



BETHUNE COLLEGE

TECHNICAL

v 4.0

DEPARTMENT OF
COMPUTER SCIENCE

Don't wait until 2020 to prepare for 5G

Mobile operators should start building up their operational capabilities to prepare networks for the proliferation of IoT applications which will come with 5G, urged Ding, President of Products and Solutions at Huawei.

"You don't have to wait until 2020 - you can start now to prepare for 5G, which will be a long journey," he said.

"There is good opportunity for operators to develop end-to-end capabilities for machine services

Compared with 4G, he said, 5G will have two distinct characteristics: a change from being network and human focused to being business and things centric.

Ding said telcos have a few years to transform their back-office systems for coming wave of IoT service.

"5G will bring new challenges, so operations need to be transformed. It can take four to five years to transform change their go-to-market model," he said.

Huawei's all cloud strategy

Malware looms over cyberspace

What is a DDoS attack? (DDoS or distributed denial of service attack is a malicious cyber attack that aims to overwhelm a target, making it unavailable to its intended users.)

As the number of attacks on the Internet grows, the threat to the security of the service of several large-scale services is increasing.

For example, if a large number of users access a website at the same time, the website will be overwhelmed and unable to provide service to its users.

DDoS attacks have become a major threat to the security of the Internet.

In July 2016, a DDoS attack on the website of the Chinese government caused a major disruption.

Fraud from I

Ask people

Scammers are using the Internet to spread their fraud. They are using the Internet to spread their fraud. They are using the Internet to spread their fraud.

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SC bristles at remark in L

One man is controlling the centre judiciary

The Children's Rights Coalition on Internet Safety is circulating a digital manifesto to political parties in an effort to put the issue of online regulation into the election agenda.

The coalition comprises ten charities including the NSPCC, Barnardo's, Action for Children and the Children's Society.

Author discusses online hacktivist

Van Zanot Lane

"I discussed his 'HackPolitik', which is based on the book.

By KATHRYN BOBBY

Thursday, the author of the book 'HackPolitik' discussed his book 'HackPolitik' at a book launch event.

The author, Van Zanot Lane, discussed his book 'HackPolitik' at a book launch event.

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City couple's blood donation website, a boon for mankind

Science Reporter

CONSIDER yourself lucky if you never had to run around arranging the blood for your next and dear ones. It is an experience which makes one realize the importance of blood donation in life. Most people have such experience.

Dr. Anand Kumar, a senior doctor at the All India Institute of Medical Sciences (AIIMS), New Delhi, has been a regular blood donor for over 20 years.

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1ST DIGITAL EDITION 2020

Drone Cage is flying high in lockdown

EXAMPLES are emerging daily of businesses that have adapted their products and services in order to meet new demands during the pandemic, and some people have thought of ways to use the technology to help businesses that may have been on the back burner while they were in full time work.

Wenderson's own vehicle technician James, 34, found himself with time on his hands when lockdown meant there were few cars on the road and he was frustrated by the accident repair from the company.



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Make social media companies protect children, urge charities

month an investigation by The Times revealed that Facebook continued to publish potentially illegal child abuse images even after its moderators had been alerted to the extreme nature of the content.

John Carr, secretary of the charity's coalition, said there had to be a new era of transparency and accountability in the social media industry. Companies have repeatedly refused to say how many moderators they employ or how they are keeping children safe.

"Facebook told us they put a lot of resources into child safety but we all have to just take their word for it," Mr Carr said. "They won't disclose how much they spend or reveal anything about the number of people they actually employ on these issues. They could be spending more on lobbying and on

CityLine



Website gets 2nd prize for 'best e-content, creativity'

The website www.blooddonors.com has been awarded the 2nd prize for 'best e-content, creativity' in the 2020 award.

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How Social Media Can and Should Impact Higher Education

By Mark Skolnikoff

There is no doubt that social media has become a part of our lives. It has changed the way we communicate, the way we learn, and the way we work.

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The F.B.I.'s Most Calculating Agent Is Its Supercomputer

By Lyle Taylor Jr.

The FBI's most calculating agent is its supercomputer. It is a machine that can process millions of pieces of data in a matter of seconds.

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IN THE SHADOW OF GOOGLE GLASS

High-tech eyewear from three area companies augments reality in very different ways.

As thousands of software developers gathered in San Francisco for the week of Google I/O, one of the most interesting announcements was the unveiling of Google Glass.

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FROM THE Editor's Desk

Brief History

The year was **2017, September** when our department decided to relaunch our wall magazine in a new avatar, aptly named **Tech-Tonic**, made to look more visually appealing, and covering a lot more trending topics on technology.

The contributors of this annual departmental activity were chiefly the 1st years, freshly inducted into our departmental family. What made this entire process more interesting and slightly challenging, was that it was done under the umbrella of our already established mentorship groups, with each mentor pushing his/her group to do better.

With time, we realised that the content being created with that much of love and effort was too special to be exhibited just inside our department, where the viewership was limited to just us. So, we approached our then principal madam, **Prof. Mamata Ray**, who granted us the permission to display it in a public viewing area inside the college campus. This added attention and respect that our efforts garnered, gave us the much-needed impetus to do better next year.



1st Digital Edition

Year 2020, amidst this lockdown, we initially thought that the yearly ritual of publishing our beloved Tech-Tonic would have to be put on hold. But then we realised that we can use the various digital content creation skills, picked up and honed by our tech-savvy students, to our advantage. So, we decided to go digital with Tech-Tonic for this year.

Without our usual face-to-face creative discussion sessions, we did face certain obstacles in the beginning. But with time we learnt new techniques to visually express ourselves in the digital world, with our students leading the way for us. Each magazine article was individually created by a separate team, ably guided by their respective mentor.

Special Feature

Once all the articles were completed and the designs duly accepted, we decided to make it into an e-magazine. Once things return to normal, we plan to print this edition of Tech-Tonic, for our departmental library. Also, we realize that the digital platform has a wider reach, both inside and outside our college, as well as saving display space. So, if possible, our future plan is to make Tech-Tonic go permanently digital.

At this juncture, I would like to draw the attention of all our readers to the fact that all the articles have been ordered as per the ranking received by the groups. The judgment was carried out by all the mentors individually, with points being given to each team, except his/her own, making the process completely unbiased.

Acknowledgement

First and foremost, we are extremely grateful to our beloved **Principal Madam (Prof. Krishna Roy)**, for her continuing support and guidance, in all our out-of-the-box endeavours.

The next person, I as the magazine editor would like to thank from the bottom of my heart, is our departmental head **Dipanwita C. Bhattacharya**. Without her unwavering belief, we would have found it difficult to work with the freedom that this project demanded.

Kudos to the entire team of mentors, who made this process thoroughly enjoyable for their students, by choosing a myriad of topics, both interesting and relevant in today's times. My gratitude goes out to our first-time but extremely able mentor **Krishanu Naskar**. Not to forget the ever-dependable **Abhishek Dey** for being my much-needed counsel in times of trouble. Special mention goes to **Pallavi Roy**, who had to leave our Bethune CMSA family in the middle of this ongoing project, but continues to be an integral member nonetheless.

But the mentors without their mentees are like the windmills without the wind. It is our students who provide us with the fuel power to fly that extra distance. All the articles of this issue of our magazine have been contributed by the **current 3rd and 5th semester students**.

Lastly, a big shoutout to my dedicated **team of designers**, who were rightly chosen for their top-ranked group work. A captain is only as good as the team she leads, and I was lucky to have been blessed with the best.

I would like to end this long introduction to the 1st digital edition of our beloved TECH-TONIC, by these parting words – ***"Knowledge is like money. To be of value it must circulate, and in circulating it can increase in quantity, and hopefully, in value"***. So spread knowledge, and show us some love. Here's to an enjoyable read for all of you.

