SIES Graduate School of Technology
RISE WITH EDUCATION

MAGAZINE FLIPBOOK

TECHSCIENCE

By the IT Department

FH 2021

Benefits of JS for ML, the advent of invisibility cloaks, requirements for settling in an alien world, AND MORE! Everything you need to know in one Magazine.

LATEST NEWS!

How clearing out space junk is taking center stage and 2021 predicted to be the year of open-source diversity.

Intro to WhatsApp's new privacy policy Inside!

TechScience Edition Tribute

Inventor-Engineer-Futurist
Nikola Tesla

SCIENTIFIC FEATS!

From quantum physics showing us the right way to make better holograms all the way to the world's first nuclear fusion reactor!

WHAT'S NEW?

Are flying cars even possible and are artificial hearts the key to immortality? Look inside to know more.

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Department of Information Technology

Vision

To develop IT professionals for accomplishment of industrial & societal needs through quality education.

Mission

1. *To impart advanced knowledge and develop skills in Information Technology and allied fields.*
2. *To enhance professional competence by inculcating values and ethics.*
3. *To upgrade technical skills and also encourage research culture.*
4. *To extend industry and alumni association for knowledge enhancement.*
5. *To nurture entrepreneurial talent and contribute towards socio-economic growth.*

Program Educational Objectives :

Graduates will be able to:

1. *Compete in professional career with social and ethical responsibilities.*
2. *Pursue higher studies / research in Engineering & Management.*
3. *Become Entrepreneurs or software professionals to satisfy the latest Industrial requirements.*

Program Specific Outcomes:

1. *Students should be able to analyze, design and develop technological solution for a given scenario.*
2. *Students should be able to involve themselves in life-long learning and cultivate skills for successful career, entrepreneurship and higher studies.*

A Note From HOD-IT

It gives me immense pleasure to inform you that the department of Information Technology is bringing out a new version of the Department Magazine T E C H S C I E N C E. This magazine is a perfect blend of articles related to advanced technologies. I am very happy to convey my congratulations to the team members in bringing out this wonderful magazine.

Acknowledgement

Hello! Welcome to the FH 2021 Edition of the TechScience Magazine.

TechScience is aimed at providing you with news and info related to amazing things happening in our world related to Technology and Science.

It is an initiative taken by the IT Department of SIES Graduate School of Technology, Nerul, Navi Mumbai.

This edition of FH 2021, is an effort of the faculty and students from TE and BE IT! We're grateful to our HoD, Dr. Lakshmisudha for providing us with the opportunity and initiative and Prof. Bushra Shaikh, for being a constant mentor and guiding us in every step.

We hope you enjoy this edition and feel free to get back to us for any queries, suggestions, feedback, etc.

- Team TechScience FH 2021

Welcoming New Members

It gives us immense pleasure to introduce to you our new members, who joined us in mid-2021 and helped us in the formation of this particular edition of TechScience. We, former members of TechScience, appreciate all thier efforts, ideas, and suggestions that we've got throughout this wonderful journey with them. With this, we would also like to pass on the baton of creating successful, insightful and informative editions of TechScience in the future, to these bright minds! Welcoming these members with a wide smile and gratitude, we wish them all the very best for all of their future work.

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What Would It Take to Actually Settle in an Alien World

Can the dream be a reality?

Article by,
Namah R Kohli, 13 August 2021

If human civilization is to survive in the long-run, we will probably have to occupy other planets. Whether we make the Earth unlivable ourselves or it simply reaches the natural end of its ability to support life, one day we will have to scout for a new home. Hollywood films such as The Martian and Interstellar give us an insight of what may be in store for us. Mars is certainly the most habitable destination in our solar system, but there are thousands of exoplanets orbiting other stars that could be a replacement for our Earth. So what technology will we need to make this possible?

First walk on Mars

The first requirement for a human settlement is a habitat, an isolated environment with the ability to maintain air pressure, composition (the amount of oxygen), and temperature, and protect the inhabitants from radiation. This is likely to be a relatively large and heavier structure than the International space station. Launching

The beginning

large, heavy objects into space is an expensive and tough job. Spacecraft since the Apollo missions, which consisted of several modules that had to separate and dock, have been sent up in pieces and assembled by astronauts. But given the impressive strides forward we are seeing in autonomous control, the pieces of a colony habitat may be able to assemble themselves. Today, manoeuvres similar to the Apollo docking are performed completely automatically. The alternative would be to carry a minimal “toolbox” from Earth and manufacture the habitat using locally-harvested resources.

Once the habitat is built, the colony will need continuous supplies of oxygen, water, energy and food to sustain its residents, presuming the colony wasn’t engineered on an idyllic Earth-like planet with these resources in abundance. Water is fundamental for life, but it could also be used to make propellant or radiation shielding.

A colony would also likely try to extract water, possibly from underground supplies of liquid – as may exist on Mars – or ice, as can been found under the surface of certain asteroids. Also, water provides a source of oxygen. On the ISS, oxygen is generated using a process known as electrolysis to separate it from the hydrogen in water. NASA is also working on developing techniques to regenerate oxygen from atmospheric byproducts, such as the carbon dioxide we exhale while breathing. Manufacturing energy is probably the technological aspect of starting a colony that we are best prepared for thanks to photo-voltaic solar panels.

Untapped Mare

But depending on the location of the colony planet, we may need to improve this technology much further.

In fact, Mars's atmosphere is subject to periodic sand storms, which are notoriously problematic as the sand further limits the amount

The goal

of light received and can also collect on and cover the panels. But we have already started to deal with these issues in the design of our current rover missions to Mars. For example, NASA's Mars Exploration Rovers Spirit and Opportunity were designed to last about 90 days but after more than 12 years, they are still operational. And we've discovered that Martian wind periodically cleans the dust from the panels. A colony needs to be self-sustained, so farming will be essential for producing food. Crops can also be utilized to convert carbon dioxide in the air back into breathable oxygen. Pressure, temperature, humidity, carbon dioxide levels, composition of soil and gravity all affect the survival and growth of plants, with different effects on different species. One potential solution that has already been proven on Earth with radishes, lettuces and green onions is hydroponic farming, which involves growing plants in a nutrient-enriched fluid without any soil.

The final requirement for a space colony will be keeping the climate habitable. Atmospheric composition and climate on other celestial bodies are very different to Earth's. There is no atmosphere on the moon or asteroids, and on Mars the atmosphere is mainly made of carbon dioxide, resulting in surface temperatures of 20°C down to -153°C during winter at the poles, and an air pressure just 0.6% of Earth's. In such preventive conditions, settlers will be limited to living inside the isolated habitats and strolls outside will only be possible using spacesuits. One alternative solution may be to change the planet's climate on a large scale. We're already studying such "geo-engineering" as a way to respond to Earth's climate change. This would require immense effort but similar techniques could be scaled and applied for example to other planets such as Mars. A large formation of orbiting solar mirrors could reflect the light of the sun on specific regions such as the poles to cause a local increase in temperature. Some have speculated that such relatively small temperature changes could trigger the climate to take on a new state with much higher air pressure, which could be the first step towards terraforming Mars.

References

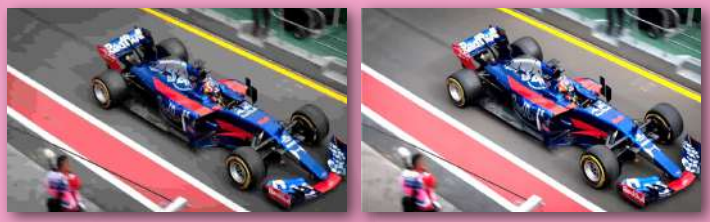
- Mars and Beyond - the road to make humanity multiplanetary.
- Mars 2020 Perseverance Rover

Tech Freak!

Android 12 is HERE!!!

A first preview of Android 12 was released by Google this year, to make Android "more intuitive, better performing, and more secure.":

1. *Support for AVIF, an image format that promises much higher quality per file size compared to jpeg.*
2. *Support for easier copying and pasting of rich content like images and video.*
3. *Multiple audio upgrades, with increasing support for up to 24 audio channels and spatial audio formats.*
4. *A new haptic feedback tool connects the vibrations of your phone to certain sounds. Developers may use the capability to recreate rough terrain in a racing game or utilise haptic feedback to identify callers based only on vibration patterns, according to Google.*



AVIF comparison

5. *Aesthetic changes to the notifications drawer and optimization of transitions and animations, restricted controls around how notifications work to make them more responsive, and limiting the number of annoying random notifications for short-lived processes — appear for less than 10 seconds.*

- *To know more click on the below link Thenextweb.com*

Revolutionizing holography with Quantum Physics

The basics and the applications of Quantum Holography

Article by,
Geetika Babu, 26 August 2021

Holography has been a fascination for most of us throughout our life, with multiple advancements, research, and innovations happening in order to make it an absolute reality with it being a part of our day-to-day life. Many steps have been taken to do so, and now, Quantum Physics has some answers. Let's find out, by starting with some basics.

What is a Hologram?

A hologram (a term taken from the Greek words holos – 'whole' and gramma – 'message') is a three-dimensional image, created with photographic projection. They're a bit like photographs that never die, sort of "photographic ghosts": they look like three-dimensional photos that have somehow got trapped inside glass, plastic, or metal, looking real, and move as you look around them, just like a real object.

Hologram

How is conventional holography different from quantum holography?

	CONVENTIONAL HOLOGRAPHY	QUANTUM HOLOGRAPHY
SOURCE OF LIGHT	A laser beam (coherent light source, unlike flashlight) is split up to make an ordinary hologram.	Quantum holography uses entangled photons emitted by a quantum source to overcome the limitations of conventional holography.
WORKING	By joining the split beams back together and by measuring the differences in the light's phase where the two beams meet, you can see how the object changes light rays falling onto it—in simple terms "what the object looks like."	Both the photons (entangled) simultaneously share the projection imprinted on one photon after falling on the object. The interference phenomenon occurs remotely, with no need to overlap the beams, leading to a hologram being obtained by detecting the two photons using separate cameras and measuring correlations between them.

What makes quantum holograms better?

Classical holography can accomplish some amazing things with light's direction, color, and polarisation, but it has certain drawbacks, including interference from unwanted light sources and high sensitivity to mechanical instabilities. However, in quantum holography, the wave-particle duality property of a photon enables it to probe the thickness of the object at the precise location it hits it at, as well as measure its thickness along its entire length all at once to create sharper, more richly detailed holograms, which open up new possibilities for practical applications of the technique.

Applications of conventional holography:

- There are active groups of artists that actively integrate holographic elements into their work.
- Holographic data storage models from "page-based" storage to 3D optical data storage are prominently used where each recorded hologram holds a large amount of data.

- In free-space optical communications, dynamic holography is used to compensate for atmospheric turbulence *(the phenomenon that gives rise to the twinkling of starlight)*.
- Holographic interferometry (HI) is a technique widely used to measure stress, strain, and vibration in engineering structures.
- Holograms commonly used for security are replicated from a master hologram that is difficult to forge- for example, credit and bank cards, passports, ID cards, currency notes.

