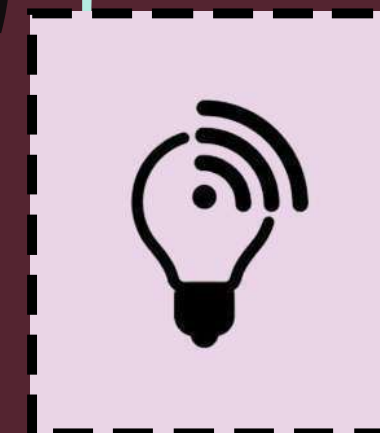
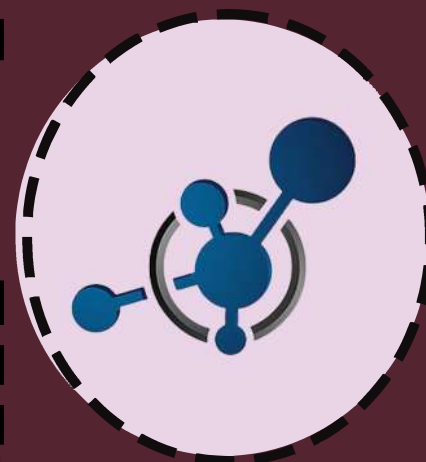
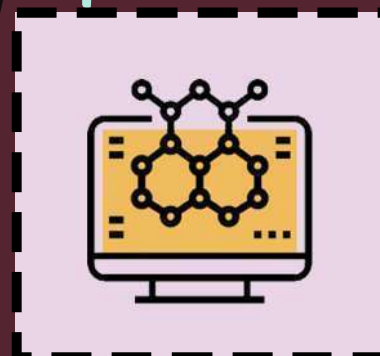
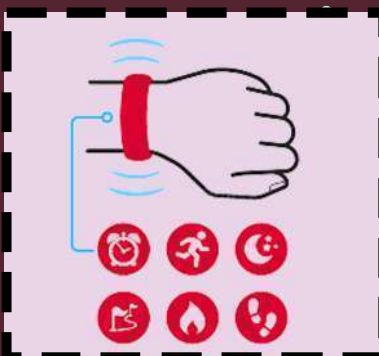




# TECH TONIC v5

Department of Computer Science || 2nd Digital edition



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## PC CARE 101



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A healthy machine means a happy you.

-3rd semester, Mentor: S. Maitra

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## From the Editor's Desk

Another year passed with mixture of despair and hope amidst this lockdown and fear of the pandemic. Though we have new rays of hope with invention and implementation programs of vaccine but we are still to get on the offline mode of teaching-learning process successfully.



However, human beings are initially a creature that survives and prospers with hope and never succumb even at the most despondent situation. We always find a way to get over the crisis or find solutions to every problem. That's how we beat the ice-age, we survived the Toba volcano eruption and Black-Death of fourteenth century. We never lose hope.

So the use of digital platform to publish our beloved Wall magazine Techtonic in form of an e-magazine that started in the year 2020 is to be continued this year also. Infact we the mentors and mentee alike found a new way to express ourselves, a new direction to explore our creative side while creating this e-version of our Wall Magazine. As it is said, Even the darkest cloud has a silver lining, here in midst of this pandemic we have this silver lining of hope that is expressed best here in this e-magazine by our beloved students.



# 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 endeavours. The next person, I as the magazine editor would like to thank is our departmental head **Dipanwita C. Bhattacharya** who has parted with us temporarily but without her trust upon us, it would be difficult for us carry on with this project.

A million thanks and gratitude to the entire team of mentors, who made this process thoroughly enjoyable for their students, by helping them to choose from a myriad of topics, both interesting and relevant in today's times. My gratitude goes first to our most efficient and trust-worthy mentor **Srijoni Maitra** from whom I myself learned a lot. Not to forget the ever- dependable **Abhishek Dey** for being my support when it was most needed. Special mention goes to **Ankita Sarkar & Tayanika Mukherjee**, both of whom did a marvelous job while doing this for first time.

But the mentors without their mentees are like the rockets without the fuel. 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 4th and 2nd semester students.

And last but not the least, a big cheer for my dedicated team of designers, who were rightly chosen for their dedication and willingness to help me out with this work. A captain is only as good as the team he leads, and I was lucky to have been blessed with the best.

I would like to end this acknowledgement to the 2nd digital edition of our beloved TECH-TONIC, by some cliché but ever true parting words – Knowledge and love are the only things which more you share, more you get ! So share knowledge and love with all and have a happy reading.

## Team of Mentors –

1. Krishanu Naskar (H.O.D.)
2. Abhishek Dey
3. Ankita Sarkar
4. Dipanwita C. Bhattacharya
5. Srijoni Maitra
6. Tayanika Mukherjee

## Design Team –

1. Madhuja Roy
2. Oindrila Pathak
3. Snehangshee Dutta
4. Tanisha Dey

Signing out –

**Krishanu Naskar**

In-charge, Editorial

Tech-Tonic (v 5.0), 2022

# PC CARE 101

A healthy machine means a happy you



## MYTHS

- ❖ Must turn off computer if away for a long duration.
- ❖ Draining your laptop battery completely is a good thing.
- ❖ Frequent power on and off can damage your machine.
- ❖ Its necessary to buy a replacement monitor or any other part of the machine from the original manufacturer only.
- ❖ Keep magnets away from hard drive.
- ❖ Antivirus stops all viruses.

## 1 CLEANUP UP HARD DISK DRIVE

Our hard disk gets filled up with unnecessary files ( temporary, corrupted or obsolete files ), over time. Thus, a disk cleanup once in a while can give your machine an extra boost.



## 2 UNINSTALL NON ESSENTIAL APPS

In most cases, our device comes with some pre-installed apps which we may never use. All they do is sit and take up space in our hard drive. We say, uninstall them and free your device's memory.



Keeping non essential apps

Keeping quality apps

## 3 SCAN FOR AND REMOVE MALWARE

Usually viruses ,spyware and other malwares make a device unusable. When a device starts to operate slow this could be a sign of malware infection .If we suspect the computer has been infected, we should try running a full virus scan to remove malware from the device.



## 5 VISIT SECURE SITES

An unprotected website has a security risk, it allows for the spread of malware and cyber-attacks. Visiting secure sites is very necessary to keep safe our computer.



## 4 EMPTY RECYCLE BIN

The recycle bin has a certain disk space dedicated to it. When we are clearing out space, it's good to permanently empty our recycle bins. To empty the recycle-bin, right click the icon and click the Empty Recycle Bin option.



6

## DRIVE DEFRAGMENTATION

Drive defragmentation actually means organizing all the pieces of each file in hard drive. It also makes sure programs are each in one place. So the unused space on hard disk is all together.

Steps :

1. Open Settings
2. Click on System.
3. Click on Storage.
4. Under the "More storage settings" section, click the Optimize Drives option.

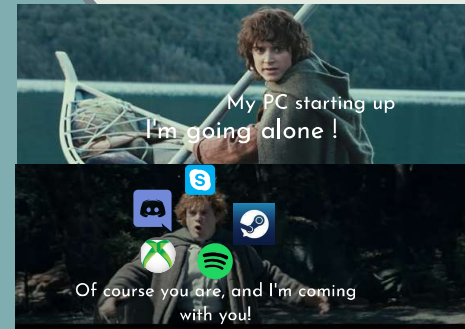
7

## DISABLE STARTUP APPS

Having a huge list of startup programs can slow down our booting process and hence, hamper the device's speed (performance).