Signing out –

Srijoni Maitra

In-charge, Editorial

Tech-Tonic (v 4.0), 2020



Team of Mentors –

1. Dipanwita C. Bhattacharya (H.O.D.)
2. Abhishek Dey
3. Krishanu Naskar
4. Pallavi Roy (ex- teacher)
5. Srijoni Maitra

Design Team –

- ❖ Manisha Bhaduri (Content Creator)
- ❖ Nilanjana Thakur (Chief Design Coordinator)
- ❖ Sanjana Poddar (Chief Visual Artist)
- ❖ Somrita Ghosh (Co-Designer 1)
- ❖ Sriparna Banerjee (Asst. Visual Artist)
- ❖ Sritama Dey (Co-Designer 2)

STUDENT CON

01 HACKTIVISM

"You are either part of the problem or part of the solution"

5th Semester, Mentor: Prof. S. Maitra

05 5G TECHNOLOGY

"Unlock the speed of the future"

5th Semester, Mentor: Prof. P. Roy

08 DRONE

"Acquire. Analyse. Inform."

5th Semester, Mentor: Prof. A. Dey

11 SUPER COMPUTERS

"Unlimited cores, Infinite possibilities"

3rd Semester, Mentor: Prof. K. Naskar

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"Prevent identity theft"

3rd Semester, Mentor: Prof. S. Maitra

15 WEB-BASED BLOOD DONATION MANAGEMENT SYSTEM

"Save in silence"

3rd Semester, Mentor: Prof. D. C. Bhattacharya

18 SECURITY AND PRIVACY IN SOCIAL MEDIA

"Think before you click"

3rd Semester, Mentor: Prof. A. Dey

20 SMART GLASSES

"You see what I see"

3rd Semester, Mentor: Prof. P. Roy

22 DIVIDED BY SOCIAL DISTANCING, UNITED BY SOCIAL MEDIA

"You are what you share"

5th Semester, Mentor: Prof. D. C. Bhattacharya

HACKTIVISM

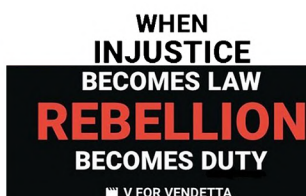
~ The Rise of the Dark Knights in Cyber Space ~

HACK + ACTIVISM

Hacktivism refers to the use of computers, IT systems and networks, to promote a political agenda or social change. It can be equated to online vigilantism – trying to bring justice in a peaceful manner, with the Internet as its medium.

OBJECTIVES OF HACKTIVISM

1. Ensuring freedom of information and free speech
2. Protesting the failure of the legal/justice system
3. Exposing corrupt individuals/organizations
4. Finding major security flaws with popular softwares



CULT OF THE DEAD COW



CULT OF THE DEAD COW

Cult of the Dead Cow (aka cDc) is the most famous and respected American hacker group founded in 1984 in Texas. Its members invented the concept of hacktivism, released the top tool for testing password security and contributed to the development of Tor. They showed how governments, corporations and criminals hold immense power over individuals and how to fight back against them.

DEFCON

DEF CON (aka DEFCON/DC) is one of the world's largest and most notable hacker conventions, held annually in Las Vegas. It was founded in 1993 by Jeff Moss (US hacker and digital security expert). Many federal law enforcement agents from the FBI, DoD and DHS regularly attend DEF CON.



BACK ORIFICE

Back Orifice (aka BO), a program which enables a user to control a computer running the Microsoft Windows OS from a remote location, debuted at DEF CON 6, in 1998. The antivirus industry immediately categorized it as malware and appended BO to their quarantine lists, but it was still widely used by unskilled hackers.

REBELS WITH A CAUSE



Goolag Campaign

The cDc launched the “Goolag” (a play on gulag Soviet forced labour camps) campaign in response to Google’s decision to comply with China’s Internet censorship policy and censor search results in its Chinese version. It uses a parody of Google’s logo which reads, “Goolag: Exporting censorship, one search at a time.”

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Chaos Computer Club



Germany’s voting machines were vulnerable. The hackers of Chaos Computer Club (CCC), Europe’s largest association, had one such machine playing chess for a month, proving they could manipulate votes. So, the Federal Constitutional Court struck down the use of voting computers, citing CCC in its ruling.

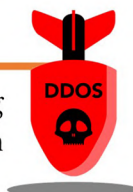


WikiLeaks & Manning

WikiLeaks is a non-profit organization dedicated to expose actions and secret information of government entities. US Army intelligence analyst, Chelsea Manning provided some classified information to Wikileaks, indicting the US of war crimes in Iraq. Manning was later arrested.

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DDoS attacks



AnonOps (group of people fighting to support freedom of information and speech) carried out DDoS attacks on MasterCard, Visa, PayPal and PostFinance as part of the campaign Operation Payback, and in retaliation to the arrest of WikiLeaks founder Julian Assange.



Arab Spring

The Arab Spring was a series of anti-government protests that spread across much of the Arab world. Beginning with Tunisia, and then Libya, Egypt, Yemen, Syria and Bahrain. The events began in the spring of 2011, leading to the name. Telecomix provided the activists with tech support.

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Sci-Hub



Alexandra Elbakyan, a Kazakh researcher, found it nearly impossible to access the research needed for her work. So she created Sci-Hub, to provide free access to millions of expensive research papers. Sci-Hub has been criticized for violating copyright, while others have described her as a “Robin Hood of Science.”

CFAA & Aaron Swartz

2013

The Computer Fraud and Abuse Act (CFAA) is a US cyber-security bill enacted in 1986 which prohibits accessing a computer without authorization, or in excess of authorization.

Aaron Swartz (co-founder of Reddit) was arrested after connecting a computer to the MIT network and setting it to download academic journals from JSTOR. Federal prosecutors charged him with wire fraud and violation of CFAA. He later committed suicide.

“**INFORMATION IS POWER, BUT LIKE ALL POWER THERE ARE THOSE WHO WANT TO KEEP IT FOR THEMSELVES**
~ AARON SWARTZ”



ANONYMOUS

Among the best-known hacktivist groups is 'Anonymous', a decentralized international hacktivist movement, widely known for its cyberattacks against several governments, government institutions and agencies, as well as some private corporations. They comprise loosely affiliated hackers from around the world, called Anons.

LULZSEC



In 2011, a small group of Anons from US and UK formed the hacker group Lulz Security (LulzSec). They claimed responsibility for compromising user accounts from Sony Pictures and taking the CIA website offline. Their intention was to embarrass website owners and ridicule security measures.

PROJECT CHANOLOGY

Their first cause to make headlines was a 2008 effort called 'Project Chanology', a direct campaign against the Church of Scientology, after the church violated free speech by taking down a video of Tom Cruise which portrayed itself in a negative light. It included repeatedly carrying out DDoS attacks on the Church's website, making prank calls to their hotline, and sending black faxes to waste their ink cartridges.



October, 2011



WE ARE ANONYMOUS

WE ARE LEGION, WE DO NOT FORGIVE,
WE DO NOT FORGET, EXPECT US

MAJOR OPERATIONS

Anonymous campaigned against child pornography by causing temporary DDoS attacks on 40 child porn sites and published the usernames of 1589 people frequenting them.

The group used its hacking prowess to campaign for LGBT rights, by defacing two Ugandan government sites in protest of LGBT intolerant laws, threatening to continue until the community was treated with dignity.

August, 2012



October, 2015



They revealed the names of 1,000 Ku Klux Klan members, stating in their press release, "You are terrorists that hide your identities beneath sheets and infiltrate society on every level. The privacy of the Ku Klux Klan no longer exists in cyberspace."

IN LIGHT OF RECENT EVENTS

After a period of relative inactivity, Anonymous is back in action – in support of the #BlackLivesMatter Movement, connected to the murder of George Floyd, the Minneapolis police department website was temporarily taken offline in a suspected DDoS attack and email addresses and passwords of police officers have been published.