Applications of quantum holography:

- Holography is already employed in microscopy in medical imaging to examine details of delicate samples that are often nearly transparent. This method enables the development of higher-resolution, lower-noise photographs, which could help us learn more about how biology works at the cellular level by revealing finer characteristics of cells.

- One that is still being worked on is data storage. When the twists are removed, holographic memory could be the next big thing in high-capacity data storage.

- With the current scenario in the technology, the holograms can now be completely computer-generated and can be used in architecture 3D modeling, mechatronics and robotics, quality control, and technical assessment in the industry. They can also display objects or scenes that never existed before.

- Quality improved holographic displays would be able to outperform other 3D display technologies used for virtual and augmented reality. This would enable more compact displays, improvements in the user's ability to focus their eyes at different distances, and offering the ability to adjust for users who wear corrective lenses.

Glossary:

Entangled Photons - Entangled pairs of photons are created by firing a single photon through a crystal to produce a pair of photons, which remain correlated even when separated by large distances.

References

- *Photons entangled in terms of radial quantum states – Physics World*
- *Quantum physics has the answer to making better holograms*

WHATSAPP NEW PRIVACY POLICY

What it is and why you should know about it

Article by,
Vaishnavi Mantri, 4 Feb 2021

WhatsApp Messenger, is an American freeware, cross-platform service owned by Facebook . WhatsApp's client application runs on mobile devices but is also accessible from desktop computers, as long as the user's mobile device remains connected to the Internet while they use the desktop app. The service requires each user to provide a standard cellular mobile telephone number for registering with the service.]In January 2018, WhatsApp released a standalone business app targeted at small business owners, called WhatsApp Business, to allow companies to communicate with customers who use the standard WhatsApp client. The client application was created by WhatsApp in Mountain View, California, which was then acquired by Facebook in February 2014 for approximately US$19.3 billion. It became the world's most popular messaging application by 2015, and has over 2 billion users worldwide as of February 2020.

Information Collected by WhatsApp

Our Account Information

Our Mobile Number, Name, Profile Photo.

Our Messages

WhatsApp does not retain our messages in the ordinary course of providing the Services to us . Instead, our messages are stored in our device and not typically stored on their servers.

Businesses On WhatsApp:

Businesses that let us interact using their Services may provide us with information about their interactions with you. They require each of these businesses to act in accordance with applicable law when providing any information to them.

PRIVACY POLICY:

The Privacy Policy explains their data practices, including the information they process to provide us with the Service. For example, The Privacy Policy talks about the information they collect and how this affects our services . It also explains the steps they have taken to protect our privacy, like building our Services so delivered messages aren't stored by them and giving our control over who we communicate with within the Services provided by WhatsApp. They are one of the Facebook Companies. This Privacy Policy applies to all of their Services unless specified by them . WhatsApp has updated its privacy policy, and users have until February 8 to accept the new terms and conditions. The new policy says how user data is impacted when there is interaction with a business on the platform, and provides more details on integration with Facebook which is WhatsApp's parent company.

HIGHLIGHTS OF NEW POLICY

- WhatsApp has now found a new way of letting users know about the privacy policy.
- WhatsApp is using status messages to give the correct information about its privacy policies to the users.
- The status messages had already appeared in India quite a few times but now it has also started appearing in the United States and United Kingdom.

Reference

- *India Today Whatsapp update*
- *Whatsapp website*

Quiz Time

1. In 2019, the _____ spyware developed by _____ was used to target Indian journalists, activists, lawyers and senior government officials.

   a) Trojanized, Cy4gate and SIO (Italy)

   b) Ghost RAT, C. Rufus Security Team (China)

   c) Pegasus, NSO Group (Israel)

   d) PhoneSpy, Android RAT

2. WhatsApp is not banned in this country.

   a) China

   b) United Arab Emirates (UAE)

   c) North Korea

   d) Nigeria

Answers on Page 38

Artificial Hearts

Could They Be the Key to Immortality?

Article by,
Geetika Babu, 26 August 2021

Heart failure can be caused by many medical conditions that damage the heart muscle- coronary artery disease, heart blockage, cardiomyopathy, congenital heart disease, diabetes, hypertension, obesity, injury, medications or illicit drug use. Cardiovascular diseases (CVDs) are the leading cause of death globally, taking an estimated 17.9 million lives each year. The World Heart Federation predicts more than 23 million CVD-related deaths per year by 2030.

Heart failure is a chronic disease needing lifelong management. Surgery or other procedures to implant cardiac devices may be recommended to treat the underlying problem.

Total Artificial Hearts (TAH), unlike ventricular assist device (VAD), are typically used to bridge the time to heart transplantation, or to permanently replace the heart in the case that a heart transplant is impossible. The obvious benefit of a functional artificial heart would be to lower the need for heart transplants because the demand for organs always greatly exceeds supply.

Here's what you should know about artificial hearts:

- There have been 13 artificial heart designs used in patients, but only one i.e. SynCardia temporary TAH has received commercial approval from the FDA.
- The TAH is readily available when needed (no wait list), not restricted by blood type or antibody level (no matching required), biocompatible with the body and pumped & monitored by an external machine called a driver.
- The TAH is designed in two different sizes to support patients as

Man with Artificial Heart

young as 9 years old and as old as 80.

- The average time on support for a SynCardia TAH patient is approximately 130 days, but some patients have lived on the TAH for more than 4.5 years.

- Stable TAH patients are able to leave the hospital and enjoy active lives at home while they wait for a donor heart.

- The TAH is available at more than 140 hospitals in over 20 countries.

OTHER INNOVATIONS IN ARTIFICIAL HEART TECHNOLOGY:

France's part machine, part cow heart

Artificial heart that combines biology with machinery and also features sensors and software to detect a patient's level of exertion and adjust output accordingly.

France's Artificial Heart

Swiss 3D printed Heart

The Swiss 3D printed heart

A soft, silicone-based heart using innovative 3D printing techniques. It possesses left and right ventricles, pumps a liquid resembling blood and weighs about the same as a natural human heart.

China's 'aerospace heart'

Built on rocket technology, uses magnetic and fluid levitation from a rocket system, and is expected to move to clinical trials in the coming years.

China's Aerospace Heart

Australia's titanium mini-heart

The device uses a single spinning disc to drive blood to the lungs and body. With the high-tech rotary pump levitating between magnets. The lack of other moving parts means the rest of the heart can be made from ultra-robust titanium. Small enough to fit inside a child's chest yet powerful enough to support an adult.

Australia's Titanium Heart

Due to limitations in biocompatibility and battery technology, the possibility of a fully implantable artificial heart may not be on the horizon for a few more years at least. But the technology has the potential to change the need for heart transplantation, transforming the outlook for people with heart disease worldwide.

Reference

- Intrestingengineering.com
- Future of artificial hearts - medicaldirector.com
- 7 things about artificial hearts
- Cardiovascular diseases - WHO.int

Tech Knowledge!

How to tell which Email tracks you!

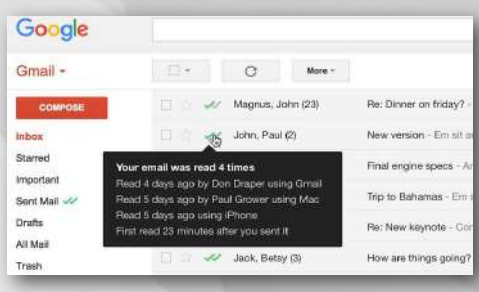
When tracking pixel - a tiny, hidden single-pixel image, is loaded, it sends a message back to the email sender, reporting the times, dates, location, the device used to open the email, and the email client used.

How to stop it?

In Gmail on the web, click the cog icon (top right), then See all settings and General: next to Images, select Ask before displaying external images. In Mail on macOS, choose Mail, Preferences, Viewing and uncheck Load remote content in messages. In the Outlook Mail program that comes with Windows 10, tap the cog icon at the bottom of the navigation pane, then pick Reading pane and make sure both Automatically download external images options are set to off.

How do you spot it?

If you want even more control, more precise options are available. Ugly Email, Trocker and freemium Mailtrack are Chrome/Firefox extensions/Gmail add-ons that enable one to check tracking mail.

