of projects from a big system which consists of containers. Kubernetes acts as a backbone for all this by providing orchestration of these containers through the pachyderm pipelines.

The diagram shows the architecture of Kubernetes.



Kubernetes allows you to deploy cloud-native applications anywhere and manage them exactly as you like everywhere. Kubernetes manages applications that are containerized across multiple numbers of hosts by providing necessary mechanisms for an application to deploy, manage and scale. The highly incorporated Kubernetes architecture is built within PaaS cloud computing service. This is called CaaS cloud computing service.

Following is a brief description of the components of CaaS:





- Physical host or VM: It is a PaaS server. E.g.: Amazon Web Service EC2 instances.
- Container networking: It is the networking phase for the containers to communicate in an asynchronous manner. Each container has its own IP address and we can ping them to communicate.
- Container scheduling: It does the scheduling part for the containers to provide the necessary resources to the pachyderm. Through the API services, the scheduler makes container A to communicate to container B Pachyderm language is converted in Kubernetes language prior to this.
- Service management, container cluster management also does the necessary part of the CaaS services.

An open-source system for deploying, scaling, and managing containerized applications, Kubernetes handles the work of scheduling containers onto a compute cluster and manages the workloads to ensure they run as the user intended.

Kubernetes marks a breakthrough for DevOps because it allows teams to keep pace with the requirements of modern software development. In the absence of Kubernetes, teams have often been forced to script their own software deployment, scaling, and update workflows. Some organizations employ large teams to handle those tasks alone. Kubernetes allows us to derive maximum utility from containers and build cloud-native applications that can run anywhere, independent of cloud-specific requirements. This is clearly the efficient model for application development and operations we've been waiting for.

**Prof. TEJASWINI B N**

**A.P CSE**

## FACTS ABOUT



### FACT 1

#### PYTHON WAS NAMED AFTER A TV SHOW

The name python, to a programming language. Was it named after a snake called python? Of course not! There is a whole different story behind it. The inspiration for the name came from BC's TV show – 'Monty Python's Flying Circus', as the creator of the python -Guido Van Rossum was a big Fan of the TV show and also he wanted a short, unique and slightly mysterious name of his invention.

### FACT 2

#### PYTHON IS OLDER THAN JAVA

Python Programming language is high in demand has grown drastically in the past 10 years. So, it seems Python is a new language that got the attraction to its audience and gave it boost. But here's a fun fact, Python is an old programming language and is even older than JAVA. Python was initially released in 1991 where as Java was released in 1995

### FACT 3

#### PYTHON OVER FRENCH

What does python have to do with FRENCH? This one sounds interesting right. Believe it or not, in 2015, python overtook French to be the most popular languages that taught in primary schools. Statistics revealed that 6 out of 10 parents preferred their children to learn PYTHON instead of FRENCH. This is just showing that many people appreciated the importance of python.

### FACT 4

#### PYTHON WAS A HOBBY PROJECT

What if I tell you Python was not created as a professional project, and rather, it was a hobby project of the creator? Python creator -Guido Van Rossum was looking for an interesting project to keep him occupied during Christmas. He had already helped to create ABC programming language earlier in his career and he had seen some issues with ABC but liked most of the features. Thus, he took syntax of ABC and fixed some issues completely and had created a good scripting language which had removed all the flaws.

# 802.11ax (Wi-Fi 6)

802.11ax or Wi-Fi 6 is the emerging Wi-Fi standard that will likely displace the current 802.11ac standard with higher throughput and overcome poor performance in crowded environments.



FIG: WIFI 6 (802.11ax) the 6th Generation of Wi-Fi.

Each new Wi-Fi standard has brought significant improvements in performance with the most recent 802.11ac, offering an impressive theoretical maximum rate of 1.3Gbps. Unfortunately, these gains have not been enough to keep pace with demand, leading to that exasperated cry heard across airports, malls, hotels, stadiums, homes and offices.

The IEEE is taking another crack at boosting Wi-Fi performance with a new standard called 802.11ax or High-Efficiency Wireless, which promises a fourfold increase in average throughput per user. 802.11ax, which is known as Wi-Fi 6 under a new naming convention, is designed specifically for high-density public environments, like trains, stadiums and airports. But it also will be beneficial

in Internet of Things (IoT) deployments, in heavy-usage homes, in apartment buildings and in offices that use bandwidth-hogging applications like videoconferencing, also designed for cellular data offloading.

## What problem is 802.11ax trying to solve?

The fundamental problems with Wi-Fi are that bandwidth is shared among endpoint devices, access points can have overlapping coverage areas, especially in dense deployments, and end users can be moving between access points.

The current solution, based on a technology from the old shared Ethernet days called Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), requires endpoints to listen for an all-clear signal before transmitting. In the event of interference, congestion or collision, the endpoint goes into a back-off procedure, waits for the all-clear, and then transmits.