HACKTIVISM IN INDIA

“BENEATH THE MASK IS MORE THAN FLESH, BENEATH THE MASK IS AN IDEA, AND IDEAS ARE BULLETPROOF”



1. Attack on Aadhaar Database (2018): RS Sharma (Chairman of TRAI), who had posted his Aadhaar number on Twitter with an open challenge to hackers, got severely trolled after hacker ‘Elliot Alderson’ posted a series of personal information linked to Sharma on the same tweet thread.

2. Legion hacktivist group (2016): Hacked into the Twitter accounts of prominent Indians namely Rahul Gandhi, Vijay Mallya, etc. The group also ascertained that it does not believe in a cashless economy, in the presence of the “deeply flawed” banking system in India.



OUR FINAL WORDS

Hactivism, made up of the two words hack (negative connotation) and activism (positive connotation), in itself, sums up the dual nature of the concept. Since it comprises individuals and groups operating outside the purview of law (hence, usually illegal), to establish its own perceived sense of justice system, the actions lie in the very grey area of right-and-wrong. The cliché of “one man’s terrorist is another man’s freedom fighter” is in play here. It depends whether you are with the “system”, or against it. Hacktivism can never replace offline justice and legal systems, or real-world sit-ins and demonstrations. Hacktivists simply wait in the shadows, searching for a crack in the system which needs correction, and then brings it to light. They fight the first few rounds of the battle, until the real world sits up and initiates the necessary course of action. Hacktivists then, must surrender their armaments and recede back into the shadows – their rightful place to be.

In this day and age of the all-pervasive Internet, this form of protest and vigilantism is here to stay, in all its shades of grey. So embrace it in its purest form, keeping in mind these words...

You either die a hero, or live long enough to see yourself become the villain.

- The Dark Knight

SUPERFAST 5TH GENERATION

SCI BUZZ >

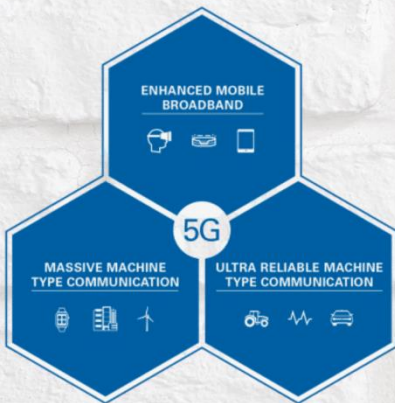
WHY IS 5G NEEDED ?

5G has the potential to support millions of devices at ultra-fast speeds, also because it has the potential to transform the lives of people around the world.

Improvement of 5G

Technology can help make life better.

EVERYTHING GETS READY WITH A BLINK OF AN EYE!



WHAT DOES IT ENABLE US TO DO?

5G will let us do whatever we do now with our smartphones, which will be yet faster and better, says **Ian Fogg** from **Open Signal**.

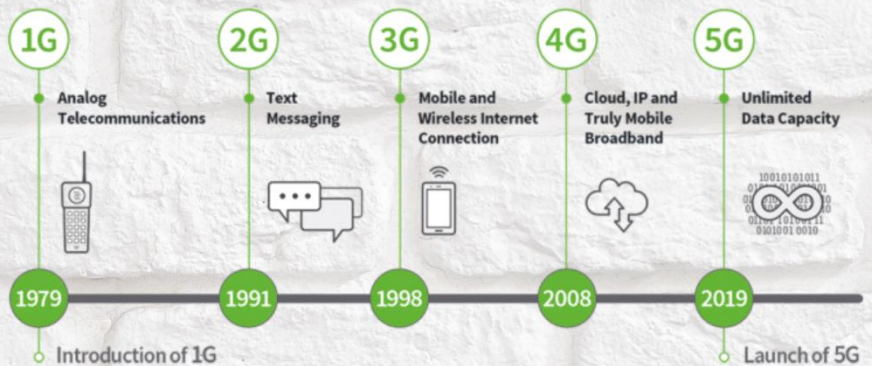
TECH >

WHAT IS 5G ?

IT is a new Global Wireless Standard after 1G, 2G, 3G and 4G Networks. This enables a new kind of Network that is designed to connect virtually everyone and everything together including machines, objects and devices. 5G is expected to unleash a massive IOT (Internet Of Things) Ecosystem.



The Evolution of 5G



DETAIL >

HISTORY

Verizon led the way in developing and deploying 5G and accelerating 5G innovation. Verizon introduced 5G in 2019 in parts of many cities in the first part of the year with plans to have 5G in more than 30 U.S. cities by the end of the year.

On December 1, 2018, South Korea became the first country to offer 5G (The Fifth Generation Mobile Wireless Standard).

Want to know more?

Explore in Detail how 5G can Change smartphone usage in India

READ NOW

5G : SECURED ?

- Strong mutual authentication
- 5G Security
- Privacy

AND

trust will be as strong as for 4G if not stronger with the increasing impact of IOT Services.



The novel coronavirus outbreak in China has highlighted the role that 5G can play in control as 5G+ thermal imaging supports contagion monitoring and it can accurately spot a moving object's temperature in real-time without contact and issue abnormal temperature alerts.

TELECOM TV

Socio-economic benefits of 5G in EU28

Data: European Commission Graphic: TelecomTV



FACTS >

5G AND ECONOMY:

5G is driving Global growth :

- \$13.2 Trillion dollars of Global Economic Output
- \$22.3 Million new jobs have been created
- \$2.1 Trillion Dollars in GDP growth

(IMPACT OF GLOBAL ECONOMY)

Another Step Forward



ZTE is conducting pre-5G trials with Bharti Airtel, Vodafone and Rjio

Will launch telecom products designed and customised for the local needs

Expects India business to grow faster than other global



Has tied up with BSNL to provide network support and 5G gear for future network needs



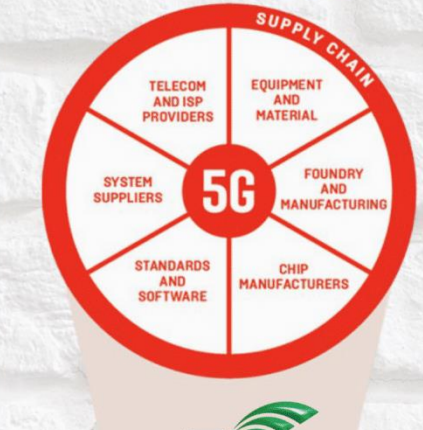
network expansion north and the east

Testing its 5G-ready products with Airtel and BSNL

won



India plans to roll out 5G services for consumers by 2020



5G



AFFECTS >

AFFECTS ON US

5G

is designed to do a variety of things that can transform our lives, especially in the areas of **Virtual Reality (VR)**, the **IOT** and **Artificial Intelligence (AI)**.



False Truths About 5G X

FACT

Scientific research has confirmed that COVID-19 is a virus with natural origins.

MYTH

"5G mobile networks are causing the spread of COVID-19."

FALLACY



Re-interpreting Randomness

Takes two phenomenon happening at roughly the same time and assumes a causal link.

That's like arguing that because Baby Yoda was introduced to the public in 2019, so he must have caused COVID-19.



QUESTIONS >

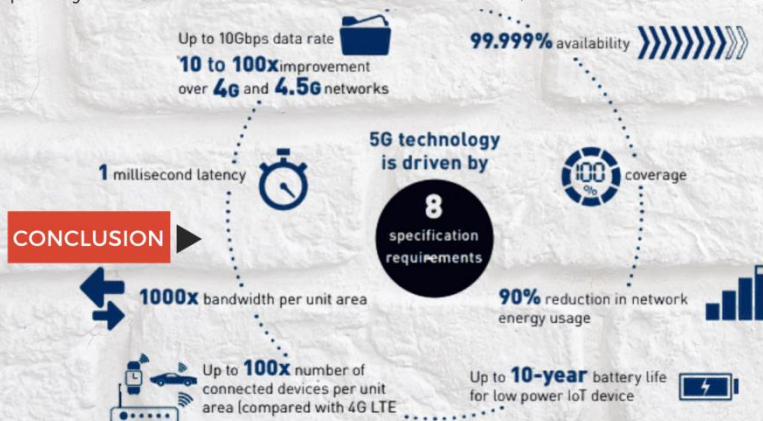
WILL I NEED A NEW PHONE?