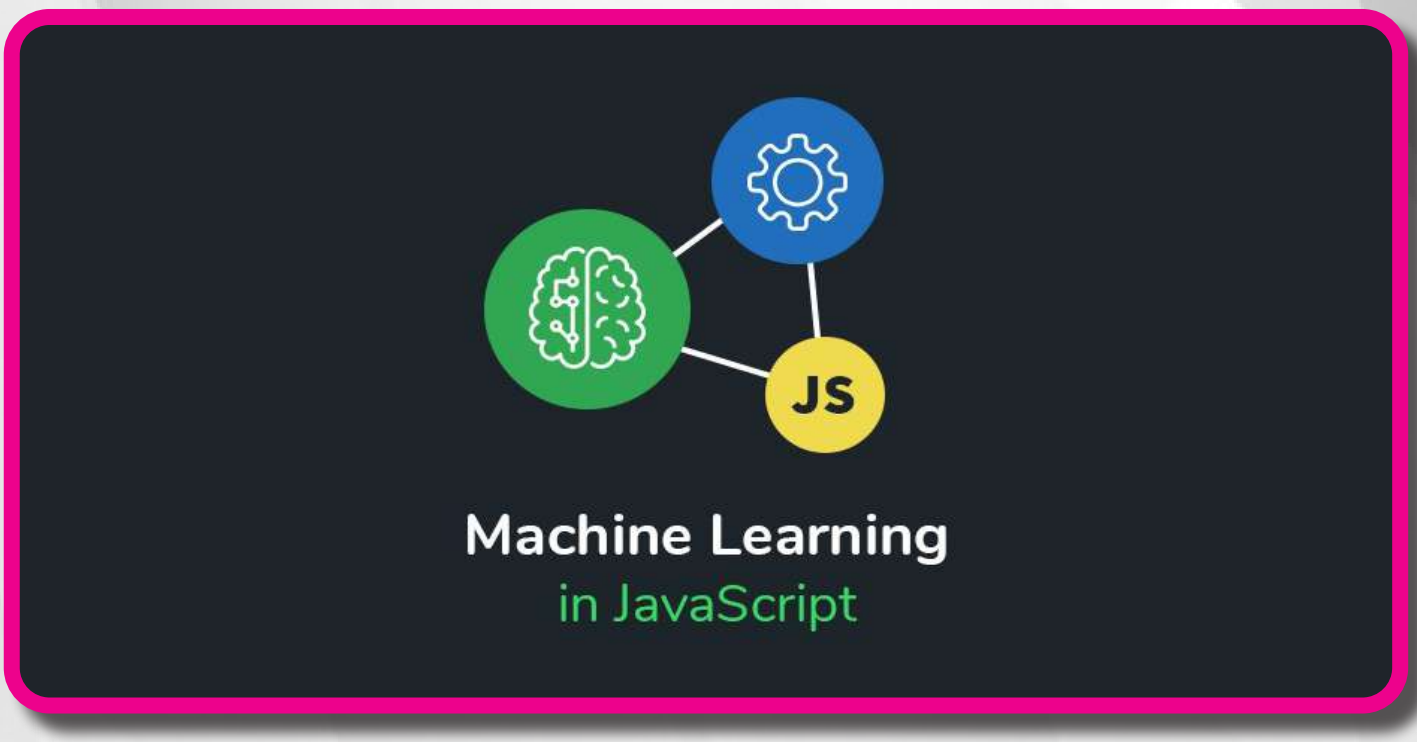


Reference

- Wired.com
- Moosend.com
- Microsoft.com

An Alternative to Python for Machine Learning and Deep Learning: JavaScript

Article by,
Vaishnavi Singanmalli, 29 September 2021

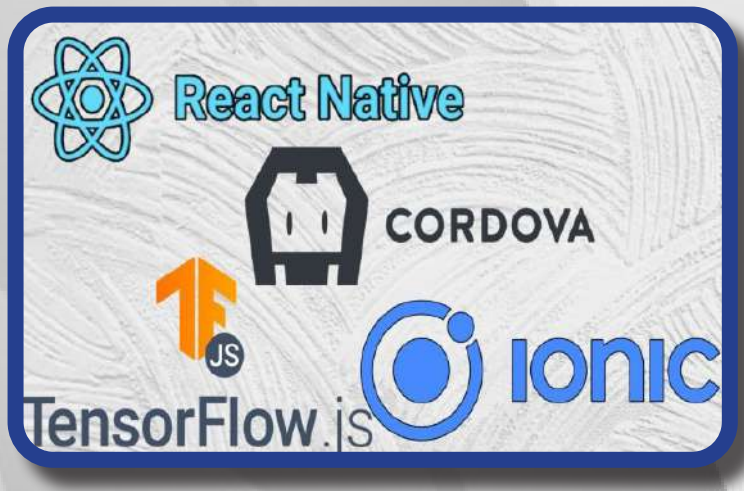


2020 has been a pivotal year for AI and machine learning solutions for development, so now is the right time to exploit the unique opportunities they present. Companies like Google, Microsoft use these technologies to create applications like Google Maps, Skype Translator (handling two-way conversations in different languages), etc.

Python has never been just a fancy alternative for machine learning but also scientific computing, backend or backend as with Node.js development, desktop apps, and lists continue. Java has been around for decades, making it the de facto language of choice for large businesses, including banks and financial institutions. However, some developers believe that JavaScript is only beneficial for the user interface.

Some Good Reasons to Have JavaScript Machine Learning Skills

1. Exclusive Machine Learning



Most AI applications depend on customer worker designs. Clients should send their information about where the AI models are running. Engineers can run their models on workers and make them accessible to client applications through web APIs. However, the problem is that Python AI is not upheld as a matter of

course on numerous client gadgets. In macOS and Linux, python comes preinstalled and there is just a need to introduce ML libraries independently. In Windows, we need to introduce Python physically. JavaScript, then again, is locally upheld by all advanced portable and work area programs. There are as of now a few JavaScript AI libraries. A model is TensorFlow. js, the JavaScript form of Google's renowned TensorFlow AI and profound learning library. Other incredible JavaScript AI libraries incorporate ML5.js, Synaptic, and Brain.js.

2. Fast and customized AI models

One significant use for JavaScript AI is model customization. For instance, assume you need to foster a text-age AI model that adjusts to the language inclinations of every client. This would put an additional heap on your workers as your clients develop and it would likewise require you to store conceivably touchy information in the cloud. An alternative is to make a base model on your worker, make a duplicate on the client's gadget, and finetune the model with the client's information utilizing JavaScript AI libraries.

From one perspective, this would keep information on clients' gadgets and block the need to send them to the worker. Then again, it would free up the assets by abstaining from sending additional derivation and preparing burdens to the cloud. Also, clients would have the option to utilize their AI capacities in any event.

3. Easy integration of machine learning in portable applications

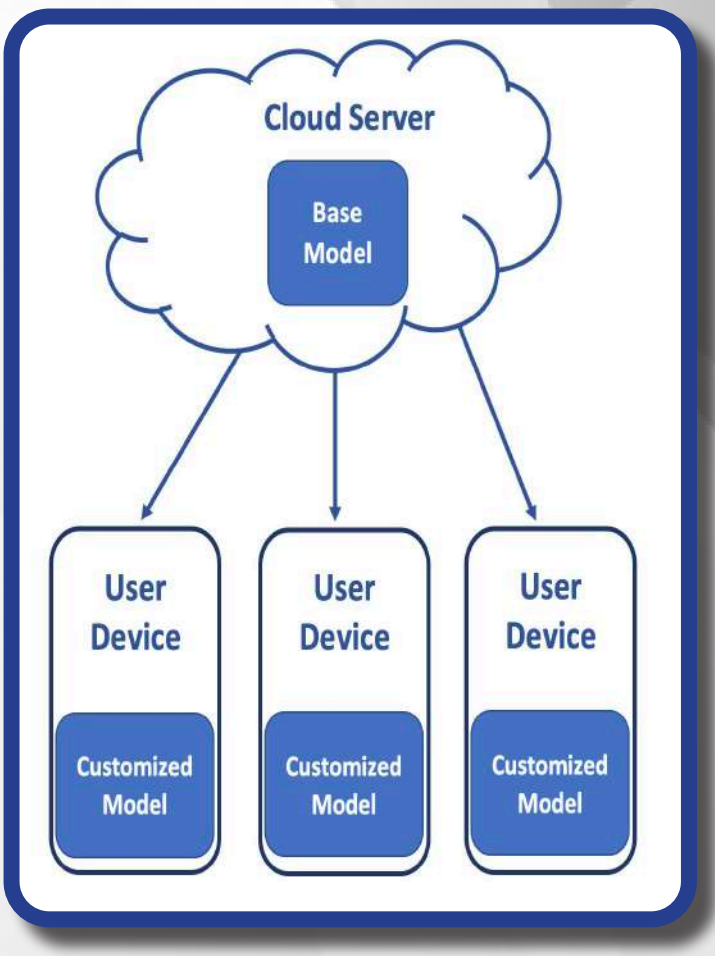
One more advantage of JavaScript AI is simple coordination with versatile applications. Python support in working frameworks is as yet in the starter stages. In any case, there is a rich arrangement of cross-stage JavaScript portable application improvements apparatuses like Cordova and Ionic.

One exemption is React Native, a well-known cross-stage versatile application advancement system that doesn't depend on web view to run applications. There are other AI libraries for portable applications, like TensorFlow Lite and Core ML.

4. Javascript machine learning on server

Python is more qualified for worker-side preparing of AI models. It can scale and appropriate its heap on worker bunches to speed up the preparation interaction. Yet, it is significant that worker-side JavaScript AI is additionally developing. TensorFlow.js has an uncommon rendition that is appropriate for workers running Node.js. The

JavaScript code you use to collaborate with TensorFlow.js is a similar one you would use for applications running in the browser. PyTorch, another well-known Python AI library, doesn't yet have an authority on JavaScript execution, yet the open-source area has created JavaScript ties for the library.



Which is better for Machine Learning? Python or JavaScript?

Python may seem to be the language of choice for most machine learning projects at first glance. However, this does not necessarily have to be true in all cases. In AI web applications that exploit front-end parts, for example, camera inputs, utilizing JavaScript might be more helpful. As the JavaScript AI people community proceeds to develop and the devices keep on developing, it may turn into a go-to alternative for some web designers who need to add AI to their range of abilities.

References

- *https://thenextweb.com/news/4-benefits-using-javascript-for-machine-learning-syndication*
- *https://www.ideamotive.co/blog/python-vs.-javascript*

Image Credits:

- *https://tutorialzine.com/media/2017/04/10-machine-learning-resources-1.png*
- *https://i2.wp.com/bdtechtalks.com/wp-content/uploads/2021/04/tensorflow.js-examples.jpg?ssl=1*
- *https://i0.wp.com/bdtechtalks.com/wp-content/uploads/2021/04/client-side-machine-learning-models.jpg*
- *https://i2.wp.com/bdtechtalks.com/wp-content/uploads/2021/04/javascript-mobile-app-machine-learning.jpg?w=1392&ssl=1*

"Flying cars" - not a myth anymore

Look! Up in the sky! It's an airplane! It's a sports car! It's a Transformer! It's Aircar!

Article by,
Arfah Upade, 26 August 2021

Want a ride?

One look at the car on the road, but soon you may have to look in the sky.

Science fiction, that's what comes to your mind when you hear "Flying car". However, Klein Vision's new feat, called "AirCar", proves that wrong.

AirCar, defined as a "dual-mode car-aircraft vehicle", sets records with its 35-minute flight from the international airport in Nitra, Slovakia to the international airport in Bratislava, Slovakia on June 28th, 2021. What's more, is, it completed its 142nd successful landing in Bratislava at 6:05 AM, just with a click of a button which transformed the aircraft into a sports car in under three minutes.

During this period, the inventor Professor Stefan Klein and co-founder Anton Zajac drove the AirCar to downtown Bratislava. After the test, on exiting AirCar, Klein announced that the flight had initiated a "new era of dual transportation vehicles."

He further added, “It opens a new category of transportation and returns the freedom originally attributed to cars back to the individual,”. “AirCar is no longer just a proof of concept; flying at 8,200ft at a speed of 100 kt (115 miles per hour), it has turned science fiction into a reality.”

Dr. Branko Sarh, Boeing Co. Senior Technical Fellow said, “Professor Stefan Klein is the world leader in the development of user-friendly Flying Cars. He further added “The automated transition from road vehicle into an air vehicle and vice versa, deploying/ retracting wings and tail is not only the result of pioneering enthusiasm, innovative spirit, and courage; it is an outcome of excellent engineering and professional knowledge,”

Let’s talk Specs

The AirCar Prototype 1 comes with a 160HP BMW engine with a fixed-propeller and a ballistic parachute. The AirCar has completed over 40 hours of test flights, including steep 45 degree turns and stability and maneuverability testing, under the administration of the Civil Aviation Authority. Its Prototype 1 has flown to 8200 ft and reached a maximum cruising speed of 190km/h (103kt).

AirCar Prototype 2, the pre-production model, will include a 300HP engine and receive the EASA CS-23 aircraft certification with an M1 road permit. Variable pitch propeller increased the chances of Prototype 2 to achieve a cruise speed of 300km/h (162kt) and a range of 1000km (621mi).

To watch the entire test flight, click on the video below:

From KleinVision - Youtube Channel

One needs to understand the significance of this event and what AirCar has achieved. Flying cars are like Zero-emission aircraft that take off and land like helicopters and transport passengers and cargo, and now may not be a distant dream waiting to be worked upon, because AirCar proves that the feat is achievable and technology available, the two most inspiring factors for companies already working on flying cars. An example of this would be Hyundai and General Motors' development work on "Air-Taxi" services and vision to bring them into operation by 2025.

For more information on AirCar, you may visit Klein Vision's official website:

https://www.klein-vision.com/

Your Thoughts!

- *What are your thoughts on this?*
- *Would you like to see flying cars around the world?*
- *Would you like to own one yourself?*

References

- *Flying car completes first-ever test flight between airports in 35 minutes*
- *Hyundai, GM serious about 'flying car' efforts*
- *Klein Vision's News Release*

Image Credits:

- *Cision PR Newswire*
- *Syfy Wire*
- *News18*

The AI landscape is shifting from 'data' to 'knowledge.'