In a crowded stadium, a busy airport or a packed train with hundreds, even thousands, of end users attempting to stream video at the same time, the system loses efficiency and performance suffers.

The good news is that 802.11ax promises improved performance, extended coverage and longer battery life. 802.11ax can deliver a single stream at 3.5Gbps, and with new multiplexing technology borrowed from the world of LTE cellular, can deliver four simultaneous streams to a single endpoint for a total theoretical bandwidth of an astounding 14Gbps.

## 802.11AX PRODUCTS

### CHIPSETS

- Broadcom (announced)
- Qualcomm Fast Connect 6900
- Celeno (announced)

On May 28, 2020, Qualcomm announced its first chips with support for Wi-Fi 6E, including chips for phones and Wi-Fi access points.

### DEVICES

- Intel's AX210 module is shipping.
- On 14 January 2021, Samsung released the Galaxy S21 Ultra.

### ROUTERS

- Asus Raptor GT-AXE11000 Wi-Fi 6E Gaming Router
- Netgear Nighthawk RAXE500 12 Stream Tri-Band Wi-Fi [sic] 6E Router
- Linksys AXE8400

### WI-FI ROUTER INTERNALS

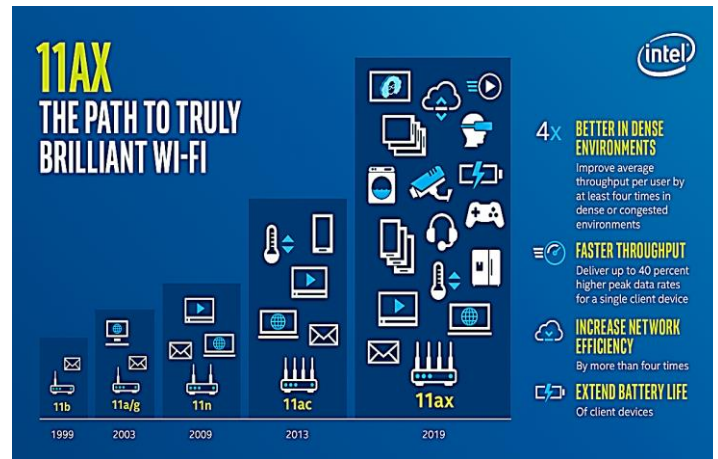
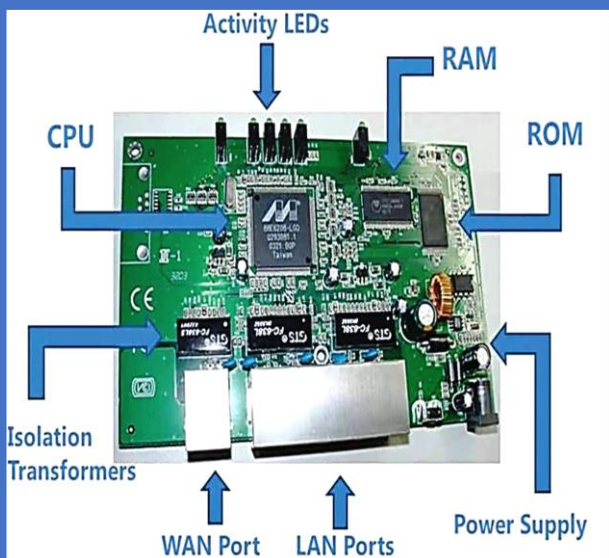


Fig: The Path to the fastest Wi-Fi speed: Three things to know about 802.11ax

### How does 802.11ax work?

The 802.11ax standard takes a variety of well-understood wireless techniques. 802.11ax delivers a nearly 40 percent increase in pure throughput, higher order QAM modulation, which allows for more data to be transmitted per packet. It also achieves more efficient spectrum utilization. For example, 802.11ax creates broader channels and splits those channels into narrower sub-channels. This increases the total number of available channels, making it easier for endpoints to find a clear path to the access point.

When it comes to downloads from the access point to the end user, 802.11ax allows for eight simultaneous streams and makes use of explicit beam forming technology to aim those streams more accurately at the receiver's antenna.

Even more importantly, 802.11ax piggybacks on Multi-User, Multi-Input, Multiple Output (MU-MIMO) with an LTE. Cellular base station technology called Orthogonal Frequency Division Multiple Access (OFDMA). This allows each MU-MIMO stream to be split in four additional streams, boosting the effective bandwidth per user by four times.

Early Wi-Fi was like a long line of customers in a bank waiting for one teller. MU-MIMO meant four tellers serving four lines of customers. OFDMA means each teller can simultaneously serve four customers.