The answer to it is 'YES'. But, when 4G was introduced in 2009/10, compatible smartphones came into the market before the infrastructure had been rolled out fully, leading to some frustration amongst consumers who were paying more in subscriptions for a patchy service.



IS 5G AVAILABLE NOW?

Yes. 5G is already here today, and Global operators have already started launching new 5G networks in early 2019. In 2020, many countries are expecting nationwide 5G network. Also all major ANDROID phone manufacturers are commercializing 5G phones. And soon, we'll be able to access 5G.



CONCLUSION



WHY >

WHY IS 5G NEEDED?

5G

is not only important because it has the potential to support millions of devices at ultrafast speeds, but also because it has the potential to transform the lives of people around the world. Improvement of 5G technology can make life better.



DID YOU KNOW?

Chipmaker Qualcomm reckons 5G could achieve browsing speeds and download about 10-20 times faster in real world (as opposed to laboratory)



PREPARED BY : STUDENTS OF SEMESTER 5

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- MADHUPARNA PANJA
- AHONA BOSE

MENTOR : PALLAVI ROY



DRONE: DYNAMIC REMOTELY OPERATED NAVIGATION EQUIPMENT

INTRODUCTION->

DRONING ON: REALIZE THE JOURNEY

When you hear the word '*drone*', most people's first thought is some kind of high-tech military weapon, flying above the clouds while the pilot sits in a control room hundreds of miles away. That's not quite what we're talking about here. The same term has been used to describe quadcopters remote control aircraft with four propellers. As the algorithms determining flight stability and control have become more sophisticated, these miniature aircraft have become cheaper and more accessible.

IS IT EASY TO FLY A DRONE?

The simple answer is yes, it's much easier than you expect but a more complicated answer would be: it depends. Like cars and cameras and mobile phones, there are different manufacturers in the drone industry prioritizing different things when they take products to market.

DRONE CODE - >

- ✓ Always keep your second sight.
- ✓ Stay below 400ft.
- ✓ Keep the right distance from people and property.



TERMINOLOGY->

The term drone was first used with the 1920s *fairy queen* and *queen bee* target aircraft. The term *unmanned aircraft system (UAS)* was adopted by the United States Department of Defense and the United States Federal Aviation Administration in 2005.



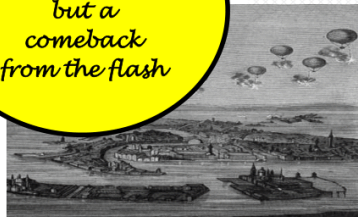
DRONE: A REVOLUTION IN THE ERA OF AUTOMATION

- Amazon are seriously considering the use of drones in its daily delivery; the *Prime Air service* will be able to deliver packages within 30 minutes via Unmanned Aerial Vehicles (UAV's).
- In remote areas, such as Africa, drones are used for the shipment of life saving medical equipment and medication where human transport would be too time consuming.
- Drones are becoming more and more popular for weddings, giving the couple a 360 view of their big day.
- There is actually a *Drone Racing League*.
- Drones are going to revolutionise the farming world, allowing farmers view of their field including damaged crops and those ready to harvest.

HISTORY

Not a flashback,
but a comeback
from the flash

”



Austria attacked Venice using **unmanned balloons** stuffed with explosives and launched around 200 of these incendiary balloons over the city.

Remote Controlled Unmanned Aerial Vehicles (UAVs).

1915-1920 saw a *big leap forward in the technology.*



The first pilotless aircraft was developed in 1916, after the outbreak of World War I called the **Ruston Proctor Aerial Target**.



1930-1945 saw other major leaps in *military drone technology.*

The U.S. navy began experimenting with radio-controlled aircraft, which resulted in the development of **curtiss nc-2 drone** in 1937. In 1935, the British developed "**queenbee**", a radio-controlled drone.

Recreational RC planes became big: Thanks to breakthroughs in **transistor technology**, radio-controlled components could be miniaturized enough to be sold to civilian customers at a reasonable cost.

1960

1980-1989



Assault military drones were beefed: The U.S. began the **Pioneer UAV Program** in 1980, with the goal of building an inexpensive drone for fleet operations. In 1986 led to the development of the **RQ2 Pioneer** – a medium-sized reconnaissance aircraft.



1990-2010 was a pivotal period for *military and civilian drone development (RAVENS)*-Mini and micro versions of UAVs introduced in 1990 and the famous Predator drone was introduced in 2000.



2010 Golden Age (AMAZON PRIME AIR)



The last 10 years or so have seen a huge explosion in drone innovation and commercial interest.

FIXED WING DRONES



- Use a 'wing' like the normal airplanes
- Never utilize energy to stay afloat on air instead, by the guide control
- They allow UAV to freely rotate around their three axes that are perpendicular to each other

SINGLE ROTOR



- Has a big sized rotor with a small sized one to control heading
- They can fly considerably faster than multi-rotors in a linear line
- Increased payloads do not impact their flight

MULTI ROTOR



- Most common type of drones
- Can be further classified based on number of rotors
- They use more than two rotors with fixed pitch spinning blades that generate lift

AERIAL PHOTOGRAPHY



“Fight or Flight”

In energy industries, drones are used to identify methane leaks in oil and gas production. Scientists are using drones to expand their research as never before. UAVs can keep sensors alive and deal with dangerous scenarios.

SURVEYING AND GIS



“Game of Drones!”

UAVs allows security personnel to reduce and deter threats, survey larger areas in less time and respond more effectively to intruders. Security drones will enable us to run anti-terror, anti-poaching, anti-criminal, anti-piracy and riot control operations safely and effectively.

“X-Streams of the Edges”

Real estate drone photography is flourishing as images captured through drones add a unique perspective to real estate property being sold. For hundreds of years, airborne cameras have made awe-inspiring images of our planet.

SCIENCE AND RESEARCH



“Eye in the sky”

Drones offer enormous opportunities for surveyors and GIS professionals. It is possible to carry out surveys and deliver surveying data in a timely and safe way. When surveying challenging terrain, drones make it no longer necessary for human operators to physically access and measure points in hazardous locations.

SECURITY



Prepared by semester 5 students:

- ∞ Rishita Sengupta
- ∞ Ishani Ghatak
- ∞ Susmita Saha
- ∞ Shreya Basak
- ∞ Ishika Mistri