Here's why that matters

Article by,
Jai Janani Radhakrishnan, 20 August 2021

Over the past year, our reliance on technology to help us keep in touch, stay safe, work, shop, and more has hugely accelerated our use of data. Time and again, we've seen organizations use this vital resource to make informed decisions, often with life-saving consequences, in seconds. Now, as we pass the one-year anniversary of COVID-19, we have seen a new landscape of data and AI-enabled business models emerging. Vastly accelerated by the events of the past year, companies have developed AI and pushed a new wave of innovation to survive and thrive in this new reality.

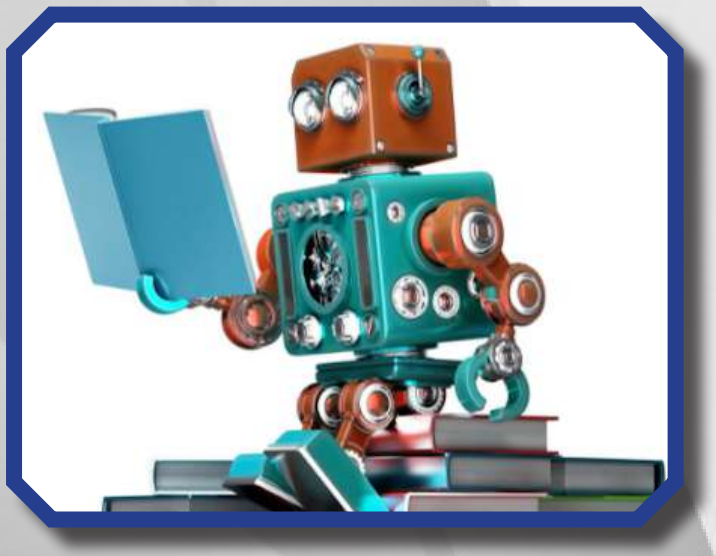
The direction of travel is already clear. We're seeing companies across industries create large and growing investments in 'data science' initiatives: an interdisciplinary field that uses scientific methods, processes, algorithms, and systems to extract knowledge and insights from structured and unstructured data.

Science and technology are rapidly evolving. The ways in which industries take advantage of them are also changing. As a result, we'll be entering a new environment. One that will increasingly rely on novel approaches to skills, governance, and machine learning (ML) engineering to fuel a vast AI ecosystem of numerous models and their various dependencies(collaboration between data scientists and software engineers to manage performance and scaling of machine learning).

In individual organizations, we call this rapid growth of interconnected models an 'AI ecosystem.' And where AI's concerned, the biggest challenge facing your business three years from now will be mastering the complexities of running one of these ecosystems. We believe there are four trends to keep in mind:

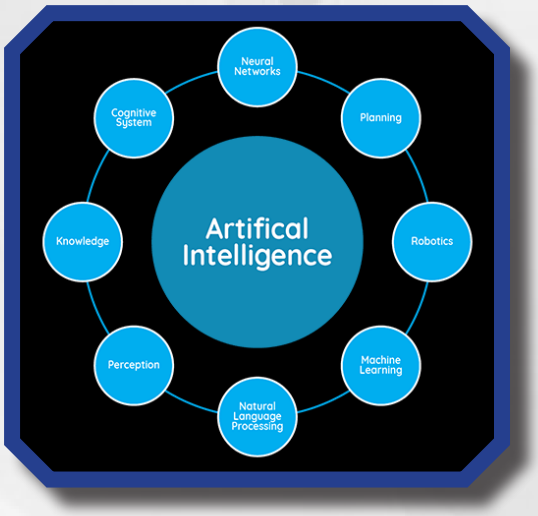
1. Better models, not first models

The majority of businesses will soon be past the stage of developing their first AI models. Instead, they'll focus on improving and expanding on what they've already implemented, including upgrading models as needed. Because each industry's difficulties (and data) are unique, domain specialisation will become more common; data scientists with scientific approaches and experience relevant to certain industries will be in great demand.



2. Transfer learning changes how we exploit text and voice

Natural language processing (NLP) will expand dramatically, with far-reaching implications (full automation of customer care, for example). And, thanks to transfer learning, these technologies' entrance hurdles will be substantially lower than they are now. Knowledge learned from one problem will be saved and automatically applied to related problem, thus reducing the time it takes for new applications to reach market. It's a game-changing development, and fine-tuning these new models will require advanced scientific skills.



3. Speed ahead on governance

New predictive models will have an easier and faster path to market. With more AI models and use-cases in production, better governance will be required to cope with the increased volume and complexity. To meet this challenge, we will need to be prepared. We must be able to control data science and build relevant frameworks, guardrails, and policing to ensure that this activity adheres to ethical norms, recognised data security standards and model transparency principles.

4. It's unicorn farming, not unicorn hunting, that's the difference!

Companies will need higher AI literacy at all levels of the organisation as the use of AI accelerates. Companies will need to know at least median statistics all the way up to the C-suite if they are to thrive in a data-driven environment. All of this will have one unavoidable consequence: demand for data science skills will outstrip supply. Because deep expertise in data science and machine learning will remain scarce, businesses will need to create new channels for upskilling existing employees, such as internal "nurseries" that nurture and grow in-demand talent.

The Time to begin is now!

The spread of AI ecosystems across companies is already underway. And as algorithms become more complicated — and interact more — they will begin to match or surpass human capabilities in specific activities. These ecosystems' outputs will be fed into new models, whose output will be fed into successor models. All of this will necessitate a unique set of modelling, computational, and engineering abilities to manage and orchestrate. Now is the time to start working on them. In three years, it will be too late to begin.

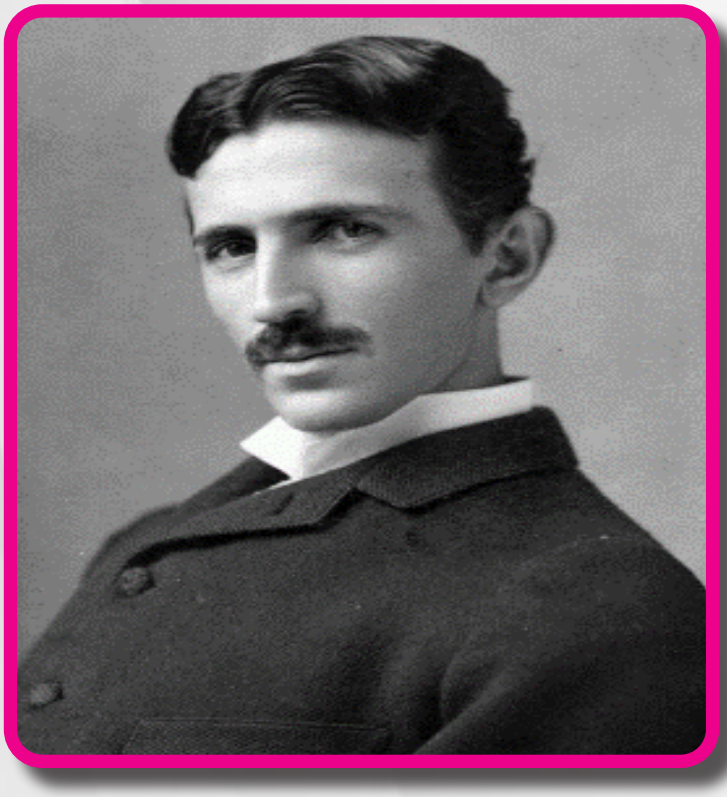
References

- 65 Artificial Intelligence Statistics for 2021 and Beyond - Semrush Blog
- The AI landscape is shifting from 'data' to 'knowledge.' Here's why that matters - TNW
- Artificial Intelligence. - builtin
- The AI Ecosystem: Mapping the future of Data Science - InformationWeek

Nikola Tesla

THE MAN WHO INVENTED THE 20TH CENTURY

Article by,
Geetika Babu, 26 August 2021



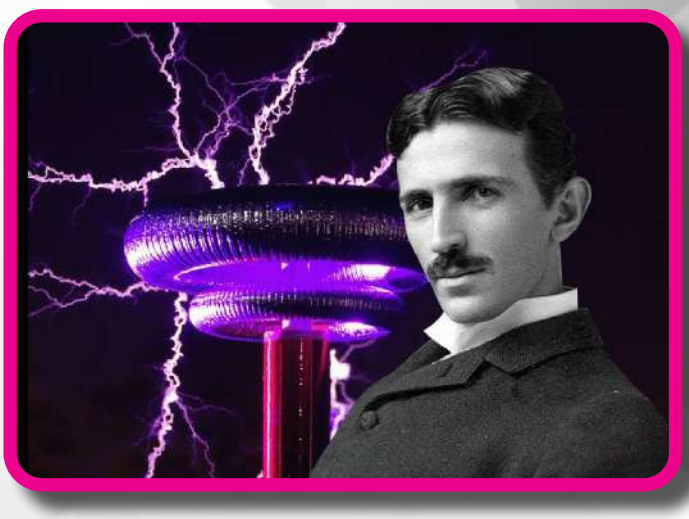
Nikola Tesla

"It seems that I have always been ahead of my time," Serbian-American engineer and physicist Nikola Tesla once mused. Born in 1856 and raised in the Austrian Empire, Tesla studied engineering and physics in the 1870s without receiving a degree, gaining practical experience in the early 1880s working in telephony and at Continental Edison in the new electric power industry. The math and physics genius' inventions constitute numerous technological breakthroughs that continue to impact our lives today. If you couldn't imagine life without your TV remote, thank Nikola Tesla for making it possible – in addition to neon and fluorescent lights, wireless transmission, laser beams, x-rays, robotics and, of course, alternating current - the basis of our present-day electrical system.

Starting in the late 1880s, Thomas Edison and Nikola Tesla were embroiled in a battle now known as the War of the Currents. Edison developed direct current (DC) which cannot be easily converted to higher or lower voltages and thus earned him royalties. Tesla believed that alternating current (AC) was the answer to this energy loss, which can be converted to different voltages relatively easily using a transformer. The two parted ways due to this conflicting business-scientific relationship. This best-known invention of Tesla was later sold to Westinghouse.