Steps :

1. Open Task Manager [Ctrl+Shift+Esc]
2. Go to startup tab.
3. Disable the rarely used apps.



8

## DISABLE BACKGROUND APPS

Some apps tend to run tasks on the background even when they are not in use and as a result it-

- i) heats up your device.
- ii) takes system resources.
- iii) reduces overall performance

Therefore, we can turn off some background apps and start them manually when required, by-

Going to settings->privacy->background apps->turn off the apps.

9

## SWITCH TO HIGH PERFORMANCE POWER PLAN

Different plans like Balanced, power saver, High performance are included in windows operating system to optimize the power usage. To boost the system performance we use the 'High Performance' power plan. It allows the device to use more power to operate faster.

Steps:

1. Open Settings.
2. Click on Power & sleep.
3. Under the "Related settings" section, click the Additional power settings option.
4. Click the Show additional plans option (if applicable).
5. Select the High-performance power plan.

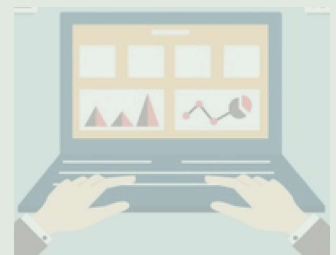


### DO'S

- Remove CDs , DVDs or thumb drives before traveling with your laptop.
- Use UPS.
- Shutdown properly.
- Keep OS updated.
- Do try to be smart when using a public wi-fi.
- Do use antivirus.
- Be careful with emails and the its attachments.

### DONT'S

- Blindly click on suspicious links.
- Physically abuse your computer.
- Eat or drink near a computer.
- Use laptops on the bed.
- It prevents heat from getting out the air vents.
- Drain your laptop battery everyday.



**After everything , if your PC still runs into some problem we suggest you try restarting. But whatever you do, don't call us ; A programmer is not a PC repair person**



# 3-D BIOMETRICS

## INTRODUCTION

### WHAT IS 3-D BIOMETRICS ?

Biometrics are a way to measure a person's physical characteristics to verify their identity. These can include physiological traits, such as fingerprints and eyes- the unique way to complete a security-authentication. A biometric system is a system that allows the recognition of a certain characteristic of an individual using mathematical algorithms and biometric data. However, most of the physical biometric recognition techniques are based on two dimensional (2D) images, despite the fact that human characteristics are three dimensional (3D) surfaces. Recently, 3D techniques have been applied to biometric applications such as 3D face, 3D palmprint, 3D fingerprint, and 3D ear recognition.

Biometrics is certainly the most secure form of authentication. It's the hardest to imitate and duplicate."

-Avival LITan



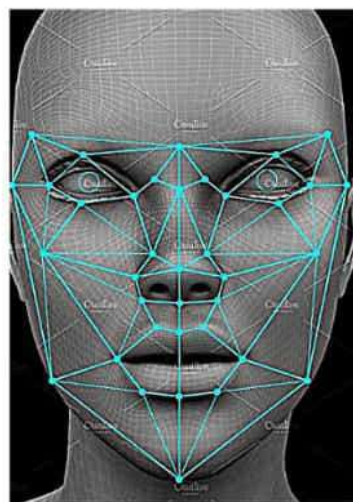
### ALPHONSE BERTILLON

22 April 1853 – 13 February 1914

Father and pioneer of Biometrics.

## TERMINOLOGY

When one examines the etymology of the word "biometrics," you can break it down into two Greek words - "bio," which means life, and "metrics," which means to measure.



## A BRIEF HISTORY OF

## BIO-METRICS

Biometric technology has come a long way since its beginnings. Here's a brief history outlining its development.

1880

Henry Faulds, a Scottish physician, missionary and scientist, publishes the first paper on forensic fingerprinting, in which he outlines specific methodology for collection and processing of fingerprints.

1892

Juan Vucetich, an Argentine Police Official, makes the first criminal fingerprint identification based on Galton pattern types.

1903

The New York State Prison system began the first systematic use of fingerprints in the U.S. for criminals.

1905

The U.S. Department of Justice forms the Bureau of Criminal Identification in Washington, DC to provide a centralized reference collection of fingerprint cards.

1924

The Identification Division of the FBI is established.

1964

Facial recognition technology is pioneered by Woody Bledsoe, Helen Chan Wolf, and Charles Bisson in 1964 as part of their collective study on pattern recognition intelligence (PRI).

1994

The modern pioneer of retina scanning technology is John Daugman, who developed and patented the first algorithms for computer-aided identification of iris patterns in 1994.

LATE 20TH CENTURY

Mechanical time clocks evolve to computer based, electronic time and attendance systems with biometric readers to identify the employee to the system.

2011

Motorola is the first company to offer a fingerprint scanner in a smartphone (the Motorola Mobility Atrix 4G).

EARLY 21ST CENTURY

Computing technologies include fingerprint technology within laptops, including Sony, Dell, Fujitsu, HP, Toshiba, Acer, and others (at one time or another).

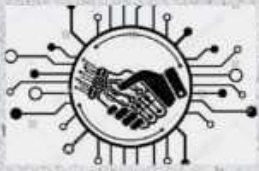
EARLY 21ST CENTURY

Automotive technologies include fingerprint recognition sensors, such as the early Mercedes S-Class Model.

2013

FingerCheck is founded, making biometric time clock technology accessible within the U.S. and beyond.





## APPLICATIONS AND BIOMETRICS IDENTIFIERS

### Fingerprint

Fingerprints serve as an important and widely used biometric data. Any device that can be touched, such as a phone screen or touchpad, has the potential to become an easy and convenient fingerprint scanner.



### Voice

Voice-based digital assistants and telephone-based service portals are already using voice recognition to identify users and authenticate customers.



### Iris

Among all the eye-based biometric recognition approaches, iris recognition is the most prominent one, which has been deployed in a wide variety of applications. Unique muscular folds found in human iris are the basis of iris recognition.



### Signature

Digital signature scanners are already in widespread use at retail checkouts and in banks and are a good choice for situations where users and customers are already expecting to have to sign their names.



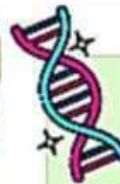
### Face


Face recognition is another biometric modality going hand in hand with fingerprint recognition in terms of popularity and deployment. Face recognition systems can scan facial features from a distance as they make use of digital imaging.

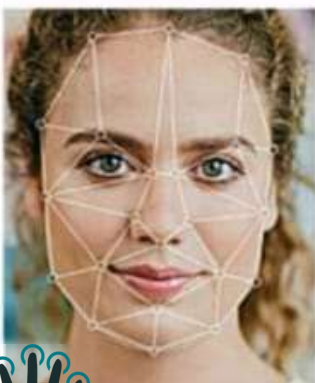


### DNA

Today, DNA scans are used primarily in law enforcement to identify suspects. In practice, DNA sequencing has been too slow for widespread use.



  
Vein recognition or vascular biometrics takes the crown of being the most secure and accurate modality due to so many advantages it inherently offers.



## Advantages

HIGH SECURITY AND ASSURANCE

CONVENIENT AND FAST

EXCLUSIVITY

SPOOF PROOF

## Disadvantages

QUITE EXPENSIVE

PRONE TO DATA BREACHES

INACCURACY IN FEW CASES

PRIVACY THREAT



## THE FUTURE OF BIOMETRIC SECURITY

Many biometric services are currently under development and testing. In a few years, these biometric technologies will be introduced everywhere. Plastic cards will recede into the background soon, and fingerprint scans will become a standard daily operation.