**Prof. SHASHIKALA H C**

**A.P CSE**

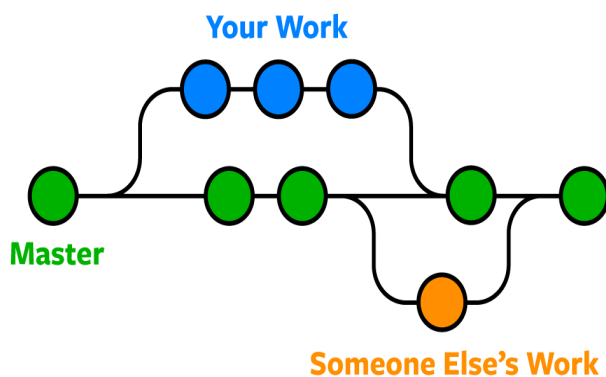


# Git: What is It? Why Should You Use It?

From web developers to app developers, Git is useful to anyone who writes code or track changes to files.

## What is Git?

Git is the most commonly used version control system. Git tracks the changes you make to files, so you have a record of what has been done, and you can revert to specific versions should you ever need to. Git also makes collaboration easier, allowing changes by multiple people to all be merged into one source. So regardless of whether you write code that only you will see, or work as part of a team, Git will be useful for you.



Git is software that runs locally. The files and their history are stored on your computer. You can also use online hosts (such as GitHub or Bitbucket) to store a copy of the files and their revision history. Having a centrally located place where you can upload your changes and download changes from others, enable you to collaborate more easily with other developers. Git can automatically merge the changes, so two people can even work on different parts of the same file and later merge those changes without losing each other's work!

## Ways to Use Git

Git is software that can access via a command line (terminal), or a desktop app that has a GUI (graphical user interface)

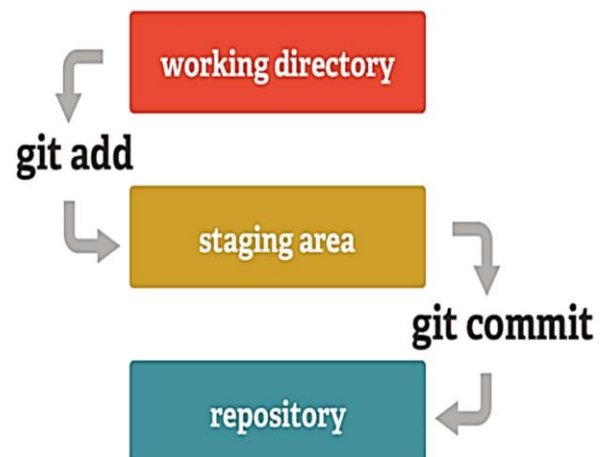
## Git Repositories

A Git repository (or repo for short) contains all of the project files and the entire revision history. You'll take an ordinary folder of files (such as a website's root folder), and tell Git to make it a repository. This creates a git subfolder, which contains all of the Git metadata for tracking changes.

## Stage & Commit Files

Think of Git as keeping a list of changes to files. So how do we tell Git to record our changes? Each recorded change to a file or set of files is called a commit.

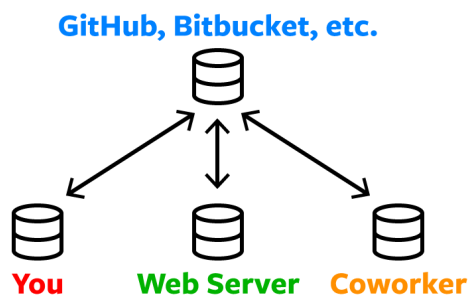
Before we make a commit, we must tell Git what files we want to commit. This is called staging and uses the add command.



Why must we do this? Why can't we just commit the file directly? Let's say you're working on two files, but only one of them is ready to commit. You don't want to be forced to commit both files, just the one that's ready. That's where Git's add command comes in. Add files to a staging area, and then we commit the files that have been staged.

### Remote Repositories

Storing a copy of Git repo with an online host (such as GitHub or Bitbucket) gives a centrally located place where you can upload changes and download changes from others, and letting to collaborate more easily with other developers. After a remote repository set up, upload (push) files and revision history to it. After someone else makes changes to a remote repo, you can download (pull) their changes into local repo.



### Branches & Merging

Git lets us branch out from the original code base. This lets more easily work with other developers, and gives a lot of flexibility in the workflow.

Here's an example of how Git branches are useful. Let's say you need to work on a new feature for a website. You create a new branch and start working. You haven't finished your new feature, but you get a request to make a rush change that needs to go live on the site today. You switch back to the master branch, make the change, and push it live. Then you can switch back to your new feature branch and finish your work. When you're done, you merge the new feature branch into the master branch and both the new feature and rush change are kept!

When merge two branches (or merge a local and remote branch) can sometimes get a conflict. For example, you and another developer unknowingly both work on the same part of a file. The other developer pushes their changes to the remote repo. When you then pull them to your local repo, you'll get a merge conflict. Luckily Git has a way to handle conflicts, so you can see both sets of changes and decide which you want to keep.

### Pull Requests

Pull requests are a way to discuss changes before merging them into your codebase. Let's say you're managing a project. A developer makes changes on a new branch and would like to merge that branch into the master. They can create a pull request to notify you to review their code. You can discuss the changes, and decide if you want to merge it or not.