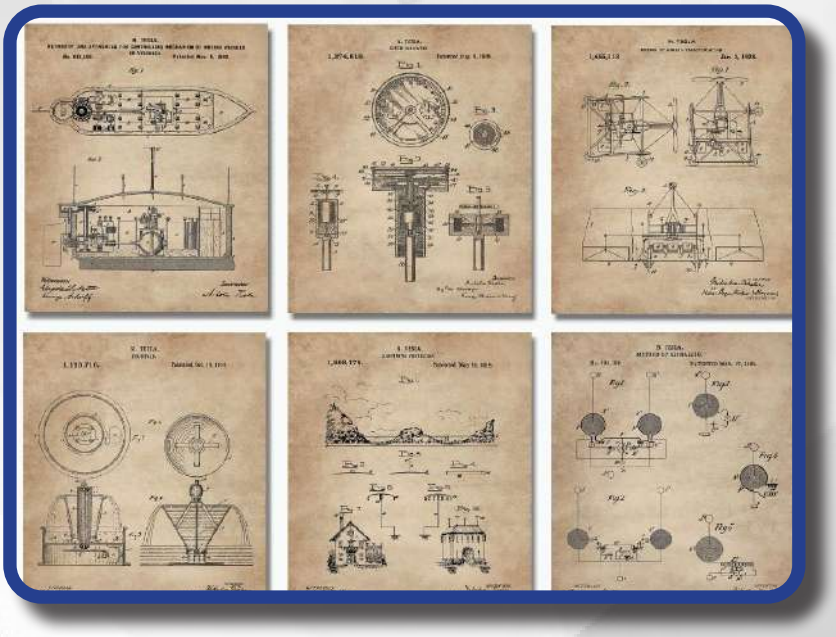
Perhaps the most familiar symbol of Tesla's work is the Tesla coil. Building upon the revelations of the Tesla coil, Tesla sought to offer wireless power for free to all by transmitting information from one tower to another using resonance. Thanks to Tesla's early work,

Magnifying transmitter which can generate millions of volts of electricity



Electric volt generator

wireless transfer of energy is finally being realized today -- from wireless chargers for electric toothbrushes and smartphones, to wireless electric vehicle charging, a technology being researched at the Energy Department's National Labs. The magnifying transmitter succeeded in transmitting an electrical current a kilometer away. Tesla designed the first hydroelectric power plant in Niagara Falls, New York, harnessing the power of the waterfalls he had marveled at since childhood. He invented a remote controlled boat that he thought could end all warfare. His claims of receiving signals from outer space were proven right—a century later. Using electromagnets to spin, Tesla's induction motor currently powers everyday household items such as vacuums, hairdryers and power tools. "Teslas," a unit used to measure the strength of magnetic fields, are named after Tesla. Another namesake is Tesla Motors, the electric car start-up, in homage to Tesla's role in the invention of the electric motor.



Patents of 6 different invention

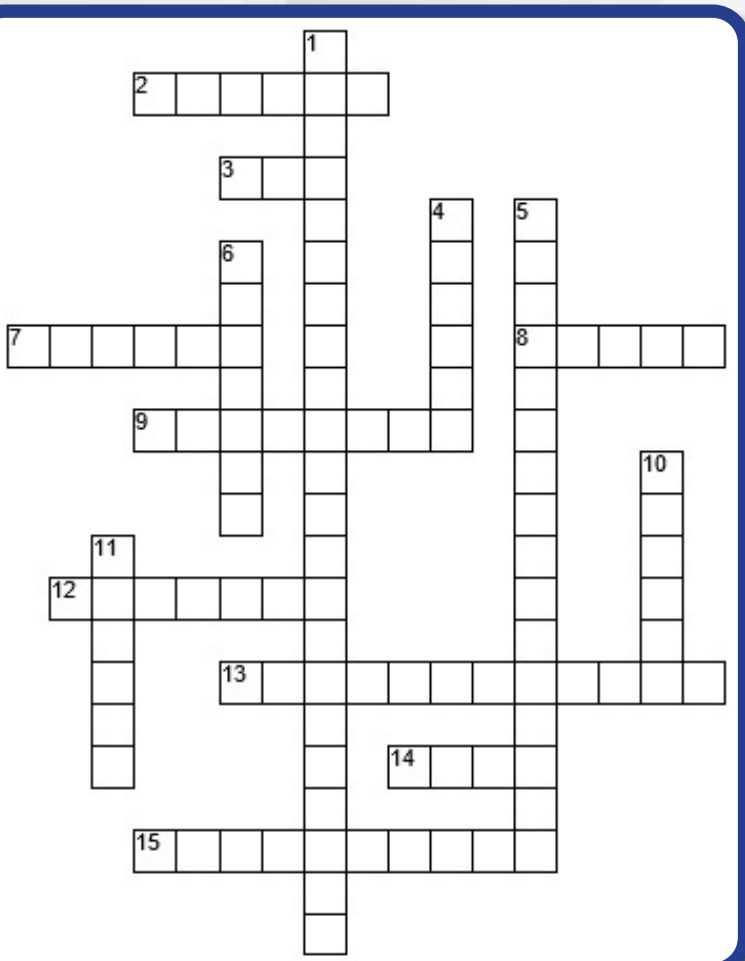
Tesla was not a savvy businessman and suffered financially, despite his achievements. He held over three hundred patents, but was only recognized for some, indicating many of his ideas were tested and failed or never became well known. The U.S. government demolished Tesla's partially completed tower because it worried German spies would use it to intercept communications during World War I. In 1895 Tesla's New York lab burned, destroying years' worth of notes and equipment.

Tesla lived his last decades in a New York hotel, working on new inventions even as his energy and mental health faded. Imagine a beam of energy that could bring down planes from miles away with nothing but electricity. Imagine an invisible wall of energy protecting a country from invasion, acting as an electric fence that could vaporize enemy soldiers the second they step foot inside. This brilliant inventor claimed to have actually created this "death ray"- however, if he had built a death ray, the world would never see it. Soon after, he died in the New Yorker Hotel. The whereabouts of the death ray remain unknown even today. However, the legacy of this man will never be forgotten and he will always be remembered because of his inventions.

References

- 9 Things you may not know about Nikola Tesla - History.com
- Tesla Death Ray - allthatintresting.com
- Biography of Nikola Tesla - smithsonianmag.com
- 11 Things about Nikola Tesla - energy.gov

Crosswords



Across

2. If a human has an artificial limb, he/she can be considered a(n) _____.

3. The police and ___ have been using drones for sting operations, causing an uproar over private property.

7. A female looking robot is a(n) _____.

8. A machine capable of carrying out a complex series of actions

9. We have jobs to solve _____.

12. If AIs solve all the problems, humanity will lack _____.

13. A robot should be _____ and reprogrammable.

14. Neural Networks require large amounts of ____ to make accurate decisions.

15. We fear that AIs will no longer need us if everything becomes _____.

Down

1. What does AI stand for?

4. In order to make a true AI, we must first understand how our own _____ function.

5. What is the closest thing that we know of to a true artificial intelligence?

6. A male looking robot is an _____.

10. Amazon is considering using _____ to deliver packages

11. Androids are designed to resemble what creatures?

Answers on Page 25

Diversity and Inculsion in Opensource project

Let's see how "open" is Open Source

Article by,
Madhuri Ramakrishnan, 11 Aug 2021

Malcolm Forbes, the publisher of Forbes Magazine once said, *"Diversity: the art of thinking independently together."* When it comes to Software Development, OpenSource is nearly synonymous. Today more than 30M developers are contributing through community-based platforms like GitHub etc.

Research shows that diverse open source projects are more productive and make better decisions.

Statistics show that 70% of companies run all their businesses with open-source software. Diversity and Inclusivity are important in every field, and open-source organizations have taken some actions to increase the representation of contributors regardless of gender, social background, and economic standing.

With programs like Outreachy, a 3-month long paid open-source program exclusive for underrepresented groups to give a head start to beginners for OpenSource contributions in organizations like Mozilla, The Linux Foundation, Apache.

Practices like using inclusive words when addressing contributors and employees within Open Source organizations have created a major impact of adopting inclusivity within the community.

Take a look into some of the examples and practices adopted in Open Source Organization which inspires Diversity in the Community.

1. Drupal

Drupal™

Diversity, Equity, and Inclusion are valued by Drupal as there is a separate team to monitor their active participation and implementation. Drupal celebrates pride month every year by changing its logo on social media platforms.

2. Red Hat

Red Hat

Red Hat is one of the leading open-source provider companies which actively take initiative in building an open-source community filled with innovation and productivity of better technology. One of the initiatives they took to encourage diversity was by including the Women in Open Source Community Award since 2015. An Award-ceremony to appreciate and honor women for their outstanding contributions to the open-source community.

3. Mozilla

Mozilla is one of the communities that are open and easily accessible to everyone looking for meaningful contributions towards the vast open source community that is perpetual seeking growth. Diversity has been one of the interests of this community that they have always taken the necessary steps towards.

Reference:

- TheNextWeb.com
- Opensenselabs.com
- OpenSource.com

4. The Linux Foundation

The Linux Foundation has taken some major steps to make bias-free surroundings and has supported and provided opportunities that enable diversity and inclusion.

- An initiative of Inclusive Naming
- Advancing diversity and inclusion in Software Engineering
- Availability of free online courses
- Diversity and Inclusion in Events
- Live Mentorship Series
- LiFT Scholarships

With consistent efforts and thought it is possible to achieve Diversity and Inclusivity in an Open Source organization. Always remember, *'Diversity results in Prosperity'.*

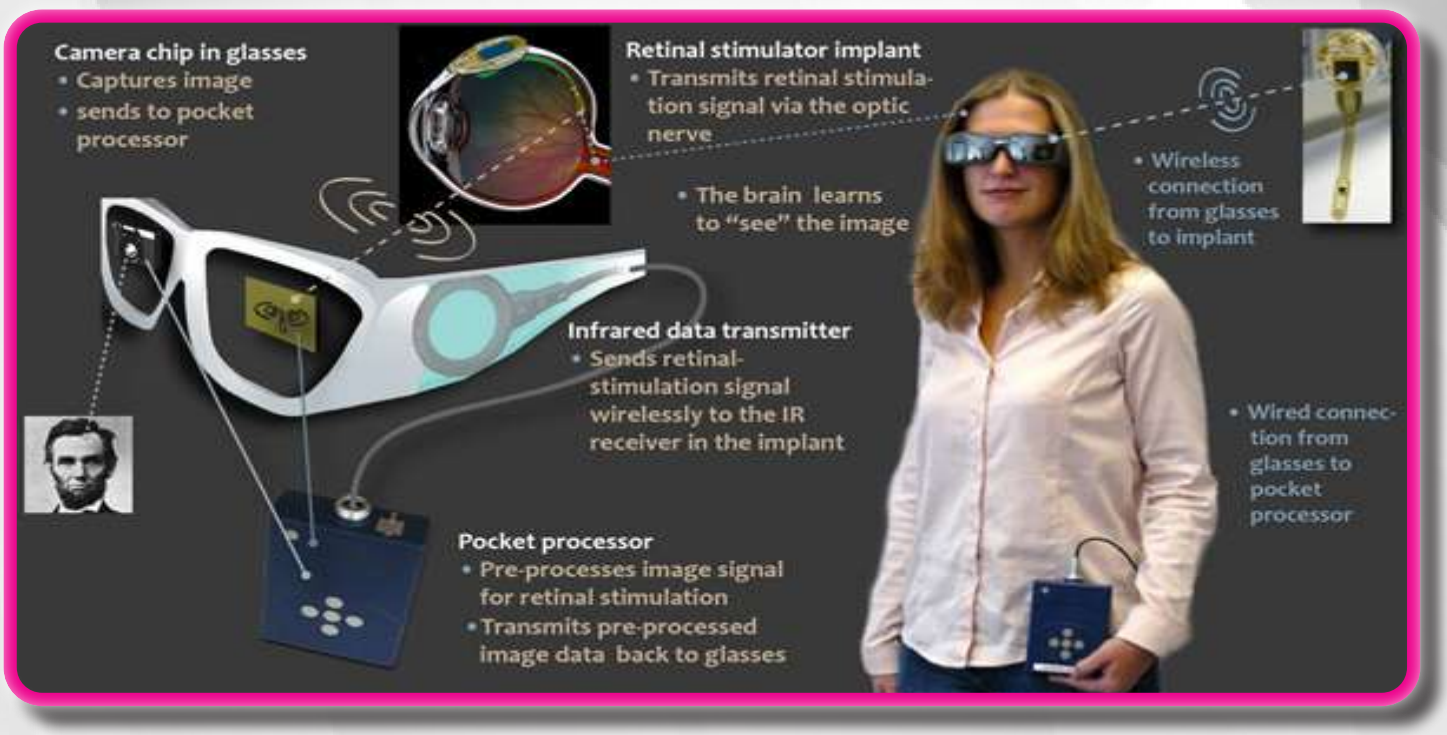
Crosswords Answer

1. *Artificial Intelligence*
2. *Cyborg*
3. *FBI*
4. *Brains*
5. *Neural network AIs*
6. *Android*
7. *Gynoid*
8. *Robot*
9. *Problems*
10. *Drones*
11. *Humans*
12. *Purpose*
13. *Multipurpose*
14. *Data*
15. *Autonomous*

Pixium Vision for the Visually Impaired

Solving the oldest human challenge in history, one step at a time.