The future of biometric security is likely to lie in simplicity. Improving modern methods is the easiest way to provide a high level of protection.

Biometric identification technologies are improving so quickly that it is difficult to predict what they will look like in a few years.

## FACTS

90% of people surveyed said they are ready to use biometric identification

Fingerprint verification leads the popularity list.

Brazil and U.A.E. are the most enthusiastic countries, while France is still sensitive.

Biometric mobile wallets are not yet trusted worldwide.

IDEMIA is a pioneer in the biometric world, with its payment card solution F.CODE

## Frequently asked Questions

### Do fingerprints and other biometrics change When you get older?

Once a person stops growing their fingerprints and other biometrics are largely constant.

### Are biometrics a threat to privacy?

This is a difficult question and probably the main barrier to wider use of biometric systems. However, if certain standards in information collection and protection are met, then biometrics can be a privacy enhancing tool.

### Are biometric systems very costly?

On average biometrics these days are not much more expensive than most other secure second factors. Many biometric systems work from relatively inexpensive sensors such as cameras or phones, and even fingerprint sensors these days can be made cheap enough.



Prepared by Students of Semester 1

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# FITNESS AND WEARABLES

IF THE TECH FITS, WEAR IT



A wearable technology or wearables refer to **smart electronic devices** worn close to and/or on the surface of the skin, where they detect, analyze, and transmit information concerning body signals and allow in some cases immediate biofeedback to the wearer.

While these technologies show great influence in fashion and entertainment they have the largest impact in the areas of health, **medicine**, and **fitness**.



In 2010, **Fitbit** released its first step counter. Wearable technology which tracks information such as walking and heart rate is part of the quantified self movement.

## ORIGIN

Horologist and inventor Abraham-Louis Perrelet is credited with creating the first, albeit rudimentary, pedometer, in 1780.

Fitness trackers, as we know them today, first surfaced in 1965 with the "Manpo-kei" and was invented by **Dr. Yoshiro Hatano**, a Japanese professor who, at the Kyushu University of Health and Welfare was researching at the time how to combat obesity.



Since the **1960s**, fitness tracking devices and the technology underpinning them has developed at a rapid pace. This has been aided by the introduction of wireless heart rate monitors in Polar watches in the 1980s.



Today, there is a growing interest to use wearables not only for individual self-tracking, but also within corporate health and wellness programs.

Will Wearable Devices Be Streamlined in Healthcare?



## RISE OF WEARABLES

In the consumer space, sales of smart wristbands (a.k.a. activity trackers such as the **Jawbone UP** and **Fitbit Flex**) started accelerating in 2013. As of 2009, decreasing cost of processing power and other components was facilitating widespread adoption and availability. In the last decades, it shows rapid growth in research of textile-based, tattoo, patch, and contact lenses.



Wearable technology can also collect biometric data such as heart rate (**ECG** and **HRV**), brainwave (**EEG**), and muscle bio-signals (**EMG**) from the human body to provide valuable information in the field of healthcare and wellness. As wearable technology continues to grow, it has begun to expand into other fields.

Wearables continue to evolve, moving beyond devices and exploring new frontiers such as smart fabrics.



**Wearables can be used to collect data on a user's health including :**

- ★ Heart rate
- ★ Calories burned
- ★ Steps walked
- ★ Blood pressure
- ★ Release of certain biochemicals
- ★ Time spent exercising
- ★ Seizures
- ★ Physical strain



THESE FUNCTIONS ARE OFTEN BUNDLED TOGETHER IN A SINGLE UNIT, LIKE AN ACTIVITY TRACKER OR A SMARTWATCH.



**Currently other applications within healthcare are being explored, such as :**

- Forecasting changes in mood, stress, and health
- Measuring blood and alcohol contents.
- Measuring athletic performance
- Monitoring how sick the user is
- Long-term monitoring of patients with heart and circulatory problems.
- Health Risk Assessment applications.
- Automatic documentation of care activities.



While wearables can collect data in aggregate form, most of them are limited in their ability to analyze or make conclusions based on this data: thus, most are used primarily for general health information. [Excepting seizure-alerting wearables, which **continuously analyze the wearer's data** and make a decision about calling for help.]



Wearables can account for individual differences, although most just collect data and apply **one-size-fits-all algorithms**.

## FUTURE OF WEARABLES

The future of how wearables could impact our lives remains relatively unknown, however, many companies have begun to set out their stalls, predicting what the next big thing will be.

What is apparent right now is that the fitness tracker and the wider wearables market show **no signs of slowing down** anytime soon.



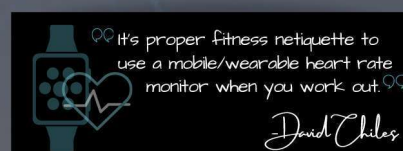
## EPIDERMAL ELECTRONICS

Epidermal electronics is an emerging field of wearable technology, termed for their **properties** and **behaviors** comparable to those of the epidermis, or outermost layer of the skin. These wearables are mounted directly onto the skin to continuously monitor physiological and metabolic processes, both dermal and subdermal.

The significance of epidermal electronics involves their mechanical properties, which resemble those of skin. Properties of epidermal electronics mirror those of skin to allow them to perform in this same way.



The fitness industry continues to grow at an exponential rate, both in terms of those attending gyms on a regular basis and those accessing the services of personal trainers or attending group classes.



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CYBERNETIC + ORGANISM

# CYBORG

IS IT SCI-FI OR NEAREST FUTURE?



## DEFINITION



A “**cyborg**” is defined as an organism with both biological and technological components. In some definitions, a cyborg is described as a hypothetical person whose physical abilities are extended beyond normal human limitations by mechanical elements built into the body.

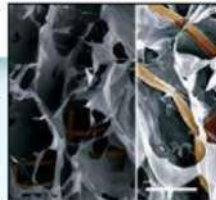
## DEVELOPMENT HISTORY

The term “cyborg” was first coined by NASA scientists, **Nathan Kline** and **Manfred Clyne's** in 1960. They discussed the potential advantages of a machine/human hybrid that could operate in other space. Cyborgs are often depicted as “half man half-machine” beings with robotic or bionic implants.



## CYBORG AND TISSUES IN ENGINEERING

Cyborg tissues structured with carbon nanotubes and plant or fungal cells have been used in artificial tissue engineering to produce new materials for mechanical and electrical uses.



## WHY CYBORG?



Cyborgs are considered as the next step of human evolution. A seed sized electronic implant of cyborg can do many functions which reduce a lot of human effort. Such an implant can replace

1. Credit Card
2. Passport, visa etc.

vs

## ROBOT



The main difference between a cyborg and a robot is the presence of life. A robot is basically a machine that is very advanced. It is often automated and requires very little interaction with humans. In comparison, cyborgs are a combination of a living organism and a machine.

## CYBORG





# TYPES OF CYBORG



## Individual Cyborg

It is used to refer to a human with bionic, or robotic, implants. Artificial objects such as prosthesis are so closely attached human bodies as to be considered as a part of one's body.

### Example

Today the C-leg system developed by Otto Bock healthcare is used to replace a human leg that has been imputed because of injury or illness.



## Social Cyborg

The full term "cybernetic organism" is used to describe larger networks of communication and control. A corporation can be considered as an artificial intelligence that makes use of replaceable human components to function.

### Example

Britain has estimated 200,000 video-surveillance cameras, many of them continuously monitoring main streets and shopping centers. The camera makes people safe but at the same time people all the more vulnerable.



