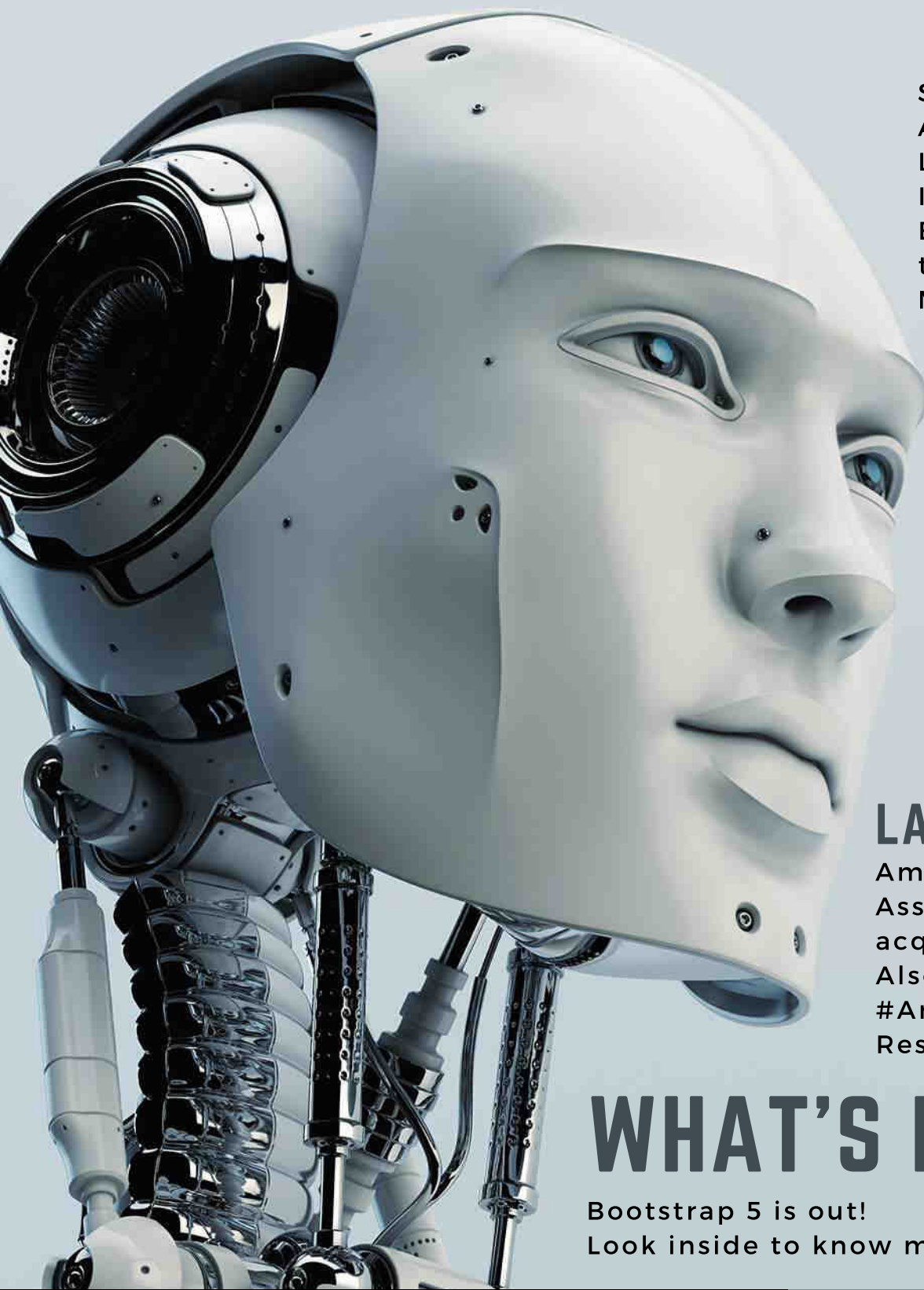




TECHSCIENCE

By the IT Department

FH 2020



Social Media
Analytics, Xenobots,
LIDAR, DEG, PULSE,
IoT!
Everything you need
to know in one
Magazine.

SCIENTIFIC FEATS

Find out about
Richard
Feynman's
Prophecy and
the first ever
NASA + SpaceX
Collaboration!

LATEST NEWS

Amazon's Distance
Assistant and
acquisition of Zoox!
Also
#AndroidDevChallenge
Results inside!

WHAT'S NEW

Bootstrap 5 is out!
Look inside to know more.