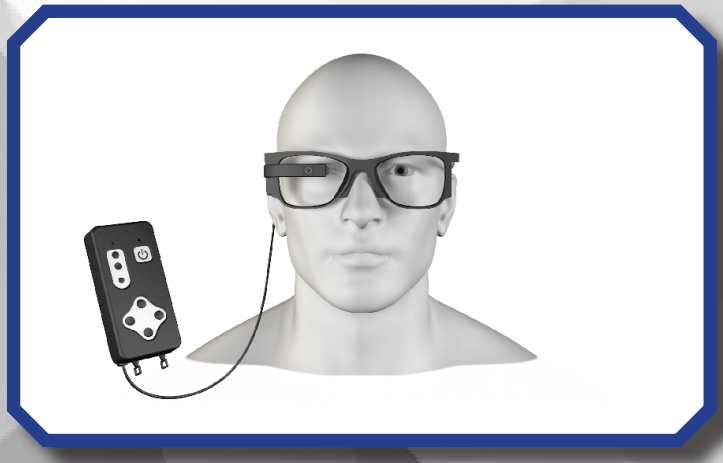
Article by,
Vaishnavi Singanmalli, 11 Aug 2021



Prima System

Treatment for blindness reflects the growing need for medical care that has never been reached worldwide, including in Europe and the United States. In 2010, there were an estimated 285 million visually impaired people worldwide and an estimated 39 million who were completely blind.

In the efforts to find the much-needed medical care, in 2020, Bioelectronics, Inc. was awarded the HealthTech Award for its next generation of bio-vision technology Prima System. Prima System has been designed to empower the visually impaired and has won the 'Best Product / Deal', according to the latest news company.



Bionic Vision

How does the Pixium Vision Works?

The Prima program is aimed at partially restoring the normal body function of photoreceptor cells in the eye by electronically stimulating nerve cells of the internal retina, and then transmitting visible information to the brain through the optic nerve.

It is a small wireless and wireless miniaturized machine that acts as a miniature panel powered by a nearby infrared lamp using a small digital

projector attached to the glasses covered by the installed head. The small size of the PRIMA implant and wireless design enables minimally invasive surgery, which can be performed under local or general anesthesia.

Did You Know?

The PRIMA implants used in the clinical trial are likely to be 2x2mm in vvsize and 30 microns in size (the third-largest human hair).

In addition to minimally invasive surgery, the purpose of the Prima System design was to improve and resolve improper implant vision by investing directly in the level of damaged photoreceptors. The PRIMA wireless sub-retinal implants connect the active body network: the inner layers of the retina and also contain 378 electrodes per pixel with its electrical return method intended to provide highly targeted electrical stimulations.

The Prima program aims to obtain a functional artificial or bionic view of light that replaces the loss of central vision. The Prima system is made up of three main components: *Wireless retina insertion, camera with and digital projector, and package processor.*

A small camera mounted on mirrors captures visual scenes in nature. Virtual reality is processed and simplified by a computer in a pocket with artificial intelligence-based algorithms to extract useful information from images.

The simplified images were then sent to the mirrors where the small digital projector printed the processed images with an infrared light bulb to the PRIMA wireless photovoltaic subretinal implant, by the reader, behind the eye under the retina.

Photovoltaic cells incorporating PRIMA convert this optical information into electrical stimulation to stimulate the bipolar nerve cells of the internal retina and cause a visual impression in the brain.

Bionic vision could change the lives of blind people:

According to leading data reported in a French study, patients with dry eye (AMD) have seen significant improvements in the detection of the PRIMA system. Recent research has also shown that patients can access each of the central views produced by the PRIMA System, as well as their remaining external views, at the same time.

Pixium Vision could be a powerful end-to-end delivery with

the rapid development of microelectronics, intelligent software algorithms, visual processing, and biology - all to create bionic vision systems capable of interacting with mechanical and AI brains. The aim is to use technology to detect vision loss or chronic illness and thus decrease blindness, increase independence, and the quality of life as a whole.

At the time of writing, 285 million people worldwide are disabled, and 39 million are completely poor out of these people with visible disabilities, 200 million have AMD, and another 365,000 people are diagnosed with AMD each day, which is why a new study by Prime Vision Technology marks a critical step in the treatment of dry AMD.

With no known cure for blind patients, dementia victims are more prone to depression, lose tens of billions of dollars together, and are known to die prematurely. By providing something different with naturally enlarged eyes, we go a long way in finding the right treatment for one of the oldest human challenges in history: blindness.

References

- *A Bionic Vision System Lets the Blind See Again*
- *Prima Bionic Vision System – Pixium Vision*

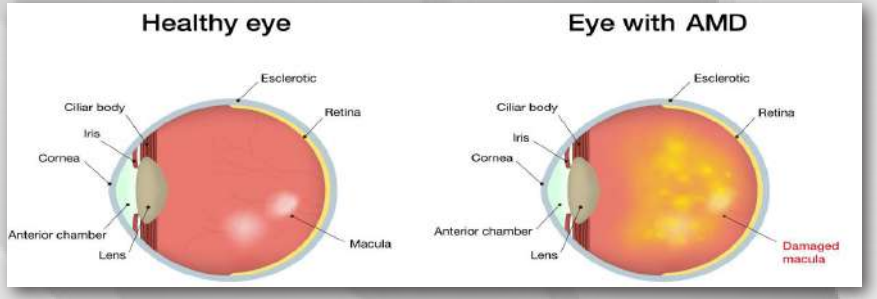
Image Credits:

- *NS Medical Devices - Vision*
- *MDDIOnline - IRIS*
- *EveryDayHealth.com*

More About AMD

What is AMD?

AMD is a Age-related macular degeneration which is a disease that affects a person's central vision. In AMD, a part of the retina called the macula is damaged. It is the most common cause of severe loss of eyesight among people 50 and older. In its early stages, AMD has no signs or symptoms, so people may not suspect they have it.



References

NationalEyeInstitute.gov

Invisibility Cloaks: A Tangible Reality

Is invisibility cloak no longer science fiction?

Article by,
Melvina Michael, 20 August 2021

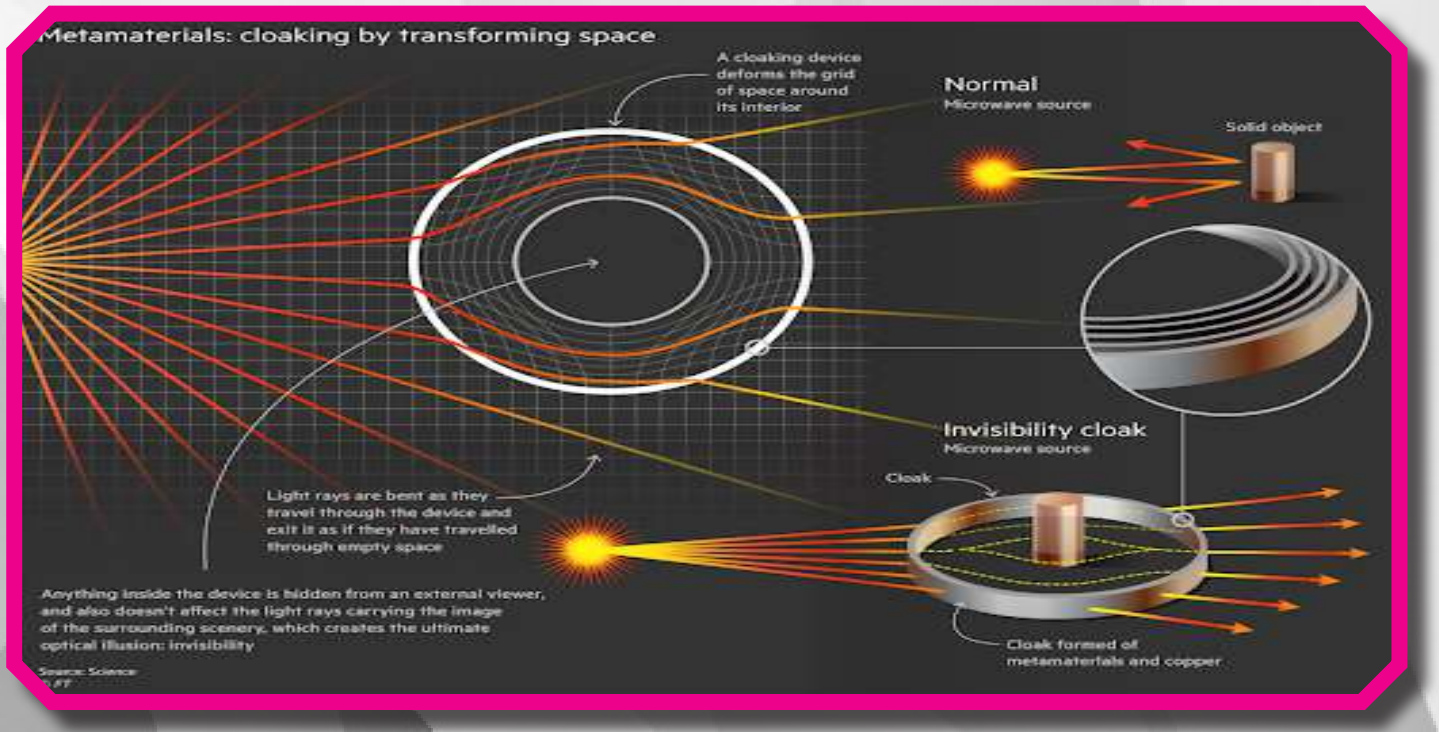
Harry Potter's invisibility cloak might not be so fantastic after all. A team of Montreal researchers claims to own it with success rendered an object invisible to broadband light, employing a new technique called spectral cloaking.

Well, This is like we could get our hands on the invisibility cloak within the near future. Scientists and various private companies are already working on the technology.