## EXAMPLES OF REAL LIFE CYBORGS

**Neil Harbisson** is a Spanish-born British-Irish cyborg artist and activist for transpecies rights based in New York City. He is best-known for being the first person in the world with an antenna implanted in his skull and for claiming to be legally recognised as a cyborg by a government.



**Jesse Sullivan** is an American electrician best known for operating a fully robotic limb through a nerve-muscle graft, making him one of the first non-fictional cyborgs. His bionic arm, a prototype developed by the Rehabilitation Institute of Chicago, in that it does not use pull cables or nub switches to function and instead uses micro-computers.

**Nigel Ackland's** robotic arm is truly the closest thing to Terminator we have. With full range of motion in all five fingers, wrist, and elbow, the dexterity and flexibility that Ackland possesses is nothing short of astonishing.

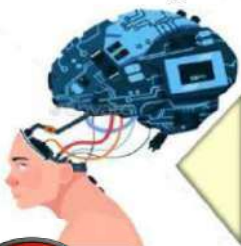


**Kevin Warwick** is an English engineer and Deputy Vice-Chancellor at Coventry University. He is known for his studies on direct interfaces between computer systems and the human nervous system, and has also done research concerning robotics.



## LATEST TECHNOLOGY

At present Cyborgology concentrates on the development of Conditional cyborgs. That is living being with a mechanical body part which is replaced for the damaged or lost body part.





## FILMS THAT USES CYBORG



## PRACTICAL APPLICATIONS:

- In medicine
- In the military
- In sports
- Artists as cyborgs
- In body modification
- In space
- In cognitive science

## ADVANTAGES & DISADVANTAGES



### Advantages

1. Enables to lead a normal life.
2. Gives artificial sight to blind people.
3. Long life of the mechanical parts.
4. Gives a part of the body back.

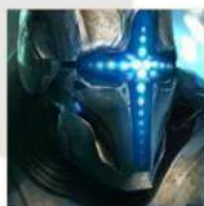


### Disadvantages

1. Cyborgs have physical limitations.
2. Cyborgs do not heal Body damage normally.
3. Cyborgs are very expensive.
4. Requires maintenance.



## FUTURE OF CYBORG



The future of cyborgs is full of exciting possibilities, with the potential to restore and even enhance human bodily functions. But like any new technology, we also need to be aware of the ethical implications, and consider how it should be used responsibly. Although we probably won't have to worry about cyborg assassins like the Terminator any time soon, most researchers agree that it's important to develop sound ethical guidelines for the use of bionics.



**“Cyborg right activists demand, labour rights for robots.”**

**-Scribe in Soliloquy**



### SEMESTER-III

Anjali Gupta

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L



F



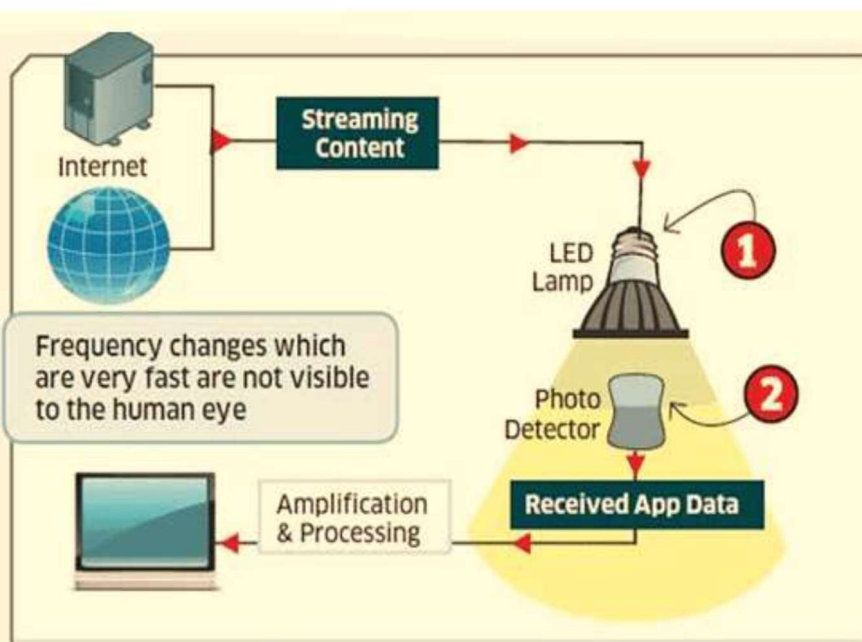
Future of Internet



## What is LiFi?



LiFi is a wireless communication system that transmits data at high speeds over LED. It can be considered as light based wifi which uses light waves instead of radio waves to transmit data.



## - How LiFi Works -



An LED bulb gives out extremely high rates of light output which is converted into an electrical signal by a photo detector. The electrical signal is then converted into a stream of binary data. This data is then accessed via an internet enabled device.

## Did you know?

Professor Harald Hass coined the term LiFi at TED GLOBAL TALK where he introduced the idea of wireless data from every light.

## APPLICATIONS



Due to it being environment friendly and economical, LiFi can be used in augmented reality, hospitals, education, retail, disaster management, military and cryptocurrency.



# BIOLOGICAL COMPUTER

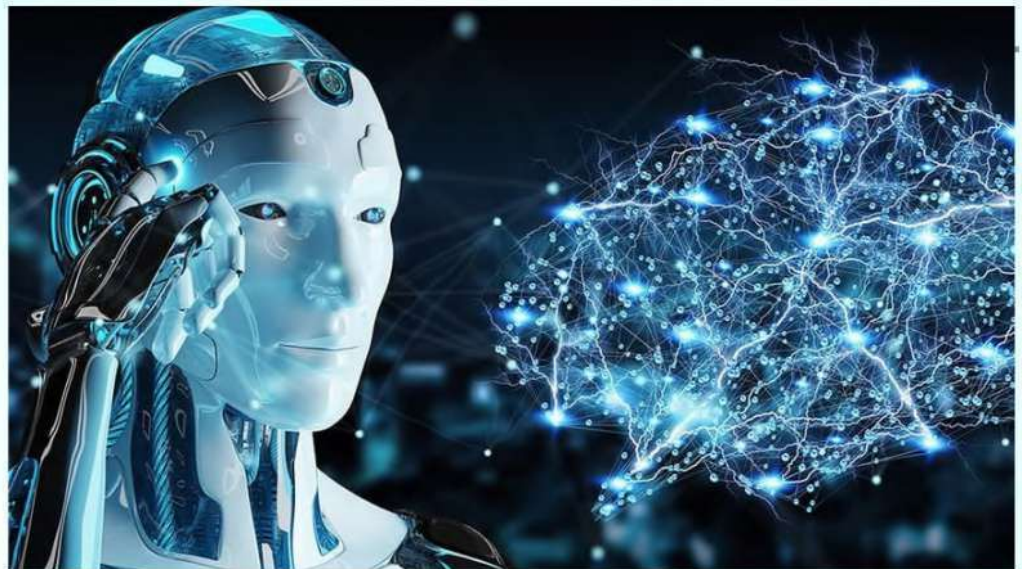
## WHAT ARE BIOLOGICAL COMPUTERS?