Prof. DEEPIKA R

A.P. CSE

#### STATS about Git and GitHub.....

Thankfully Git and GitHub have streamlined the market and now more than 70% of organizations use Git

#### COMPANIES using GitHub

6917 companies reportedly use Git in their tech stacks, including Netflix, Shopify, and Udemy.

#### DEVELOPERS using GitHub

106061 developers on StackShare have stated that they use Git.

# Why is Big Data Analytics So Important?

Data, in today's business and technology world, is indispensable. Big Data refers to vast and voluminous data sets that may be structured or unstructured. This massive amount of data is produced every day by businesses and users. The Big Data technologies and initiatives are rising to analyze this data for gaining insights that can help in making strategic decisions. The concept evolved at the beginning of the 21st century, and every technology giant is now making use of Big Data tools and technologies.

Here the Big Data Analytics comes into the picture.

Big data analytics is the often-complex process of examining big data to uncover information -- such as hidden

patterns, correlations, market trends, and customer preferences -- that can help organizations make informed business decisions. So, it can be generalized as the practice of examining large data sets to underline insights and patterns as the Data Analytics field in itself is vast.

The use of Data analytics by the companies is enhancing every year. As the primary focus of the companies is on customers. Organizations can use big data analytics systems and software to make data-driven decisions that can improve business-related outcomes.

## Big Data Analytics and Data Sciences

Big Data Analytics in the field of Data Sciences is a perspective of how Big Data is utilized in the IT sector.

Big Data analytics is indeed a revolution in the field of Information Technology. Big data has the properties of high variety, volume, and velocity.

The data sets come from various online networks, web pages, audio and video devices, social media, logs, and many other sources.

Big Data analytics involves the use of analytics techniques like machine learning, data mining, natural language processing, and statistics. The data is extracted, prepared, and blended to provide analysis for the businesses.

Large enterprises and multinational organizations use these techniques widely these days in different ways.

## Big Data Analytics



Data analytics in data science practices qualitative as well as quantitative techniques to improve business productivity and profits. The data analytics tools are used by researchers, analysts, and engineers for business organizations to access the data efficiently.

There are special analytics tools that use these techniques to analyze the data sources for fresh insights. The data is usually real-time data produced at a huge scale. This data is unstructured, and the tools help to capture this data and store it for analysis. Hence the big data and business analytics tools are very advanced.

These tools can be two types: Storage and Analysis Big Data analytics tools.



Some of these data analytics tools include Apache Hadoop, Hive, Storm, Cassandra, Mongo DB, and many more.



*The image represents 4 ways Big Data is transforming the education sector*

### Job Opportunities and Big Data Analytics

Job Opportunities open for Big Data Analytics knowledge is another important perspective with the rapid growth of requirements. With huge interest and investment in Big Data technologies, the professionals carrying the skills of big data analytics are in huge demand. The organizations pay attractive incentives and packages for qualified professionals. The IT professionals like engineers and data administrators can learn the analytics tools for a promising career.

In different domains of industry, the nature of the job differs and so does the requirement of the industry. Since analytics is emerging in every field, the workforce needs are equally enormous.

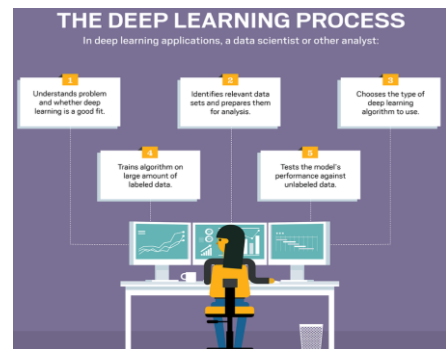
The job titles may include Big Data Analyst, Big Data Engineer, Business Intelligence Consultants, Solution Architect, etc.

The benefits may include more effective marketing, new revenue opportunities, customer personalization, and improved operational efficiency. With an effective strategy, these benefits can provide competitive advantages over rivals.

### Conclusion

The importance of big data analytics leads to intense competition and increased demand for big data professionals. Data Science and Analytics is an evolving field with huge potential.

Data analytics help in analyzing the value chain of business and gain insights. The use of analytics can enhance the industry knowledge of the analysts. Data analytics experts provide the organizations a chance to learn about the opportunities for the business.



*The image exhibits typical work of a Big Data Analyst as Deep Learner*

A better understanding of customer needs, behavior, and sentiment, which can lead to better marketing insights, as well as provide information for product development.

Companies can use this information to their advantage; automating processes, gaining insight into their target market, and improving overall performance using the feedback readily available.

Companies that use Big Data include Amazon, Netflix, Starbucks, American Express, Next Big Sound, BDO, Capital One, General Electric (GE), Miniclip.

There are huge requirements and significance of big data analytics in different fields and industries. Hence, it becomes essential for a professional to keep oneself abreast of these techniques. At the same time, the companies can gain a lot by using these analytics tools correctly.