The trail to making the magic of cloaking technology is not as straightforward as one would possibly think. The technology is far from perfect. It is tough, but we have to consider various aspects before making something invisible. Finding the most practical and functional option is very difficult.

So how does it work?

An invisibility cloak would need to find a way to bend light around an individual or object from all directions. To make an object disappear before an individual's eyes, a cloak would need to simultaneously interact with all of the wavelengths, or colours, that structured light. The invisibility cloak has to be designed for specific bandwidths of radiation.



In the earlier research, scientists have noted a problem with the above way works. The straight path directly through a region of space is always shorter than the path that curves around the region, so it might take longer for light to travel around the object, it's concealing than to travel straight through. This time delay can lead to visible distortions and thus not resulting in invisibility.

Yet, one among the ways scientists have created cloaking technology is comparatively simple. They have used cameras to record and project images of what is behind an object onto the object's surface, making it appear as if it is not even there. Scientists have come up with a new solution about invisibility based on the use of dielectric (nonconducting) materials.

The article by Interesting Engineering quoted that Canadian camouflage company Hyperstealth Biotechnology has patented the technology behind a material that bends light to form people and objects near, invisible to the naked eye. The material, called Quantum Stealth, is currently still within the prototyping stage but was developed by the company CEO Guy Cramer primarily for military purposes.

Ideally, these would work passively without pumping in extra energy and for all wavelengths of light. That does not mean you can make an invisibility cloak that would perfectly redirect light for all shades of any colour. The wavelength of light would have to be even narrower than that emitted by any laser that can be built. "Essentially it might be impossible," says Alù.

Quantum Stealth-experiment by the researchers

It may seem easy in movies but is difficult to create in the real world because no material in nature has the properties necessary to bend light in that way. Scientists have managed to create artificial nanostructures, called metamaterials which can do work. But we look forward to whether the scientists can make it into a reality, such that it will not be fiction anymore.

References

- *Invisibility Cloaks Are No Longer Just Science Fiction*
- *Invisibility cloaks can never hide objects from all observers*
- *Now you see me: true invisibility cloak impossible to build*

World's first nuclear fusion reactor to be tested this June

A step to end the global energy crisis by building the universe in a lab

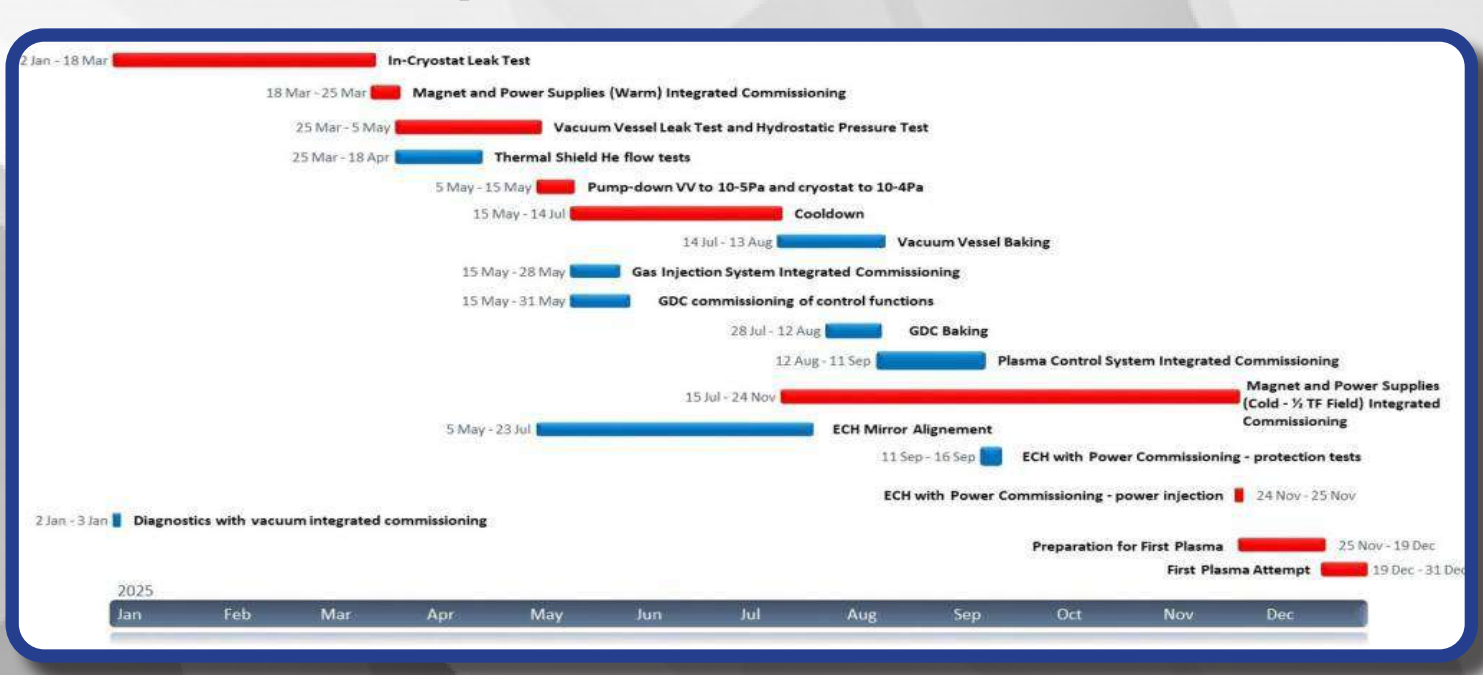
Article by,
Arfah Upade, 10 August 2021

This June, Scientists will put the International Thermonuclear Experimental Reactor (ITER), the world's first nuclear fusion reactor, to the test. If things go as planned, ITER will move one step closer to becoming the world's first functioning nuclear fusion reactor during the inaugural tests the scientists will conduct on it.

Previously, nuclear fusion has been used to produce thermonuclear warheads, powering weapons of mass destruction. However, this is not the purpose of ITER. The main objective of utilising nuclear fusion through ITER is to harness it to power cities worldwide. An advantage of using ITER for this purpose is that it would be the first fusion reactor capable of producing more energy than it takes to operate.

The EUROfusion researchers will launch the Joint European Torus (JET), a separate experiment designed to adjust the fuel and material requirements for the ITER experiment prior to launch.

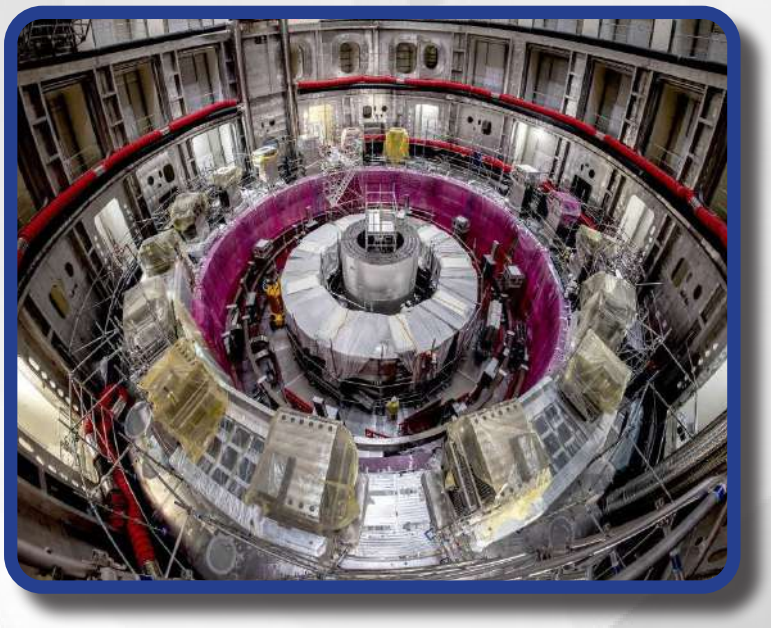
The size difference between JET and ITER is the most important. Actually, although the JET experiment appeared first, the development of the ITER concept has become an indispensable part of it. When scientists redesigned it to interface with the ITER mission, JET was shut down for several months.



ITER could change everything, but...

If nuclear fusion reactors can be built and operated safely and correctly, the global energy crisis would most certainly be solved. However, it's one long shot.

When the nuclei of two atoms fuse, they release an amazing amount of energy. The big idea behind fusion reactors is to use relatively little energy to release a lot of energy. This is how the sun and other stars work, and why they are so bright and emit so much heat.



But...rebuilding the universe in the laboratory is an extremely complex task. Solving nuclear fusion involves more than just the right fuel mixture, but it is indeed most of it. The conditions for achieving controlled nuclear fusion are much more difficult than simply making explosive warheads. However, this is more of an engineering and technical issue than a safety issue, as in theory, nuclear fusion reactors are completely safe. The kind of dangerous radiation or reactor meltdown that may occur in fission is basically impossible to occur in fusion.

The real problem is the generation of enough energy and that too, useful energy, in the right way. And, of course, you must control it so that it does not produce too much. It's easy to imagine nuclear fusion, but practically even modern supercomputers find it difficult to simulate fusion on a large-enough scale for use.

Then, why still do it?

Once JET starts this summer, we will have a chance to solve some of these problems. Then, in 2025, ITER will begin a ten-year work cycle, in which it will operate on low-power hydrogen reactions.

During this period, scientists will monitor the system while exploring multidisciplinary methods to solve various engineering problems that arise. The core of these efforts will be the creation of machine learning systems and artificial intelligence models that can power the simulations needed to scale up the nuclear fusion system.

Finally, in 2035, when the ITER team has enough data and information, they will change the hydrogen source of fuel for the reactor to deuterium and tritium, which are much more powerful and packed with energy.

If all goes according to plan, we may replace the global energy crisis with rich fusion energy in a few decades.

Did You Know?

India formally joined the ITER Project in 2005 and the ITER Agreement between the partners was signed in 2006. As signatories to the ITER Agreement, the ITER Members China, the European Union, India, Japan, Korea, Russia and the United States will share in the cost of project construction, operation and decommissioning, and also share in the experimental results and any intellectual property generated by the project.

References

- *Nuclear Fusion: World's First Ever Reactor To Be Tested This Summer*
- *Scientists will test the world's first nuclear fusion reactor this summer*
- *ITER project: India's role in creating a miniature sun on Earth*

Image Credits

- *https://www.iter.org/album/construction*

This Flying AI Robot Can Pick Fruits

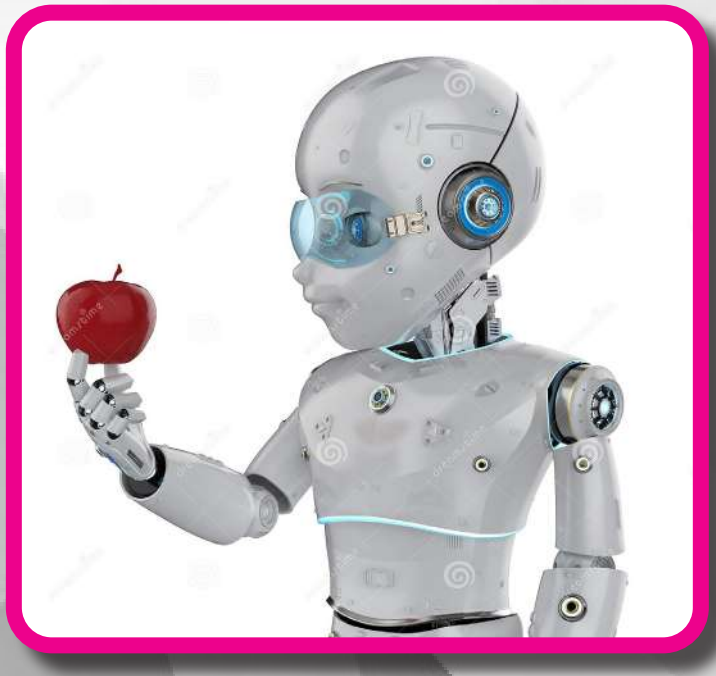
Preventing Waste in the Process

Article by,
Jai Janani Radhakrishnan, 20 August 2021

Fruit pickers are becoming tougher to come by in order to harvest the world's orchards. Seasonal employees are unable to cross borders due to COVID-19 travel restrictions, therefore some farmers are using AI drones to pick their crops.