BIOLOGICAL COMPUTERS ARE MADE FROM LIVING CELLS. INSTEAD OF ELECTRICAL WIRING AND SIGNALING, BIOLOGICAL COMPUTERS USE CHEMICAL INPUTS AND OTHER BIOLOGICALLY DERIVED MOLECULES SUCH AS PROTEINS AND DNA. JUST LIKE A DESKTOP COMPUTER, THESE ORGANIC COMPUTERS CAN RESPOND TO DATA AND PROCESS IT, ALBEIT IN A RUDIMENTARY MANNER SIMILAR TO THE CAPABILITIES OF COMPUTERS CIRCA 1920. WHILE BIOLOGICAL COMPUTERS HAVE A LONG WAY TO GO BEFORE, THEY ARE AS SOPHISTICATED AS TODAY'S PERSONAL COMPUTERS, THE FACT THAT RESEARCHES HAVE BEEN ABLE TO GET BIOLOGICAL COMPUTERS TO COMPLETE A LOGIC GATE IS A NOTABLE ACHIEVEMENT.

## ADLEMAN- INVENTOR OF BIOLOGICAL COMPUTERS



- His article released in 1994, described how to use DNA to solve a well known mathematical problem, called the directed Hamilton Path problem.
- Goal of the problem is to find the shortest route between a number of cities, going through each city only once. As you add more cities to the problem, the problem becomes more difficult.



## WORLD'S FIRST 'BIOLOGICAL COMPUTER' DEVELOPED

WASHINGTON: Scientists in the US claim to have developed the world's first "Biological Computer" that is made form bio molecules and can decipher images encrypted on DNA chips.

A team from the Scripps Research Institute in California and the Technion-Israel Institute of Technology claims it has created the computing system using bio-molecules.

In the research, when suitable software was applied to the biological computer, the scientists found that it could decrypt, separately, fluorescent images of Scripps Research Institute and Technion logos.

And, although DNA has been used for encryption in the past, this is the first experimental demonstration of a molecular cryptosystem of images based on DNA computing, say the scientist led by prof. Ehud Keinen.

"In contrast to electronic computers, there are computing machines in which all four components are nothing but molecules,"- Prof. Keinen.



# Application of Biological-Computers

The implantable biological computer is a device which could be used in various medical applications where intercellular evaluation and treatment are needed or required. It is especially useful in monitoring intercellular activity including mutation of genes. The main advantage of this technology over other like technologies is the fact that through it, a doctor can focus on or find and treat only damaged or diseased cells. Selective cell treatment is made possible. Bio-computers made of RNA strands might eventually serve as brains for producing biofuels from cells, for example, or to control “**smart drugs**” that medicate only under certain conditions.

## Types of Bio-Computers

1. Bio-Chemical
2. Bio-Mechanical
3. Bio-Electronic

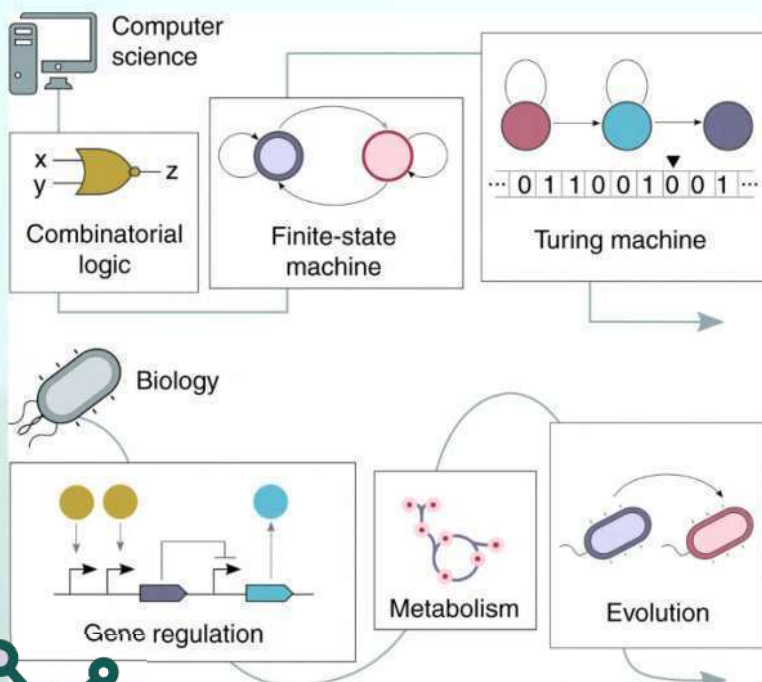
## Pros

- The main advantage of this technology over other like technologies is the fact that through it, a doctor can focus on or find and treat only damaged or diseased cells. Selective cell treatment is made possible. The biological computer can also perform simple mathematical calculations.



## Cons

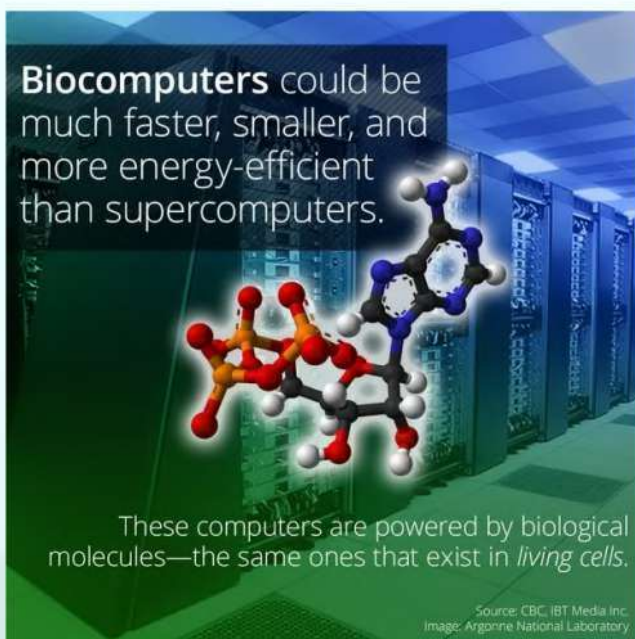
- The molecular operations are not perfect, DNA computing involves a relatively large amount of error, As size of problem grows, probability of receiving incorrect answer eventually becomes greater than probability of receiving correct answer.
- Sometimes there are errors in the pairing of DNA strands, Simple problems solved faster on electronic computers, The human assistance is required, Time consuming lab procedures, No universal method of data representation and DNA has a





# THE WORLD'S SMALLEST COMPUTER

The world's smallest computer (around a trillion can fit in a drop of water) might one day go on record again as the tiniest medical kit. Made entirely of biological molecules, this computer was successfully programmed to identify - in a test tube - changes in the balance of molecules in the body that indicate the presence of certain cancers, to diagnose the type of cancer, and to react by producing a drug molecule to fight the cancer cells.



## Bio-neural Gel Packs

The U.S.S. Voyager NCC-74656 was one of the first Starfleet vessels to be fitted with this breakthrough in computer technology.

The bio-neural gel packs used in Voyager's computer systems represent a scientific leap that is comparable to the introduction of electronic circuitry in the 23rd century. As bio-neural circuitry is composed of synthetic cerebral neurons suspended in a gel matrix, the computers are able to operate in a similar way to the human brain. This means they operate much faster than silicon chips, making a 'best guess' rather than working through all possible calculations.

**INTERFACE**  
The gel packs use a mechanical interface to slotted into housings that connect them to the rest of the computer system.

The gel packs employ synthetic neural fibers that are suspended in biomimetic gel.

### NEW TECHNOLOGY

Torres was unfamiliar with bio-neural gel pack systems when she was promoted to chief engineer, but she quickly came to appreciate the advantages.