Mentor: Prof. Abhishek Dey

SUPER COMPUTERS

1. WHAT IS A SUPERCOMPUTER?

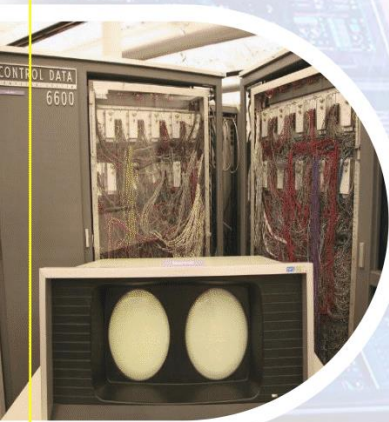
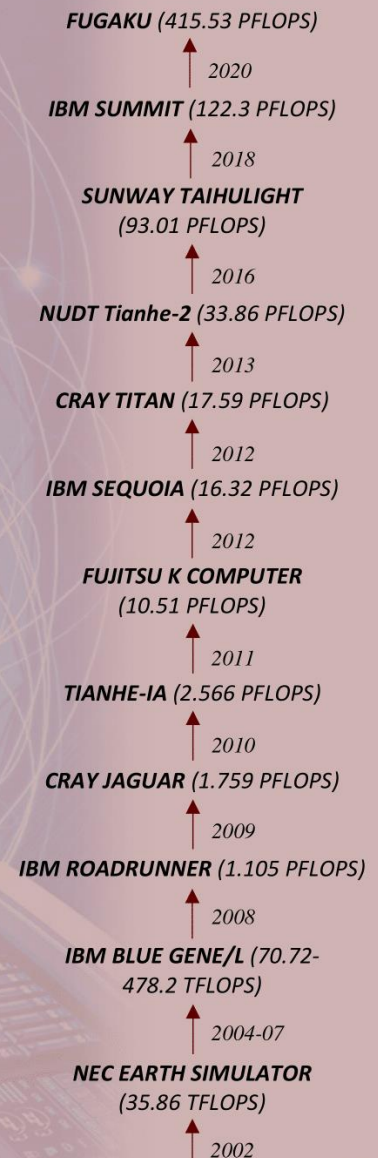
A **supercomputer** is a computer that performs at or near the currently highest operational rate for computers. Traditionally, supercomputers have been used for scientific and engineering applications that must handle very large databases or do a great amount of computation (or both). Although advances like multi-core processors and GPGUs (general-purpose graphics processing units) have enabled powerful machines for personal use, by definition, a supercomputer is exceptional in terms of performance. The largest, most powerful supercomputers are really multiple computers that perform parallel processing. In general, there are two parallel processing approaches: symmetric multiprocessing (SMP) and massively parallel processing (MPP).

The performance of a supercomputer is commonly measured in floating point operations per second (FLOPS) instead of million instructions per second (MIPS).



1.1 Supercomputer TITAN, USA

SUPERCOMPUTER TIMELINE*



1.2 The first Supercomputer

1.2 WHAT DO SUPERCOMPUTERS DO?

Supercomputers play an important role in the field of computational science, and are used for a wide range of computationally intensive tasks in various fields, including quantum mechanics, weather forecasting, climate research, oil and gas exploration, molecular modelling (computing the structures and properties of chemical compounds, biological macromolecules, polymers, and crystals), and physical simulations (such as simulations of the early moments of the universe, airplane and spacecraft aerodynamics, the detonation of nuclear weapons, and nuclear fusion). They have been essential in the field of cryptanalysis. Most supercomputer operating system used to *Unix*, but it's now superseded by *Linux*.

1.3 TYPES OF SUPERCOMPUTERS

There are three main categories of general purpose supercomputers: *Vector processing machines*, *Tightly connected cluster computers*, and *Commodity computers*. Vector processor is, "a CPU that is able to run mathematical operations on a large number of data elements very quickly." A vector processor is opposite of a scalar processor, which can only do one element at a time. A computer cluster is "a group of connected computers that work together as a unit." There are basically four types of clusters: Director-based clusters, Two-node clusters, Multi-node clusters, and Massively parallel clusters. Commodity clusters are, "A large number of commodity PC's interconnected by high-bandwidth low-latency local area networks."



2.1 PARAM Brahma,
India's fastest Supercomputer

2.1 PARAM – the Indian Supercomputer

PARAM is a series of supercomputers designed and assembled by the Centre for Development of Advanced Computing (C-DAC) in Pune, India. PARAM means "supreme" in the Sanskrit language, whilst also creating an acronym for "PARAllel Machine". The PARAM 8000 was the first machine in the series and was built from scratch. A prototype was benchmarked at the 1990 Zurich Super-computing Show: it demonstrated that India had the second most powerful, publicly-demonstrated, supercomputer in the world after the United States. PARAM 8600 was an improvement over PARAM 8000. The PARAM 9000 (1994) was designed to be merge cluster processing and massively parallel processing computing workloads. Typically a system used 32–40 processors, however it could be scaled up to 200 CPUs using the clos network topology. The PARAM 10000 (1998), PARAM Padma (2002), PARAM Yuva (2008), Yuva II (2013), ISHAN (2016) and **PARAM Brahma** (2020) are the respective successors. Brahma is a supercomputer offering a computational power of 850 TeraFlop with 1 PetaByte storage capacity. It is supported by a first-of-its-kind cooling system called direct contact liquid available in India.

2.2 FUGAKU – the fastest Supercomputer

Fugaku — named after an alternative name for Mount Fuji — is a petascale supercomputer at the RIKEN Center for Computational Science in Kobe, Japan. The supercomputer is built with the Fujitsu A64FX microprocessor. This CPU is based on the ARM version 8.2A processor architecture, and adopts the Scalable Vector Extensions for supercomputers. Fugaku was aimed to be about 100 times more powerful than the K computer (i.e. a performance target of 1 exaFLOPS) and have a high level of practicability in the world. Fugaku uses 158,976 A64FX CPUs joined together using Fujitsu's proprietary torus fusion interconnect. Fugaku will use a "light-weight multi-kernel operating system" named *IHK/McKernel*. The operating system uses both Linux and the McKernel light-weight kernel operating simultaneously and side-by-side.



2.2 FUGAKU,
The fastest Supercomputer

In 2018 Nikkei reported the programme would cost ¥130 billion (US\$1 billion).

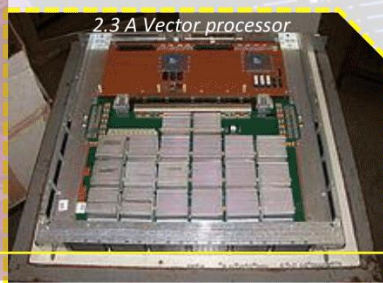
2.3 CURRENT STATUS

We have lived through six generations of very high performance computers - the so-called supercomputers. The next generation is due in a year or so. What do we know about multiprocessor systems? Unfortunately, not enough. At the present time there are numerous dual processors (e.g., IBM 3081, CDC CYBER 875, Cray X-MP, Fujitsu 382, etc.). Some of these can grow to eight or more systems. Computer Scientists throughout the world tell us that the best way to gain performance is to multiplex our CPUs (scalar or vector). At the same time, it is becoming more and more difficult to get higher speed electronic components.

2.4 SUPER to HYPER

Nowadays quantum computation is probably considered as the most promising way to achieve superfast calculation performances to be implemented in the next generation of hyper-computers. Nevertheless, the realization of an hypercomputer, namely a system able to perform countable infinite computational steps within a finite time, is usually considered not allowed due to the Heisenberg uncertainty principle that limits the energy required by such steps. This proposal opens very interesting prospects towards a deeper understanding of quantum information and computation as well as to the realization of an actual hypercomputer system and its applications to frontier fields such as Artificial Intelligence.

*All the above mentioned supercomputers in the list have been featured in the TOP500



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< Semester 3 >

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Sohini Roy Chowdhury

Sritama Mondal

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Soumili Mukherjee

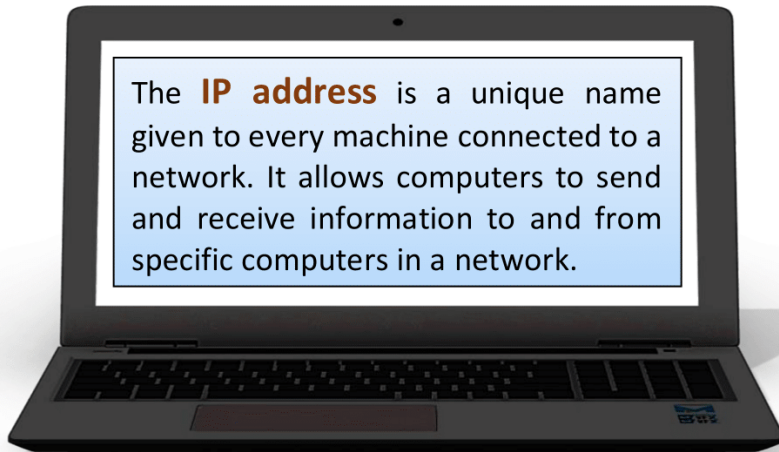
Mentor: Prof. Krishanu Naskar



IP Spoofing



Like you have an address, so do we!