*Wish you the best to get ahead in your Big Data career!*



**Priya Singh M**  
6<sup>th</sup> semester, CSE

# Augmented Reality and Education

## Augmented reality

An artificial environment created through the combination of real-world and computer-generated data. Augmented Reality was initially designed for medicine, military and maintenance purposes. So, companies interested in mobile development such as Nokia, Qualcomm, Google are willing to fund research on AR.

## Augmented Reality in Education

Augmented reality in education can serve a number of purposes. It helps the students easily acquire, process, and remember the information. Additionally, AR makes learning itself more engaging and fun. It is also not limited to a single age group or level of education, and can be used equally well in all levels of schooling; from pre-school education up to college, or even at work.

### Benefits of augmented reality in education:

- **Accessible learning materials** – anytime, anywhere. Augmented reality has the potential to replace paper textbooks, physical models, posters, printed manuals. It offers portable and less expensive learning materials. As a result, education becomes more accessible and mobile.
- **No special equipment is required.** Unlike VR, augmented reality doesn't require any expensive hardware. Because 73% of all teens currently own a smartphone, AR technologies are immediately available for use for the majority of the target audience.
- **Higher student engagement and interest.** Interactive, gamified AR learning can have a significant positive impact on students. It keeps them engaged throughout the lesson and makes learning fun and effortless.
- **Improved collaboration capabilities.** Augmented reality apps offer vast opportunities to diversify and shake up boring classes. Interactive lessons, where all students are involved in the learning process at the same time, help improve teamwork skills.
- **A faster and more effective learning process.** AR in education helps students achieve better results through visualization and full immersion in the subject matter. A picture is worth a thousand words, right? So, instead of reading theory about something, students can see it with their own eyes, in action.
- **Practical learning.** Apart from schooling, professional training can also benefit greatly from the use of AR. For example, accurate reproduction of in-field conditions can help master the practical skills required for a certain job.
- **Safe and efficient workplace training.** Imagine being able to practice in heart surgery or operating a space shuttle without putting other people in danger or risking millions of dollars in damage if something goes wrong. It is possible with AR.
- **Universally applicable to any level of education and training.** Be it learning games for kindergarten or on-the-job training, AR isn't limited to only one-use case or field of application.

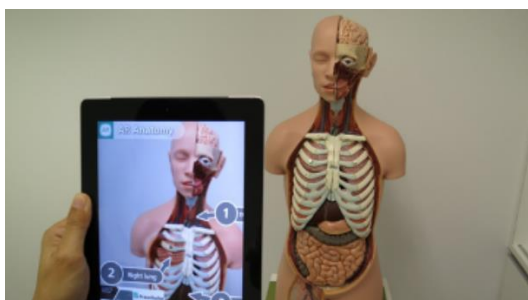
## Challenges of augmented reality in education

Despite the listed benefits, there are certain challenges faced by AR in education

- A lack of necessary training. Some teachers might struggle putting these new technologies into practice as their background training doesn't provide the necessary skills. Only the most open-minded teachers and innovative educational institutions are ready to apply augmented reality apps in education.
- Dependence on hardware. Using augmented reality in the classroom requires a certain resource base. For example, not all students have smartphones capable of supporting AR applications.
- Content portability issues. The AR app you build needs to work equally well on all platforms and devices. However, it is practically impossible to provide the same quality of AR content on any device.

## Augmented reality in professional training

- **Augmented reality in healthcare education:** Medical professions require a high level of proficiency and accuracy since any possible mistakes can have a negative impact on patients' health and wellbeing. Augmented reality in medical education is usually applied to help learners study through interactive visual representations, create simulations and train medical students, and practice surgery or other medical procedures on virtual patients. For example, the HoloAnatomy is an award-winning healthcare education app helping medical students learn about the human body using AR simulations



- **Augmented reality in the space industry:** Historically, the space industry has been on the leading edge of adopting emerging tech, and AR is no exception. Today, the space sector leverages AR learning to train astronauts and engineers how to perform complex tasks that require advanced technical skills and precision. Learning how to build a space capsule, maintain a space station, and even explore the surface of unknown planets is easy using real-time instructions projected through AR-glasses. For instance, NASA currently uses AR to teach astronauts to walk on the surface of Mars using digital images.
- **Augmented reality in the engineering:** Training can be carried out by using AR glasses like Google Glass. Amateur engineering students can be trained by professionals who can provide instructional manuals as aforementioned, and this can be further supported by technical diagrams and know-how videos for extreme clarity. For example, CAD, an engineering essential, involves designing, conceptualising, manufacturing, testing, and maintaining objects before they are built in real life.

## Conclusion:

Augmented Reality can bring a breakthrough to the traditional education system by transforming the complete learning experience, especially during this time where education is mostly online. All-together, it will also impact the interest of students and make them efficient. Also, this will help students in comprehending concepts in an immersive environment, which will simplify concepts and make learning easy. Through AR, students can teach themselves myriads of processes and practice theoretical information in a simulated product on their own.