## Future of Bio-Computers

Future for the Biological computing is very bright, biological computing is a young field which attempts to extract computing power from the collective action of large numbers of biological molecules, CPU being replaced by the biological molecules remains in the far future

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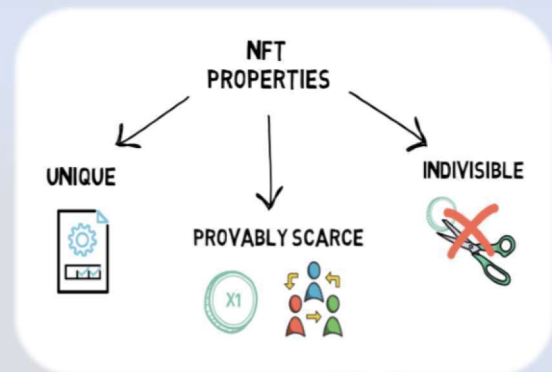
# NFT

NON-FUNGIBLE TOKEN

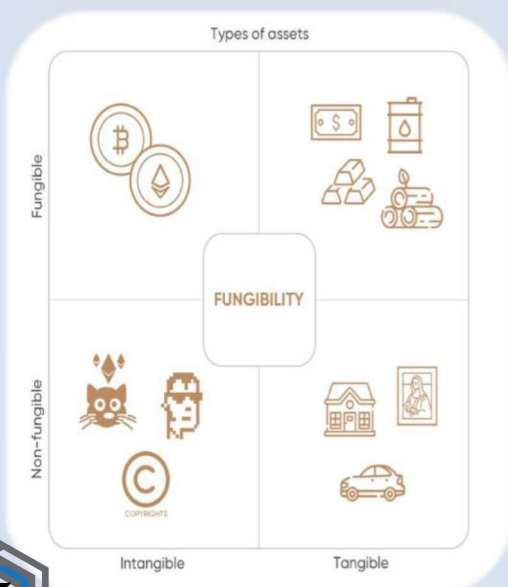
## YOUR ASSURANCE OF DIGITAL ASSET

### WHAT ARE NFTS?

- Non-fungible tokens or NFTs are cryptographic assets on BLOCKCHAIN with unique identification codes that distinguish them from each other and cannot be replicated.
- Unlike crypto currencies, they cannot be viewed the item, only exchanged at equivalency. NFTs exist on a public block chain that serves as a record of ownership.
- While anyone can view the item, only the buyer of an NFT has the “official” status of being its owner.



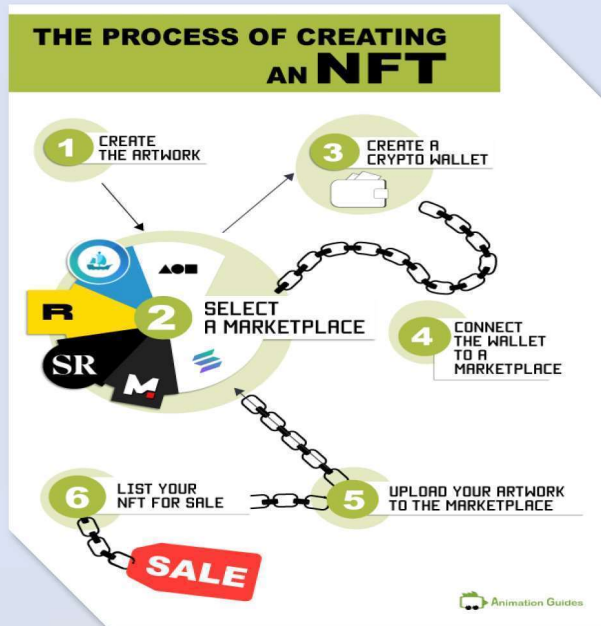
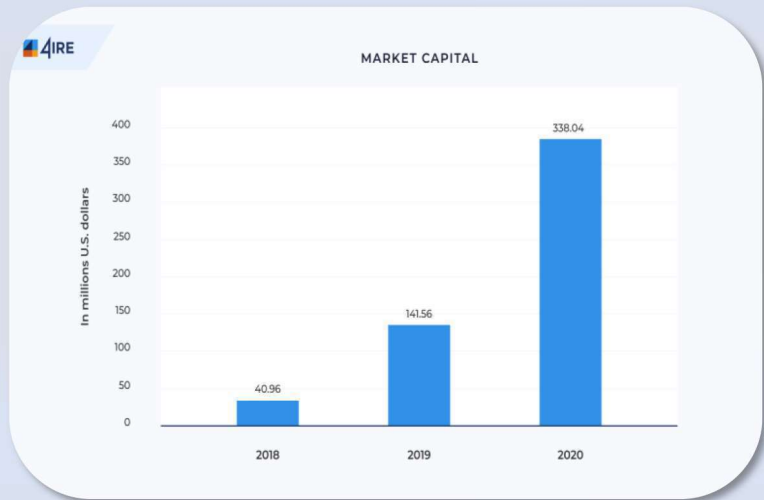
### Understanding NFTs



- Like physical money, cryptocurrencies are fungible i.e., they can be traded or exchanged, one for another. For example, one Bitcoin is always equal in value to another Bitcoin.
- Similarly, a single unit of Ether is always equal to another unit. This fungibility characteristic makes cryptocurrencies suitable for use as a secure medium of transaction in the digital economy.

# Why NFT is trending?

- Although they have been around since 2014, NFTs are gaining notoriety now because they are becoming an increasingly popular way to buy and sell digital artwork. An amazing \$174 million has been spent on NFTs since November 2017.
- The concept gained more popularity during the Covid-19 pandemic, as lockdowns pushed more and more people to share online spaces for longer hours.
- NFTs are so popular because it is still relatively new. But, that being said, the implications for NFTs in numerous industries like banking, funding, service industries and over time will make inroads into other industries to become part of our ecosystem fabric.



- ❖ Research shows that the meta-verse is best experienced with commerce as one of its core values. There are ways to make NFTs more useful by adding functionalities that can be utilized in a variety of applications across numerous meta-verses at once.
- ❖ A previously issued NFT, for example, can be transformed into an asset in a game release or used to get access to future NFTs and experiences, therefore enhancing the NFT's usability and worth.



- NFTs, like most crypto assets, exist on decentralized blockchains. This means that they are not under the control of any central authority like a bank or a government organization.
- While this allows creators to have ownership and control over the distribution and monetization of their work, it makes imposing uniform regulations on crypto art extremely difficult.



# NFT & Blockchain

## HOW DOES A TRANSACTION GET INTO THE BLOCKCHAIN?



- There is a very possibility of an artist's work being made into an NFT without their consent.
- If the NFT then sold for a profit, the earnings would go to the NFT minter but not the original creator of the art piece.
- While creating an NFT with another artist's work is considered infringement of copyrights, the nature of blockchain only allows the addition of data to the ledger.
- This makes deleting or altering the infringed piece of content nearly impossible.