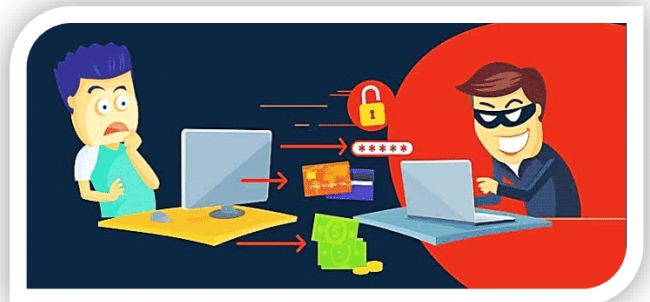
Why Spoof?

Spoofed IP addresses can give attackers the ability to:

- ▶ Avoid being discovered by the authorities.
- ▶ Perform malicious acts by masquerading original identity.
- ▶ Steal information by pretending to be a trusted source.

What is IP Spoofing?

IP Spoofing is creating Internet Protocol (IP) packets with a false source IP address, for the purpose of impersonating another computing system for malicious use.



Spoofing Attacks: Types



Detect a Spoofed Packet

- ! Sending host increments the **IP ID** number, which can be easily probed. So it is used to detect a spoofed packet.
- ! When the maximum amount of data is reached, a **window size field** is set to zero. If the packet is not spoofed, the sender should stop sending data.
- ! **TTL field** is decremented in the routed IP packet header to prevent endless routing. This can be used to detect a spoofed packet.



Don't Be Spoofed!

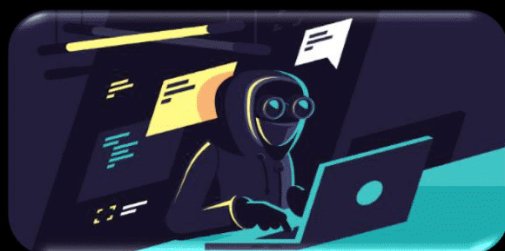


Are YOU At Risk?

IP Spoofing is **easy** due to certain loopholes in the network interface identification:

- ⚠️ IP Routing is hop by hop where the route of an IP packet is decided by all the routers it goes through.
- ⚠️ Routers look at destination addresses only.
- ⚠️ Authentication is based on source address only.
- ⚠️ It is very easy to change the source address field in an IP header file.

Newsfeed



DDoS Attacks: Some Of the Biggest Ever

Trending

Technology

Sports



Amazon Mitigates Biggest DDoS Attack

17th June, 2020

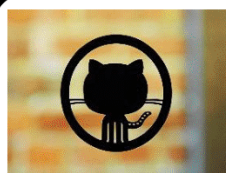
Traffic hit a peak of 2.3 Tbps; led to 3 days of "elevated threat" status.



NETSCOUT Witnesses 1.7 Tbps Attack

5th March, 2018

Attack targets customer of a US based service provider.



GitHub Platform Hit at 1.35 Tbps

28th February, 2018

It caused the whole website to go down for 10 minutes.

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Sampurna Dutta

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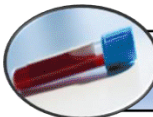
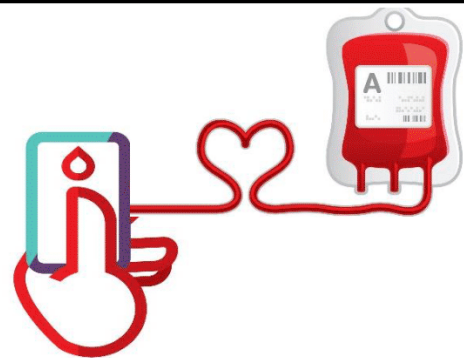
WEB-BASED BLOOD DONATION MANAGEMENT SYSTEM

- An Era Of
Change



Web-based Blood Bank Management System:

Blood Bank Management System (BBMS) is a web-based application that is designed to store, process, retrieve and analyse information concerned with the administrative and inventory management within a blood bank.



**Prevents contamination of
donated blood.**



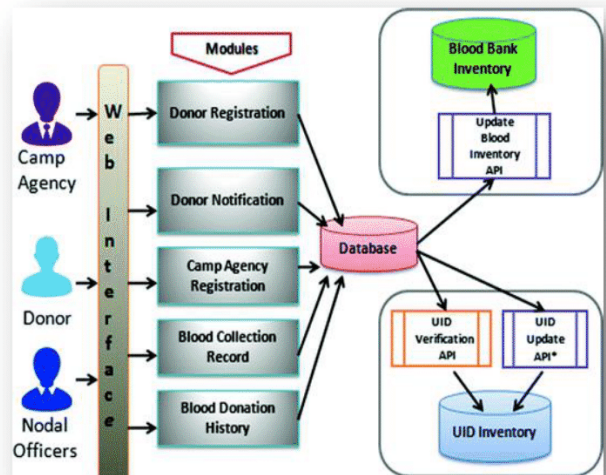
**Provides centralized blood
donor registry.**



**Prevents time
consume.**

**Why is Web-based Blood
Donation Management
System better than
the manual system?**

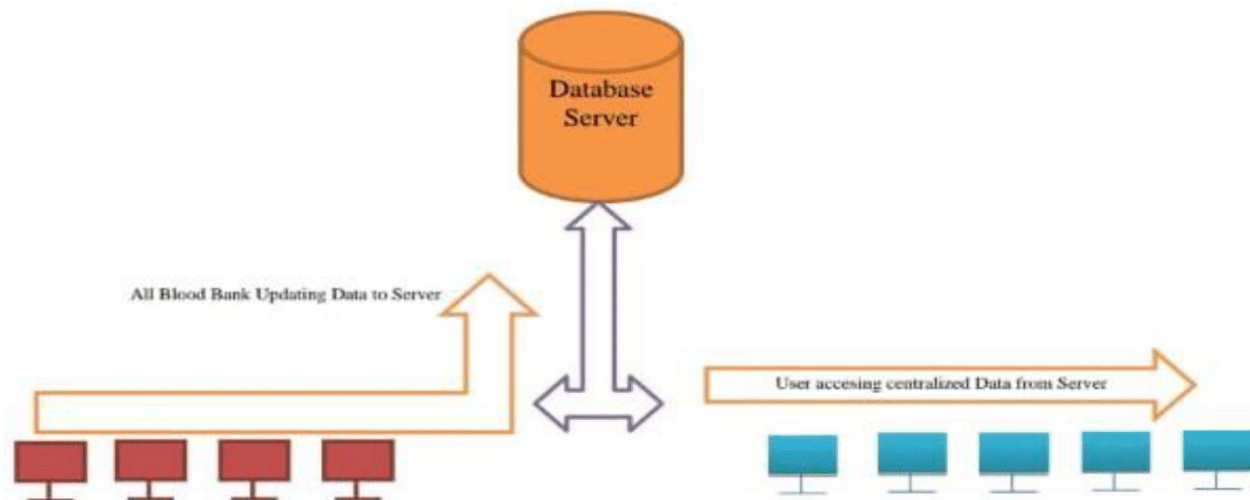
MODULES OF WEB-BASED BBMS





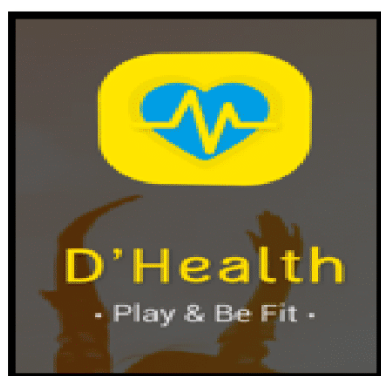
Apheresis is a special kind of blood donation that allows a donor to give specific blood components, such as platelets.