**Mrudula S Prasad**  
4<sup>th</sup> Semester, CSE



# Cyber Threat Game Changed? Who's hunting who?

Yes, the Cyber Security Gameplay has changed for real and the Cyber Threat Hunting Game has been varying drastically over the last years. And here's to this.

For a very long time now, IT security has earned a reputation for hampering operational progress. However, security is actually a deciding factor that can dictate the future stakes. Now that the cyber-attacks have become more refined, they've started mimicking our online traits and impersonating people. Sometimes, the AI assistant also gets taken over by a malicious attacker or weaponized AI becomes refined enough to convincingly impersonate a real person whom you trust.

The past decade has seen an increasing growth in new security vulnerabilities and malware alone has evolved, becoming more sophisticated, unexpected, diverse, and powerful than ever before. We can't deny being a part of this digital battlefield, which is quickly shifting to a war of AI algorithms. There is some debate as to when we can expect to see AI used as weaponry in cyber-attacks as well. With this, one can do nothing but wait until the next attack.

Autonomous cyber-attacks being one deadly attack, have a defined target - intellectual property - or persist opportunistically for monetary gain or mischief. As they sustain their presence, they will grow stronger in their insider knowledge as they build up control over data and entire networks.

Once released, these self-learning attacks will not be controlled or wait for orders from home base. They will make their own decisions often while deep inside corporate networks and deliver blows slowly, stealthily, and virtually without a trace.

Next, these new machine intelligences will target the very defences deployed against them. They

Will learn how the firewall works, and times of day that the security team is in the office. They will then adapt to avoid and weaken defences. All the while, they will use their strength to spread, creating inroads for compromise and contaminating devices with brutal efficiency.

Also, in the coming ten years, nation sponsored organizations will continue to develop cyber-attack technologies for defence and offense; financially driven criminal groups will continue to seek ways to monetize cyber-attacks; hacktivists will continue to use cyber to convey their messages; terrorist groups will also shift to cyber space; and finally – people with no apparent motive, who seek to demonstrate their technical skills, will continue “contributing” to the attacker ecosystem.

Another challenge we will encounter in cyber defence is that, unlike the physical world where we kind of know who our potential adversaries are and what “weapons” they use, in cyber space anyone could be our enemy. We are accessible from every point of the globe. Last but not least, many cyber-attacks are run automatically by “bots” that scan the entire network and find the weakest spot, so we won't need to look like an “attractive target”.

We simply need to have a vulnerable point. And yes, we are all TARGETS!



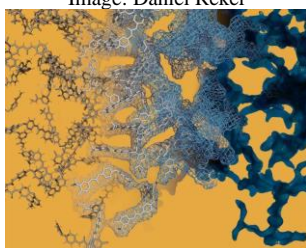
**Shalini R**  
4<sup>th</sup> Semester, CSE

# Big data dreams for tiny technologies

Well beyond Internet Studies itself, but arguably led by it to a considerable extent, there has been a turn towards computational methods in the study of social and communicative phenomena at large scale. This “computational turn” has commonly been described as a turn towards “big data” or, more specifically, towards “big social data”, and it continues to drive the development of new research methodologies, approaches, and tools. Internet Studies has been an advocate of “big data” approaches because the field connects several core disciplines that use “big data” methods – media, communication and cultural studies, the social sciences, and computer science.

## MIT research combines machine learning with nanoparticle design for personalized drug delivery.

Image: Daniel Reker



Molecular dynamics simulation (above) is juxtaposed with an electron microscopy image (right) of the cancer drug sorafenib. Sorafenib, like many other small molecule drugs, can spontaneously form intricate nano-scale structures that change how the drug behaves.

Small-molecule therapeutics treat a wide variety of diseases, but their effectiveness is often diminished because of their pharmacokinetics — what the body does to a drug. After administration, the body dictates how much of the drug is absorbed, which organs the drug enters, and how quickly the body metabolizes and excretes the drug again. Nanoparticles, usually made out of lipids, polymers, or both, can improve the pharmacokinetics, but they can be complex to produce and often carry very little of the drug. Some combinations of small-molecule cancer drugs and two small-molecule dyes have been shown to self-assemble into nanoparticles with

extremely high payloads of drugs, but it is difficult to predict which small-molecule partners will form nanoparticles among the millions of possible pairings.

MIT researchers have developed a screening platform that combines machine learning with high-throughput experimentation to identify self-assembling nanoparticles quickly. In a study published in *Nature Nanotechnology*, researchers screened 2.1 million pairings of small-molecule drugs and “inactive” drug ingredients, identifying 100 new nanoparticles with potential applications that include the treatment of cancer, asthma, malaria, and viral and fungal infections.