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A Note from the 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 2020 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 2020, is an effort of the faculty and 12 SE IT students!

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 for her brief article on Social Media Analytics.

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

- Team TechScience FH 2020

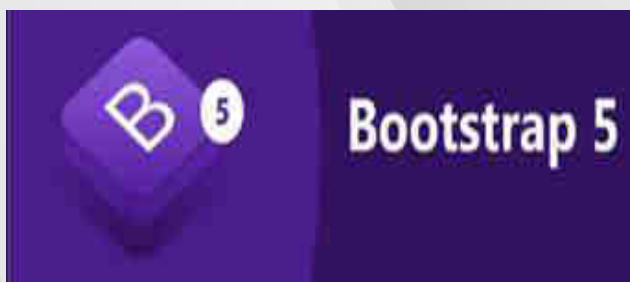
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INTRODUCING BOOTSTRAP 5!

Article by,
Vanitha Reddy, 3 July 2020

Bootstrap, the most popular CSS front-end framework which has been around for more than 8 years and is built to design modern, responsive, and dynamic interfaces for professional design web pages, currently undertook a major update, Bootstrap 5.



Bootstrap 5 alpha was officially released on June 16, 2020 after several months of refining

The following are some of the changes of Bootstrap 5:

1. *jQuery was removed, why?*



Bootstrap has been using jQuery for more than 8 years, however, this shouldn't be a surprise as jQuery has been losing ground in times when frameworks such as React.js, Vue.js and Angular.js are being used by an increasing amount of developers across the world. Ad-

ditionally, many of jQuery's querying features can be done by just writing vanilla JavaScript query selector nowadays. Removing this dependency will lighten the project's size considerably.

2. *Internet Explorer 10 and 11 support dropped.*



Both Internet Explorer 10 & 11, accounts for less than 5% of global browser usage and considering that since 2016 Microsoft ended support for versions older than 10 this is an understandable change.

3. *Switch to Vanilla JavaScript*



JavaScript is the programming language of the web. Most modern websites are powered by JavaScript. The removal of jQuery support in Bootstrap 5 gives way to writing efficient vanilla JavaScript code without worrying about the size or adding up any other non-essential functions.

4. Responsive Font Sizes

Bootstrap 5 will enable responsive font sizes by default which will automatically resize the typography element according to the size of the user's viewport through RFS engine or Responsive Font Sizes. It is a pre-processor or postprocessor-powered-mechanism that automatically calculates the appropriate font-size values based on the user's screen size or viewport. It works on known pre-processors or postprocessor tools such as Sass, Less, Stylus or PostCSS.

5. Removed Card Decks

In Bootstrap 4, in order for you to be able to set equal width and height cards that aren't attached to one another, you need to use card decks. In Bootstrap 5, the Bootstrap team removed the card decks since the new grid system offers more responsive control.

6. Custom SVG icon library



In Bootstrap 5, there's a brand new SVG powered icon library created by Mark Otto, co-founder of Bootstrap. Even before the official release of Bootstrap 5, these icons could be added and used in projects.

7. Switching from Jekyll to Hugo



Jekyll basically provides page templates such as navigation and footers that will reflect on all of your web pages. However, in recent years Hugo has been deemed to be the fastest and most recommended one.

8. Class updates

Some of the CSS classes that are already removed, according to the Bootstrap 5's official Github project tracking board are:

- form-row
- form-inline
- list-inline
- card-deck

Here are some new Bootstrap 5 CSS classes that are added:

- gx-* classes control the horizontal/column gutter width
- gy-* classes control the vertical/row gutter width
- g-* classes control the horizontal & vertical gutter width
- row-cols-auto

Conclusion..

Additional important changes are as follows:

- Improved grid system
- Improved documentation
- Improved modularity
- Improved forms
- New responsive font
- New utilities & helpers
- Easier customization & theming
- Lighter package
- New API available

In conclusion Bootstrap 5 should be faster, simpler and better looking. There aren't huge changes in terms of the base set of components, but rather appreciate the time it will save you developing beautiful user interfaces and the shorter loading time for the users.