SYSTEM ARCHITECTURE IN WEB-BASED BBMS



D-HEALTH APP

-"INDIA'S 1ST WEB-BASED BBMS"



The "**D-Health**" app is a data sensitive and data intensive platform. It is India's first Aadhaar-based centralized donor authentication and identification application that leverages the power of cloud computing. **Strides Software Solutions**, an Aurangabad based startup, took on the task to enable the availability of safe and high quality blood components. D-Health app brings all the key stakeholders of blood cycle management – blood banks, blood camp organizers, donor, hospitals and patients on one platform.

TARGET: As said by the Founder of Strides Software Solutions, **Dinesh P Mutha**, the D-Health app helps bridge the demand supply gap by making the blood drives need base and organizers reach out to donors in case of emergency and enables patients and hospitals search for blood components across member blood banks at a single click.



DINESH P MUTHA



**OTHER
WEB-BASED
BBMS**





Granulocytes, a type of white blood cell, roll along blood vessel walls in search of bacteria to engulf and destroy.



ADVANTAGES

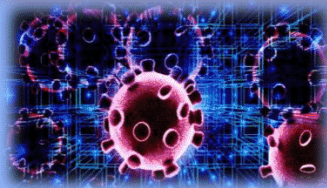
- The BBMS makes the overall project management much **easier and flexible**.
- It provides **high level of security** with different level of authentication.
- Everything will be very **fast** instead of hand written or manual work.
- Donors can donate blood **conveniently** by checking the list of blood donation camps.

DISADVANTAGES



- It requires **active internet connection**.
- At present it is available for some **limited zone**.
- **Difficulty in identifying** blood donor's expiry date.
- It requires **high cost maintenance**.

Role of Web-based BBMS in COVID-19 Pandemic



During the **COVID-19** pandemic, even in absence of elective surgeries, there is an urgent need for blood services to be prepared to ensure blood sufficiency for post-partum haemorrhage, emergency surgeries, cancer treatment and hereditary disorders. BBMS aims to measure **donor attendance** and **blood demand** in order to help find efficient ways of managing blood supply and demand during the **COVID-19** pandemic. Web-based BBMS did played a great **advantageous role** in this pandemic by keeping proper track of pure blood. Wed-Based BBMS did not let patient get injected with impure blood. This system keep records of pure blood donors, so with the records, this system successfully made pure blood available as soon as possible to the patient who needed blood.

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2ND YEAR (3RD SEMESTER)

AYUSHI KARMAKAR

PUJA DAS

SUPARNA MAJUMDER

AMBITAMA PODDAR

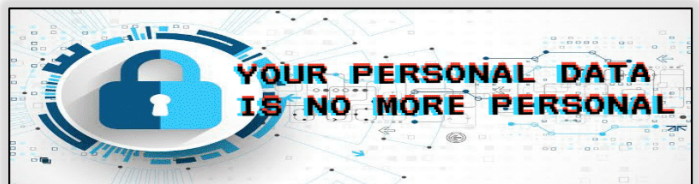
Supervised By:

SMT. DIPANWITA C BHATTACHARYA

SECURITY & PRIVACY IN SOCIAL MEDIA

WHAT IS SOCIAL MEDIA?

Social media are interactive computer-mediated technologies that facilitate the creation or sharing of information, ideas, career interests and other forms of expression via virtual communities and networks.



YOUR precious information is at SOMEONE ELSE'S fingerprints now!

There are several ways in which social media websites like Flickr provides geotagged photos.



SHARING isn't always CARING!

It can happen that some applications may share your information with advertising and tracking companies.



A single key press and your taste gets revealed.....

Google and other search engines collect information about you everyday, some of them may lead you to fake sites.



Your every footprint is under UNWANTED surveillance

Your ISP (Internet Service Provider) and other third parties can view any information you exchange with a non-secure website.





ALERT! SOMEONE OUT THERE IS WAITING TO BE 'YOU'

Identity thieves illegally use an individual's personal information to pretend to be them.



BEWARE OF MALWARE

Malware can create a backdoor, giving cyber criminals access to your device and data.

The 3P's of being 'SOCIALLY SECURE'



Be choosy about sharing your social security number — even the last 4 digits



Keep your social network activity private



Be careful about taking drastic actions

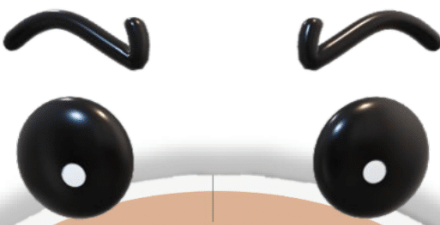


Turn on private browsing

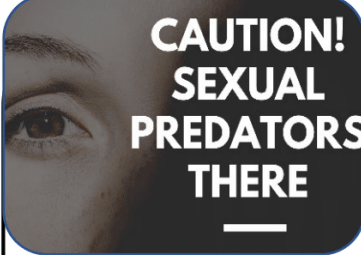
Hackers go **PHISHING**
to make their weekends
special



Phishing attacks are when emails, instant messages or other messages claiming to be from a trusted source ask for information.



Handle It
with care!
Else
Be ready to
face the
dare!



CAUTION! SEXUAL PREDATORS THERE

Due to the high content of personal information placed on social networking sites. Such sites have become increasingly popular for online sexual harassment.

Prepared by:
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☐ Rima Kundu
☐ Esha Chakraborty
☐ Sampurna Bhattacharya
☐ Bidisha Sengupta
Mentor: Prof. Abhishek Dey

Introducing Smart Glasses

What it is...



Smartglasses or smart glasses are wearable computer glasses that add information alongside or to what the wearer sees. Smart Glasses are a new form of media devices. They enable augmented reality experience. The glasses display informations in a hand free smartphone like format, and wearers communicate with the device using natural language voice commands.

History...



In 1968, computer scientist Ivan Sutherland created The Sword Of Damocles, with the help of his students. This device is considered to be the first virtual reality head-mounted display system. The first wearable glasses known to the history appeared in Italy during 13th century, though smart glasses have only been on the market in the 21st century. The technology behind invention of smart glasses was to build a camera into the lens, while the specs would connect it with the smart phones and transfer data.

How it works...



Smartglasses collect information from internal or external sensors. It controls or retrieves data from computers and wireless technologies like Bluetooth, Wi-Fi, and GPS. It can also send audio and video files to user via Bluetooth or WiFi headset. They aim to provide life monitoring services, as well as creating a platform with well equipped Augmented Reality Technology insisting us to lead a much easier way of lifestyle.