## Conclusion

- The NFT market is more efficient than the traditional one. It is built around digital art NFT marketplaces, and in terms of fees, it is well below the 5% or even 10% fees that are paid to traditional art brokers.
- While there are already several extremely promising technology applications in the luxury and gaming industry that should gradually mature over the next three years, some argue that the NFT craze will be short-lived, especially in the art sector.
- Perhaps, the NFT craze will be short-lived, but more importantly, it could make a big shift in where the digital economy is heading.

| Pros   | Cons  |
|--|---|
|  <p>Could help unlock new revenue streams in industries like gaming, art, sports, and technology!</p> |  <p>Building dApps may be difficult and time consuming.</p>  |
|  <p>Could help introduce MILLIONS of people to cryptocurrencies.</p>                                  |  <p>Too difficult for normal users to understand, needs to be simplified for future usage.</p>                         |
|  <p>Transforms the attitude towards ownership and makes it easy to own real-world assets.</p>         |  <p>Possibility of users buying and selling an asset to make a short profit. Making the market extremely unstable.</p> |

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# AI AND ROBOTICS

## What is AI?

Artificial Intelligence is a computer program that mainly focuses on the development and analysis of algorithms which in other words means that AI is a computer program that is capable of creating a machine having its own intelligence and behaviour.

## What is Robotics?

Robotics is a branch of AI, which is composed of Electrical Engineering, Mechanical Engineering, and Computer Science for designing, construction, and application of robots.

Artificial intelligence (AI) and robotics are a powerful combination for automating tasks inside and outside of the factory setting. In recent years, AI has become an increasingly common presence in robotic solutions, introducing flexibility and learning capabilities in previously rigid applications.



***Father of AI : John McCarthy***



## What is history of artificial intelligence?

The history of artificial intelligence (AI) began in antiquity, with myths, stories and rumours of artificial beings endowed with intelligence or consciousness by master craftsmen. ... The field of AI research was founded at a workshop held on the campus of Dartmouth College, USA during the summer of 1956.



**George C.  
Devol**

## What is the history of robotics?

The earliest robots as we know them were created in the early 1950s by George C. Devol, an inventor from Louisville, Kentucky. He invented and patented a reprogrammable manipulator called "Unimate," from "Universal Automation." For the next decade, he attempted to sell his product in the industry, but did not succeed.



**Herbert  
Simon**

## Who invented robots and artificial intelligence?

December 1955 Herbert Simon and Allen Newell develop the Logic Theorist, the first artificial intelligence program, which eventually would prove 38 of the first 52 theorems in Whitehead and Russell's Principia Mathematica.



**Allen Newell**

## Objectives

Robots are aimed at manipulating the objects by perceiving, picking, moving, modifying the physical properties of object, destroying it, or to have an effect thereby freeing manpower from doing repetitive functions without getting bored, distracted, or exhausted.



# ARTIFICIAL INTELLIGENCE

Everyday and potential use

A few examples of how we already use AI and the possibilities it offers



## Why is robots and artificial intelligence important?

The answer is simple. Artificial Intelligence or AI gives robots a computer vision to navigate, sense and calculate their reaction accordingly. Robots learn to perform their tasks from humans through machine learning which again is a part of computer programming and AI.



## Where do robotics and AI mingle?

One of the reasons the line is blurry and people are confused about the differences between robotics, and artificial intelligence is because there are artificially intelligent robots—robots controlled by artificial intelligence. In combination, AI is the brain and robotics is the body.

## The current status of robotics

According to World Robotics, the estimated number of robots installed worldwide is around 50 million. Currently Japan and South Korea are the leading countries in robotics development as they are coming up with some of the latest and most innovative human-like robots.

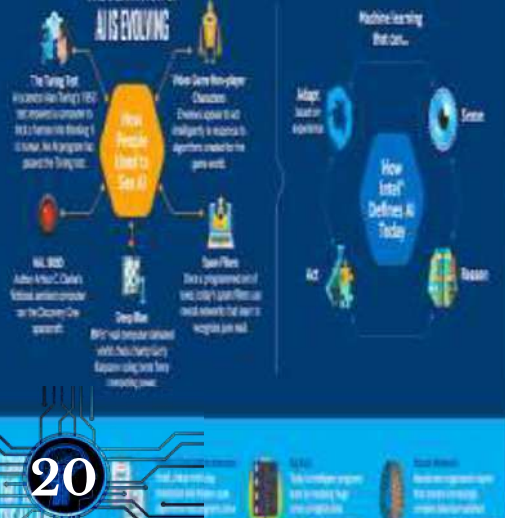
## Growth of robotics

The use of robots in many industries is becoming increasingly common. These robots can either be physical robots or software bots. It is estimated that there will be 3 million industrial robots in operation during 2020. Furthermore, Gartner projected that RPA software spending was over \$1.3 billion in 2019. As such, the need and desire for bots of all sorts is seemingly only to going to increase.

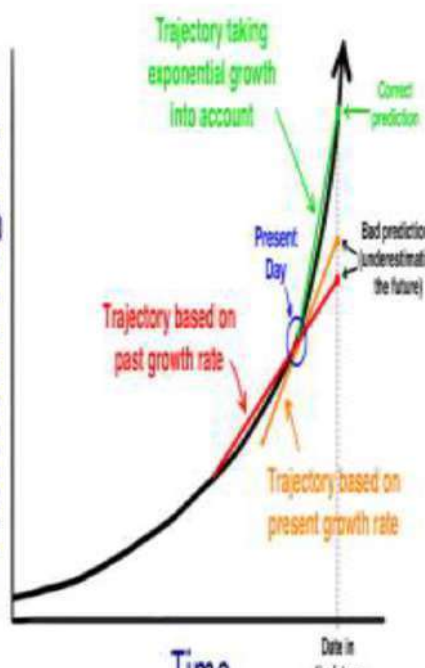
### ARTIFICIAL INTELLIGENCE—THE NEXT BIG REVOLUTION IN COMPUTING

Computer scientists have been pursuing artificial intelligence (AI) since the 1950s. Here's why the age of artificial intelligence may finally be here.