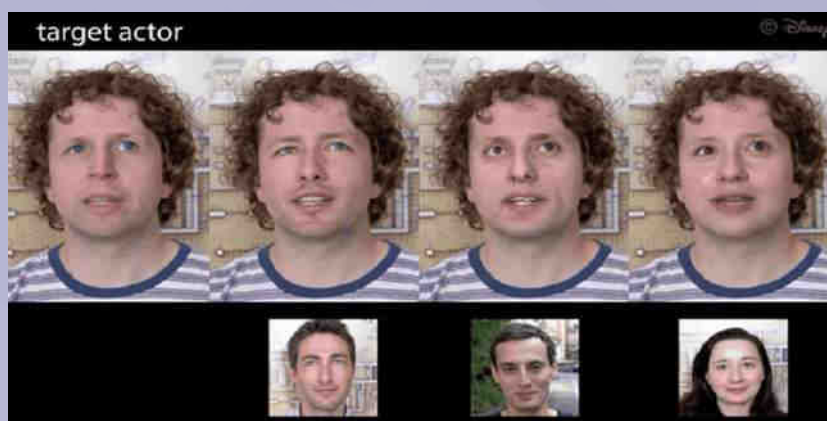
SOURCES:

- [Bootstrap 5 alpha!](#)
- [Theme Selection - Bootstrap 5](#)
- [Morioh - Bootstrap Forum](#)

Mind – Boggling Fact: Have you heard of Disney's Deep-fakes??

Disney's researchers recently showcased a paper and video in Eurographics European Association for Computer Graphics for what they call the first photorealistic deepfake at a megapixel resolution.

What's a deepfake exactly? Well, we'll let the image do the talking.



Social Media Analytics

Article by Prof. Bushra Shaikh, 7 July 2020

Social media platforms are one of the best places for businesses to connect with consumers. Marketers and businesses are realizing this opportunity and flocking to social networks. Even so, many are not making social media marketing a priority.

However, without any data or analytics to fuel your strategy, you'll be going in blind. And that never works out for anyone, unless you get lucky.

So, if you're prudent enough to not rely on luck for the success of your social media marketing, then you should rely on analytics.

From your social media accounts' performance metrics to audience insights, there's a lot of data available for you to use. Basing your social media strategy on actual facts and data can help improve its effectiveness and ensure that you're successful.



“**Social Media Analytics** (SMA) refers to the approach of collecting **data** from **social media** sites and blogs and evaluating that **data** to make business decisions. This process goes beyond the usual monitoring or a basic **analysis** of retweets or 'likes' to develop an in-depth idea of the **social** consumer.”

For the uninitiated, social media analytics (SMA) is the collection, analysis and interpretation of structured and unstructured social media data to support insightful decision-making (Chen 2012; Bekmamedova and Shanks 2014 as cited by Khan, 2017).

It is commonly used by marketers to track online conversations about products and companies. One author defined it as "the art and science of extracting valuable hidden insights from vast amounts of semi-structured and unstructured social media data to enable informed and insightful decision making."

Mining Business Insights from the Seven Layers of Social Media Analytics:

Social media analytics is such a minefield of information, for example, just using the *Insights* page of Facebook as a page manager tells which posts were popular, what our fan engagement is, the media reach of the posts, when our fans are online, the demographics of people near our business and popularity of one's competitors. Through analytics, one can now know who my fans are, what my fans want to see and when is the best time to post.

Khan (2017)



These layers can be measured using different social media analytics tools. There is a plethora of available tools online, some for free, others with a subscription.

Some of the more known ones are **Facebook Insight** for page owners, **Google Analytics** and **Hootsuite** to name a few.

7 Layers of SMA

This kind of information is just scratching the surface of SMA. According to Khan (2017), there are seven layers of social media analytics:

1. **Text** - used to understand social media users' sentiments or identifying emerging themes and topics.
2. **Actions** - used to measure popularity and influence over social media.
3. **Networks** - used to identify digital influencers and their position in the network.
4. **Hyperlinks** - reveal internet traffic patterns.
5. **Apps (applications)** - understanding in-app purchases, customer engagement and mobile user demographics.
6. **Search Engine** - trends analysis
7. **Location data** - mapping location of users.