“So many drugs out there don’t live up to their full potential because of insufficient targeting, low bioavailability, or rapid drug metabolism,” says Daniel Reker, lead author of the study and a former postdoc in the laboratory of Robert Langer. “By working at the interface of data science, machine learning, and drug delivery, our hope is to rapidly expand our tool set for making sure a drug gets to the place it needs to be and can actually treat and help a human being.” Langer, the David H. Koch Institute Professor at MIT and a member of the Koch Institute for Integrative Cancer Research.

## A cancer therapy meets its match

In order to develop a machine learning algorithm capable of identifying self-assembling nanoparticles, researchers first needed to build a dataset on which the algorithm could train. They selected 16 self-aggregating small-molecule drugs with a variety of chemical structures and therapeutic applications and a diverse set of 90 widely available compounds, including ingredients that are already added to drugs to make them taste better, last longer, or make them more stable. Because both the drugs

and the inactive ingredients are already FDA-approved, the resulting nanoparticles are likely to be safer and move through the FDA approval process more quickly.

The team then tested every combination of small-molecule drug and inactive ingredient, enabled by the Swanson Biotechnology Centre, a suite of core facilities providing advanced technical services within the Koch Institute. After mixing pairings and loading 384 samples at a time onto nanowell plates using robotics in the High Throughput Sciences core, researchers walked the plates, often with quickly degrading samples, next door to the Peterson (1957) Nanotechnology Materials Core Facility core to measure the size of particles with high throughput dynamic light scattering.

Now trained on 1,440 data points (with 94 nanoparticles already identified), the machine learning platform could be turned on a much bigger library of compounds. Screening 788 small-molecule drugs against more than 2,600 inactive drug ingredients, the platform identified 38,464 potential self-assembling nanoparticles from 2.1 million possible combinations.

The researchers selected six nanoparticles for further validation, including one composed of sorafenib, a treatment commonly used for advanced liver and other cancers, and glycyrrhizin, a compound frequently used as both a food and drug additive and most commonly known as licorice flavouring.

Although sorafenib is the standard of care for advanced liver cancer, its effectiveness is limited.

In human liver cancer cell cultures, the sorafenib-glycyrrhizin nanoparticles worked twice as well as sorafenib by itself because more of the drug could enter the cells. Working with the Preclinical Modeling, Imaging and Testing facility at the Koch Institute, researchers treated mouse models of liver cancer to compare the effects of sorafenib-glycyrrhizin nanoparticles versus either compound by itself. They found that the nanoparticle significantly reduced levels of a marker associated with liver cancer progression compared to mice given sorafenib alone, and lived longer than mice given sorafenib or glycyrrhizin alone. The sorafenib-glycyrrhizin nanoparticle also showed

improved targeting to the liver when compared to oral delivery of sorafenib, the current standard in the clinic, or when injecting sorafenib after it has been combined with cremophor, a commonly-used drug vehicle that improves water solubility but has toxic side effects.

### **Personalized drug delivery**

The new platform may have useful applications beyond optimizing the efficiency of active drugs: it could be used to customize inactive compounds to suit the needs of individual patients. In earlier work, members of the team found that inactive ingredients could provoke adverse allergic reactions in some patients. Now, with the expanded machine learning toolbox, more options could be generated to provide alternatives for these patients.

“We have an opportunity to think about matching the delivery system to the patient,” explains Reker, now an assistant professor of biomedical engineering at Duke University. “We can account for things like drug absorption, genetics, even allergies to reduce side effects upon delivery. Whatever the mutation or medical condition, the right drug is only the right drug if it actually works for the patient.”

The tools for safe, efficacious drug delivery exist, but putting all the ingredients together can be a slow process. The combination of machine learning, rapid screening, and the ability to predict interactions among different combinations of materials will accelerate the design of drugs and the nanoparticles used to deliver them throughout the body.

In ongoing work, the team is looking not just to improve effective delivery of drugs but also for opportunities to create medications for people for whom standard formulations are not a good option, using big data to solve problems in small populations by looking at genetic history, allergies, and food reactions.

As we said, the future of big data is clear and unshakeable. If you have noticed, technologies like IoT, Machine Learning, artificial intelligence and more are making their ways into our everyday lives. Behind all of these is Big Data sitting strong in an authoritative position.



There are devices talking to each other over a connected network sharing and generating data you feed, and there are algorithms learning patterns and processing information from the generated data. A simple example of the Internet of Things is your smart television that is connected to your home network and generating data on your viewing patterns, interests and more.

With social apps installed, it is also taking into consideration your personal tastes and preferences and cumulatively working on personas like yours to deliver better online content and streaming options. You would be amazed to know that the massive blockbuster House of Cards was the result of Big Data analytics!



Together, they are designed to offer the best of convenience and support to consumers and industries globally. A warehouse of Amazon is mostly automated, and there are tech companies that have replaced manpower with a simple code for monotonous jobs. As much as redundancy is killed by Big Data and analytics, newer opportunities are equally arising on the other side as well.