Even before the outbreak, growers were having trouble getting employees to help gather their crops. The American Farm Bureau Federation (AFBF) issued a warning in July 2019 about persistent labour shortages. Farmers "try to hire American workers, but there are few takers — and those who do take agricultural jobs frequently quit before the season is over," according to AFBF President Zippy Duvall.

With travel restrictions in place around the world, governments across Europe called on those who had lost their jobs as a result of the pandemic to assist with the harvest last year. Spain and Italy have even proposed to allow illegal migrants to work as pickers.



Picking the Best

It was a direct response to labour shortages that prompted the idea. "At the appropriate time and for the right price, there are never enough hands available to pick fruit. Farmers lose billions of dollars each year because fruit is left to perish in the orchard or sold at a fraction of its peak value," according to the business.

The FAR robot deploys AI perception algorithms to discover fruit trees and vision algorithms to locate and classify the fruit among the foliage. The robot then determines the ideal way to approach the fruit while maintaining stability as its picking arm grabs the item.

Because of a single autonomous digital brain in a ground-based device, the drones can harvest the orchards without colliding.

A Job few people want

Each year, nearly 800 million tonnes of fruit are produced worldwide, representing a market worth more than half a trillion dollars.

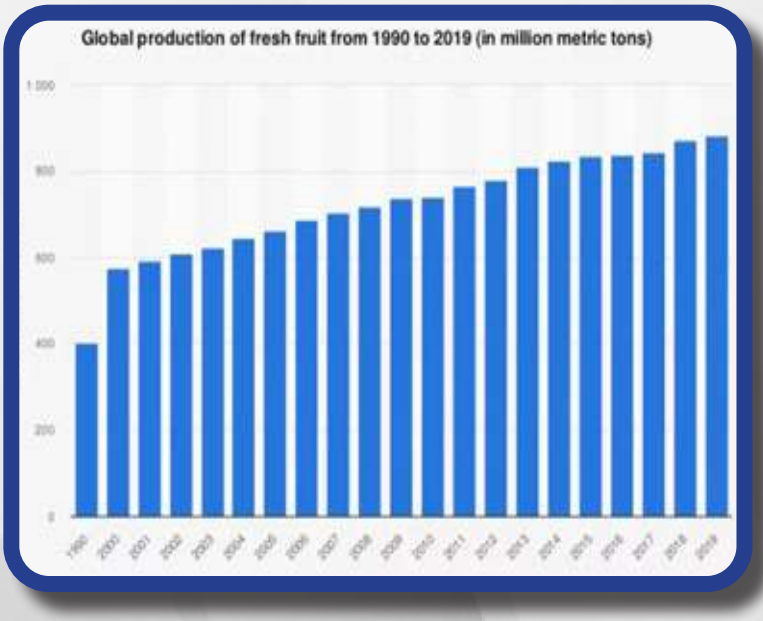
"We require a huge number of dependable pickers, and we must pay salary, arrange visas, lodging, food, healthcare, and transportation," said John White, CEO of Marom Orchards, one of the first fruit farms to deploy the new flying robot pickers.

"Costs are constantly rising. This is strenuous seasonal labour, and other crops can pay better. Agricultural labour is being abandoned by young people all throughout the world in favour of higher-paying, full-time urban jobs," he noted.

Tevel claims that its robots are meant to assist rather than replace human fruit pickers. The company claims that by 2050, there will be a shortfall of five million pickers, and that its drones will ensure that the 10% of fruit currently left unharvested is plucked.

The United Nations has declared 2021 as the International Year of Fruits and Vegetables, with an emphasis on innovation and enhanced technology to raise fruit and vegetable production efficiency and productivity while reducing loss and waste.

In its study, Data-Driven Food Systems for Crisis Resiliency published last year, the World Economic Forum stated that technology must be utilised to make agriculture more sustainable in the aftermath of COVID-19, and advocated for a "innovation ecosystem" to stimulate new breakthroughs.



Reference

- https://www.weforum.org/agenda/2021/02/flying-ai-robot-harvest-fresh-fruit/
- https://amp.interestingengineering.com/flying-autonomous-robot-uses-ai-to-identify-and-pick-ripe-fruit
- https://www.energetskiportal.rs/en/this-flying-ai-robot-can-pick-fruit-preventing-waste-in-the-process/
- https://www.intelligentliving.co/flying-autonomous-robot-pick-ripe-fruit-24-7/

IT IS TIME TO CLEAR THE SPACE JUNK

Article by,
Saara Parkar, 24 Aug 2021

LOST IN SPACE

Researchers are looking into new ways to combat space junk as the number of objects in orbit increases so rapidly. Although concern about space junk dates back to the satellite era, the numbers are rising so rapidly that the problem is becoming more urgent.

HOW MUCH SPACE JUNK IS THERE?

It's incredible to think that we have been a space bond since the late 1950s.

We have made countless scientific discoveries and made the world more connected than ever before, but with every breakthrough we left something behind. Waste!

Our human exploration of space has produced a myriad of rockets and satellites that still orbit our planet, and we face an ever-increasing risk of collision as we launch more. We've also been creating a bit of a mess.

As of right now, there are around 2,000 active satellites orbiting Earth. There are also about 3,000 dead satellites littering the skies. Approximately 34,000 pieces of space junk larger than 10 centimeters in diameter and millions of smaller pieces that could also prove hazardous if collided with something else.

Space Waste Fact

It is estimated that space debris can reach speeds of 4.3 to 5 miles per second. This is almost seven times faster than a bullet, equivalent to a bowling ball moving at 300 mph

COULD THIS BE THE SOLUTION?

To keep on rocketing into space, it's time to empty the garbage. Maybe an orbiting tug with tentacles that can capture a spent rocket would be the answer to eliminating dangerous space junk? Or could a mini-fridge-sized spacecraft with a powerful magnet be the answer?

On March 22, Astroscale, a Tokyo-based startup, partnered with Japan's space agency, JAXA, to develop space trash pickers. The company called the project ELSA-d, which stands for End of Life Services by Astroscale.

Two spacecraft are involved in the project. It consists of a 386-pound mini-fridge-sized satellite armed with a magnet. Similarly, there is an extremely small satellite, which weighs just 37 pounds. This satellite is shaped like several pizza boxes stacked together, and has a rotating magnetic plate. The smaller satellite will serve as a 'practice target' for the bigger satellite, allowing them to test how well they will be able to chase and capture it. When they launched they were attached, but in a few months after the systems have been thoroughly tested, the service provider will release the client into its own orbit. During the rendezvous, operators on the ground will move one satellite close enough to the smaller one for the magnet to attach itself.

Following the successful meet-up of both objects, a second phase of the project will involve sending the small machine into tumbling orbit, making it

much harder to capture. It will again need the magnet to be grabbed by the bigger satellite. Astroscale is attempting to demonstrate to potential customers that it can capture debris in a manner that resembles erratic space travel. Once those two spacecraft are captured a second time, they will enter a joint orbit and be burnt up harmlessly as they enter Earth's atmosphere.

Astroscale capabilities would normally be used to remove the dead satellites of specific companies or to clear crowded patches of space that might impede the mission of commercial companies or space agencies. The company's magnetic plate, which uses magnets to let satellites grasp each other, will only work if satellite operators attach the plate to future spacecraft, just like a trailer hitch to a vehicle in orbit. Astroscale capabilities would normally be used to remove the dead satellites of specific companies or to clear crowded patches of space that might impede the mission of com-

mercial companies or space agencies. The company's magnetic plate, which uses magnets to let satellites grasp each other, will only work if satellite operators attach the plate to future spacecraft, just like a trailer hitch to a vehicle in orbit.

WHAT ARE THE CHALLENGES?

In order to grasp the target without bumping it and steering it in another trajectory, you have to match the speed and direction of the object. "You have to calculate the tumbling rate, navigate toward it, and negotiate the capture with an object that won't cooperate," Piguet says. The last thing you want to do is create more debris.

DID YOU KNOW?

- *Nasa recently published a guide to avoiding satellite accidents for commercial providers, and SpaceX and nasa recently signed a contract to prioritize safety during launches and orbital maneuvers*
- *The Astroscale team will begin planning a second mission to grab a defunct Japanese upper-stage rocket booster sometime in 2023*
- *As the first company to agree to use these magnetic plates on its satellites, OneWeb announced plans to launch its broadband service in October 2021.*

Reference

- https://www.wired.com/story/its-finally-time-to-take-out-the-space-trash/
- https://www.nationalgeographic.com/science/article/space-junk

Quiz Time

1. _____ is an initiative by the Indian Space Research Organization (ISRO) which is an early warning system in space to detect debris.

   a) Project ISON b) Project NETRA c) Project NISAR d) Project CRD2

2. Which country contributed to huge amounts of space debris

   a) India b) China c) CIS Countries d) USA

Answers on Page 38

TechScience WordSearch

L D R U F R A I G P A C D L S
I E Y M H I J G T T O A J L C
N M D T I E E R O R N T O O L
S R L F U L I C G G M O H I T
A G O D O S I L H O T D N B K
S E I T N O E A T L C Y M H M
A H Z S X N U R A G H I C B H
F E D O L P T R L S E T C E R
S Q G L S E E S I M S I A N S
A T B M A H A R A S H T R A U
W T M L P T D C P I E N T H L
S O S I S D X I F N S S H A N
T I R A N I H S E O C S Y V S
S E N S C C F R O V H H U Q H
P R P W E P H L L Q O H A R C

Clues

1. India's first 'Laser Interferometer Gravitational-Wave Observatory (LIGO) project' is to come up in which state ?
2. Which company launched a WhatsApp API enabled chatbot called 'Mitra', to provide employment opportunities ?
3. Which country is the largest contributor of space waste ?
4. Which of the following terms IS NOT one of the five basic parts of a robot? Peripheral tools OR End effectors
5. Who is known as the -Father of AI ?

Quiz Time Answer

Quiz 1
1. a 2. d

Quiz 2
1. b 2. c

WordSearch Answer

1. Maharashtra
2. Vahan
3. Russia
4. Peripheral tools
5. John Mccarthy