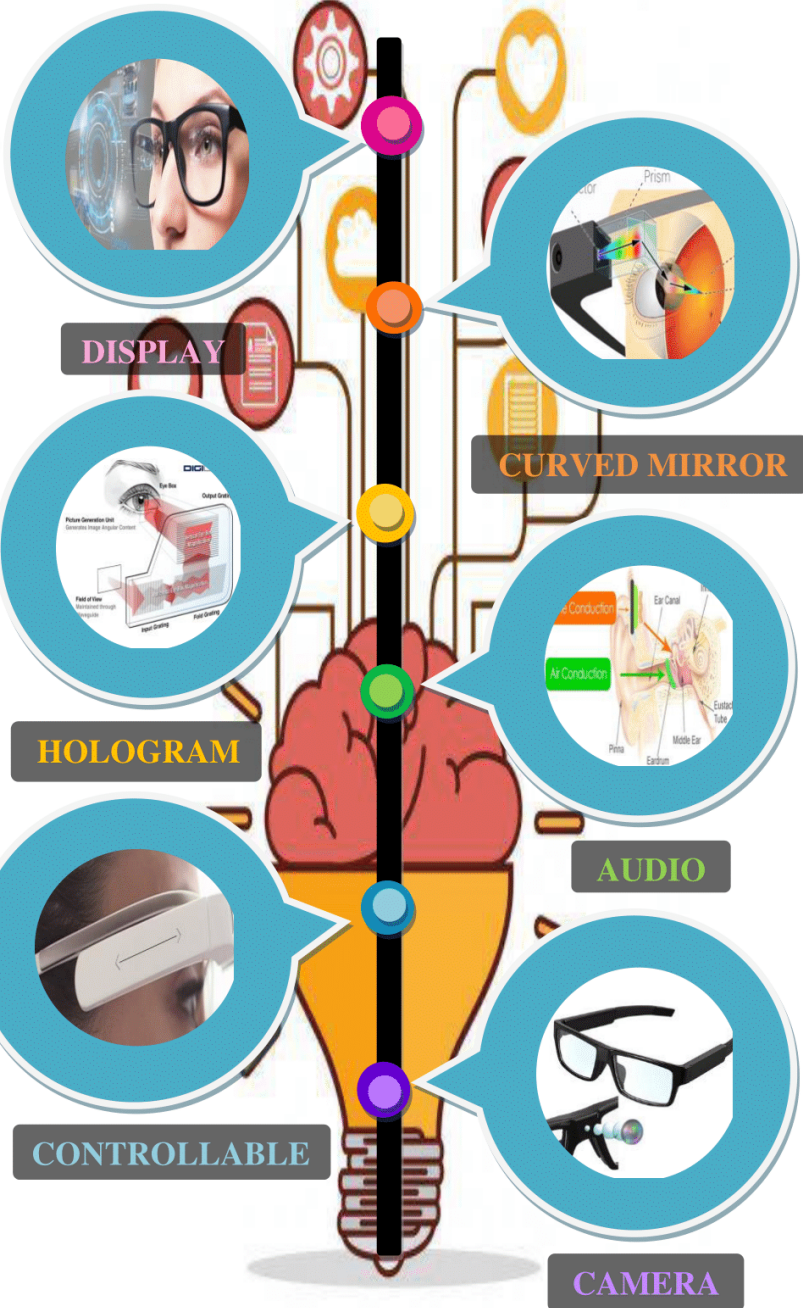
Technology Overview



- ✓ Improved health and safety
- ✓ Low Costs at Greater Efficiency.

Merits & Demerits

- ✗ May take a toll on our vision
- ✗ Understanding and user adoption is difficult



Prepared by Semester 3-

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Monaly Sarkar

Ayushi Dey
Pallavi Paul

Mentor- Pallavi Roy



DIVIDED BY SOCIAL DISTANCING, UNITED BY SOCIAL MEDIA

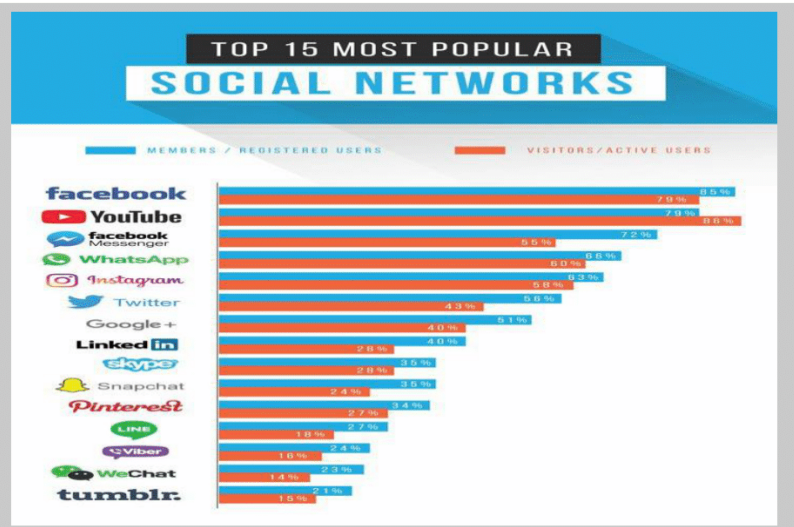


"Social Media is not a media. The key is to listen, engage and build relationships"

-David Alston

The apps that are used to serve our purposes during this pandemic situation are:

- **Social networks and social shopping networks:**
Facebook, Twitter, LinkedIn, Polyvore, Etsy, Fancy
- **Media sharing networks:**
Instagram, Snapchat, Youtube
- **Blogging and publishing networks:**
Wordpress, Tumblr, Medium
- **Discussion forums:**
Reddit, Quora, Digg



Can you ever imagine your life without social media during this quarantine? In 2019, an estimated **2.95 billion** people were using social media worldwide while now the number has increased to **4.5 billion** in just 6 months. In India, social media has gathered approximately **376.1 million** users in this year.

Here some of the most used social networking sites are shown where people can have voice interaction, online classes, business meetings, buying products, sharing reviews, reading books, entertainment and all other purposes spending roughly 144 minutes per day.



5 Ways to Stay Connected During Social Distancing



Video calling



Online group chat



Digital games



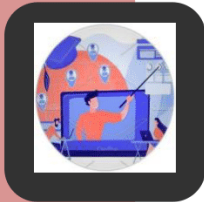
Online classes



Social media

STAY HOME, STAY SAFE

The non-pharmaceutical intervention of social distancing is a key policy to reduce the spread of COVID-19 by maintaining physical distance and reducing social interactions. Hence, people are turning to social network to work, communicate and stay in touch with their loved ones, thus influencing their lives through social media.



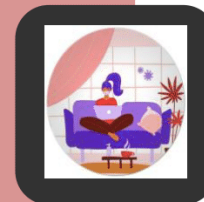
EDUCATION MATTERS, HOBBIES TOO!!

Many educational institutions started offering online courses to ensure education was not disrupted by the quarantine measures. Leisurely activities and hobbies are getting nurtured through online platform and libraries.



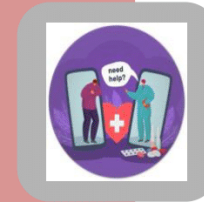
DISTANCING IS THE NEW MANTRA!

With the blessing of social networking, communication among people is possible maintaining safe distance which helps to prevent the spread of COVID-19.



GET UP AND WORK!

In addition to preventing the spread of viruses, remote work (work from home) also save commute time and provides more flexibility.



DO NOT PANIC IN PANDEMIC!

Medical based app and sites like “ArogyaSetu”, “Red Cross Society”, “Med Life”, etc. can provide us necessary information of pandemic, blood donors and online medicine delivery at our doorsteps.



\$ CLICK AND CASH \$

Online transactions and payment are making money transfer easier and also indulging small business houses to set up their own online activities.

LAST BUT NOT THE LEAST

Despite of all the bright aspects, social media has some dark sides too...



BEWARE OF THEFT!!

Online fraud, cyberbullying and others...



MIND YOUR USAGE!!

Internet addiction, health issues, spreading of misinformation.



CAN I AFFORD?

May be un-affordable, bad infrastructure, lack of bandwidth support.

Hence we can say that, today the greatest risk of worldwide catastrophe is pandemic, an enormously infectious virus that's more devastating and may kill many people. The transparency that we have gained through this current COVID-19 situation, we now understand that we were not geared up for this pandemic situation. The next pandemic is not a matter of "if it happens", but "when it happens", would we be prepared in advance against the pandemic at an individual and collective level. What we actually need is preparedness. Indeed, the technology has advanced more and will continue to advance exponentially, but the human institutions and societies need to accelerate in adapting to it and continue investing in building the technology systems for the preparedness. After the COVID-19 outbreak, it is evident that the technology innovations are helping to manage the epidemic in a timely, systematic, and calm manner. Technology may help shape us, but do not forget that we help shape it as well. We can use it to be creative and kind. We can use it to be together.

**BE SOCIAL THROUGH
NETWORKING-
BE SAFE BY
DISTANCING**

Presented By-

(SEMESTER-V)

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BHATTACHARYA