#### THE DEFINITION OF AI IS EVOLVING



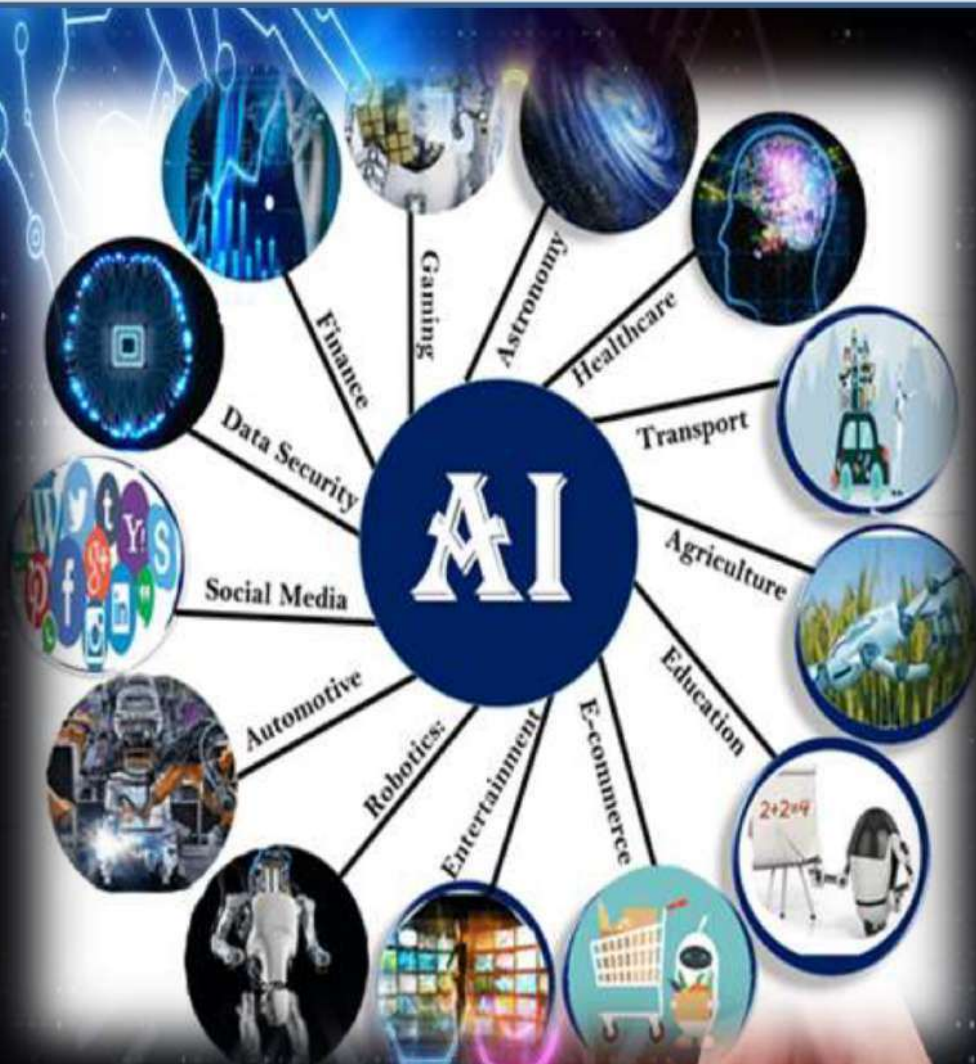
Human Progress





## THE FUTURE IS NOW: AI'S IMPACT IS EVERYWHERE

There's virtually no major industry modern AI — more specifically, “narrow AI,” which performs objective functions using data-trained models and often falls into the categories of deep learning or machine learning— hasn't already affected. That's especially true in the past few years, as data collection and analysis has ramped up considerably thanks to robust IoT connectivity, the proliferation of connected devices and ever-speedier computer processing. Some sectors are at the start of their AI journey, others are veteran travelers. Both have a long way to go. Regardless, the impact artificial intelligence is having on our present day lives is hard to ignore



### Growth of robotics

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AN IDEA THAT MOST PEOPLE SIMPLY DIDN'T BELIEVE

## NANO TECHNOLOGY

Nanotechnology, also shortened to nanotech, is the use of matter on an atomic, molecular, and supramolecular scale for industrial purposes.

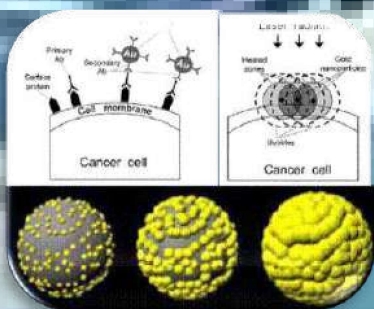


The American physicist Richard Feynman lectured, "There's plenty of room at the bottom," at an American physical society meeting at Caltech on December 29, 1959, which is often held to have provided inspiration for the field of nanotechnology.

# BIG THINGS FROM A TINY WORLD

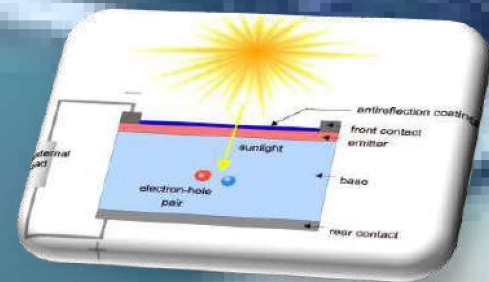
## HEALTH APPLICATION

cancer treatment. They have been shown to be effective tumorkillers in those with kidney or breast cancer. Multi-walled nanotubes are injected into a tumor and treated with a special type of laser that generates near-infrared radiation for around half a minute.



## ENERGY APPLICATION

energy more efficiently by using the small size of nanoparticles and also the use of renewable energy through green nanotechnology by generating, storing, and using energy without emitting harmful greenhouse gases such as carbon dioxide.



## APPLICATIONS

## INDUSTRIAL APPLICATION

nanomedicine, as nanoparticles can be used as contrast agents for common imaging techniques such as computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET).

The ability for nanoparticles to localize and circulate in specific cells, tissues, or organs through their design can provide high contrast that results in higher sensitivity imaging, and thus can be applicable in studying pharmacokinetics or visual disease diagnosis.

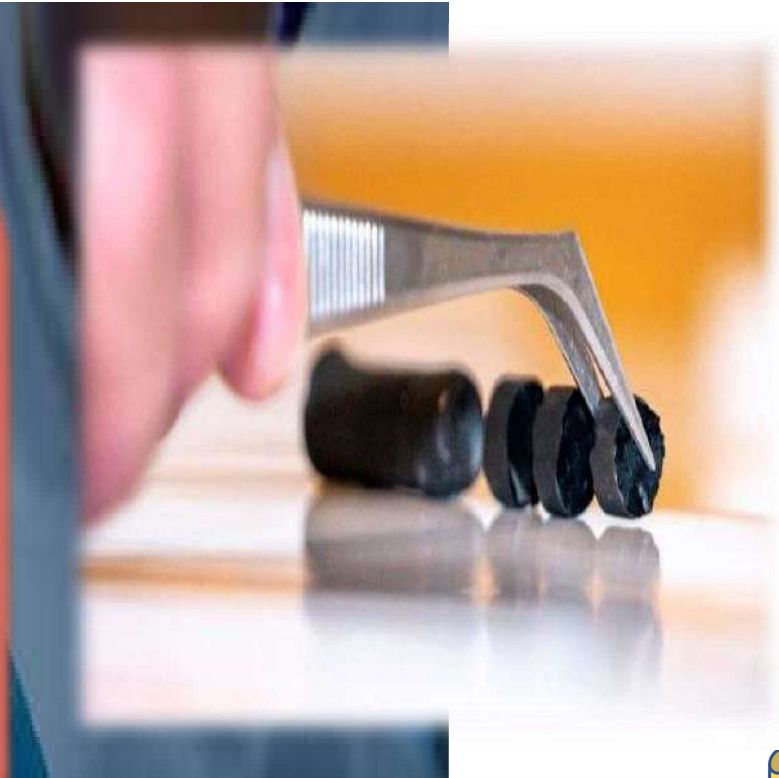
## SOLAR CELLS

cells are increasing the amount of energy absorbed from sunlight. Solar cells are currently created from layers of silicon that absorb sunlight and convert it to usable electricity. Much of the energy that is lost during this transformation is due to heat, however by using nanoparticles there is less heat emitted thus producing more electricity.



## WHY WE NEED NANOTECHNOLOGY??

as having the potential to increase the efficiency of energy consumption help clean the environment, and solve major health problems. It is said to be able to massively increase manufacturing production at significantly reduced costs.



Nr a phene  
Batteriesanog

Nanotechnology is giving rise to nanographene batteries that can store energy more efficiently and weigh less. Lithium-ion batteries have been the primary battery technology in electronics for the last decade, but the current limits in the technology make it difficult to densify batteries due to the potential dangers of heat and explosion. Graphene batteries being tested in experimental electric cars have promised capacities 4 times greater than current batteries with the cost being 77% lower. Additionally, graphene batteries provide stable life cycles of up to 250,000 cycles, which would allow electric vehicles and long-term products a reliable energy source for decades.

*Today's scientists and engineers are finding a wide variety of ways to deliberately make materials at the nanoscale to take advantage of their enhanced properties such as higher strength, lighter weight, increased control of light spectrum, and greater chemical reactivity than their larger scale*

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