“Hiding within those mounds of data is knowledge that could change the life of a patient, or change the world.”

- Atul Butte, Stanford



Akshara Appanna B,  
Alumni, CSE, CEC

**HOW SWIGGY USES MACHINE LEARNING**

For classifying products as veg/egg/ non-veg; for customer intelligence to understand the preferences of our users; or if they are affordability-conscious customers; and to deliver a personalised listing of restaurants in the listing page and search.

**HOW UBER USES MACHINE LEARNING**

Based on historical data, Uber predicts the time and areas of demand. The system uses these predictions to alert drivers of the areas with upcoming demand. This way, Uber makes sure that there are enough cabs in the predicted areas of demand and bridges the supply-demand gap. Demand prediction systems enable the app to slightly increase the prices during peak hours, eventually increasing profitability.

# ACHIEVEMENTS

**project proposal Approved by the KSCST Student Project Programme - 44th Series**

***Congratulations!!!***  
CONGRATULATIONS!!!

## KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

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### 44<sup>th</sup> Series of Student Project Programme: 2020-21

List of Student Project Proposals Approved for Sponsorship

#### CITY ENGINEERING COLLEGE, BENGALURU

PROJECT REFERENCE No.	PROJECT TITLE	BRANCH	COURSE	NAME OF THE GUIDE(S)	NAME OF THE STUDENT(S)	SANCTIONED AMOUNT (IN Rs.)
44S_BE_4354	SMART AGRONOMIC SYSTEM WITH GLOBAL STORAGE ACCESS USING IoT	COMPUTER SCIENCE AND ENGINEERING	B.E.	Prof. DEEPIKA R Prof. AMBIKA P R	Mr. NISCHAL KOTHARI M Mr. PAVAN V Mr. MOHAMMED SHAHID ULLA Ms. KRUPA D	6000.00

### *Winners*



**Mr Nischal Kothari M, Mr. Pavan V, Mr. Md. Shahid Ulla,  
Ms Krupa D**



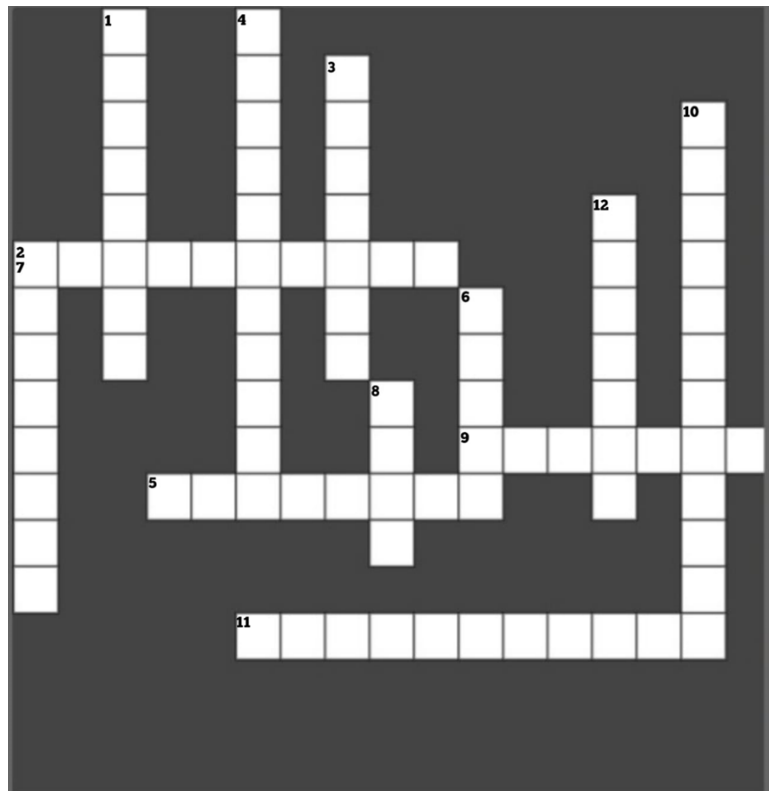
# TECHNICAL CROSSWORD-2

## Across:

2. A small, portable hard drive used to save information.
5. A file that stores and organizes information.
9. Changes printed images to a digital format.
11. Used to put information into a computer.

## Down:

1. Used to save web pages for easy access later.
3. A group of web pages on the internet.
4. A document that uses rows and columns to store information.
6. Input device used to control the cursor.
7. A program that blocks access to certain sites.
8. Unsolicited electronic messages.
10. Used to get information from the computer.
12. Illegally gaining access to a network or file.



## ANSWER TO TECHNICAL CROSSWORD-1

### Down

1. Monitor, 3. Bug, 4. Browser, 6. Hardware, 7. Upload, 8. Firewall, 9. Font, 12. Output, 13. Link

### Across

2. Input, 5. Copyright, 10. Hypertext, 11. Download, 14. Byte, 15. Load



Udanka Aarunjain

6<sup>th</sup> semester, CSE