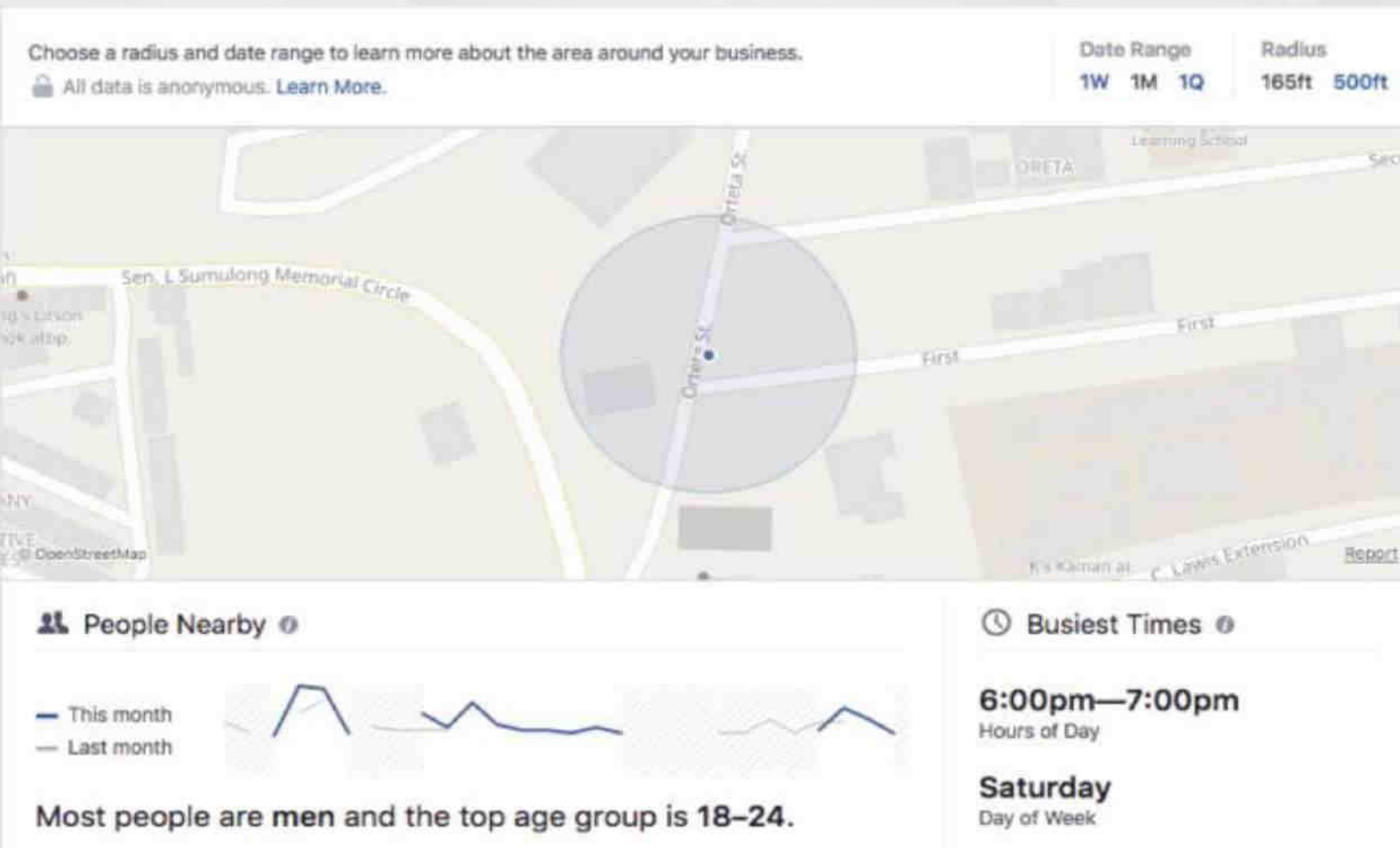
Back to the free WI-FI spots. You probably frequent certain businesses because they offer free WI-FI connection but what you probably did not know is that, by doing so, you are also giving them free information.



Analytics allow page owners to look at the demographics of certain geographical niches. In the case of Facebook, demographic data of people can be seen who used the application within 500 feet from a particular business address.

From a targeting standpoint, this data capture is a boon.

It allows us to understand the social media behaviors which can lead to more effective marketing (Boire, 2014). I'm pretty sure that once business owners and government officers realize this, we'll be seeing more free WI-FI spots.



On a more serious note, another challenge in using analytics is that it is understood that communication will no longer be mass-produced. Customisation will be a necessity in order to be relevant to target audiences. Hartley (2002) suggests that customisation can be seen as ‘an empowering development’ by assuming media greater diversity, taking into account marginalised or excluded groups by offering new content.

Using social media to educate is one of its greatest potential. There is great resistance in many schools (Halavais, 2014) but it can still be used as a teaching tool.

Social media is such a powerful tool that should not just be harnessed to increase profits by businessmen but also by government agencies to touch base with their constituents and create collaborations through online engagement.

Hoffman’s (2017) perspective of the future role of social media in government is that, “The better we understand social media, the more it will improve government”, in light of using analytics to create a more participatory form of government.



“Social media provides students an opportunity to engage in discussions and activities outside

the classroom, to learn in public and makes transparent some of the processes of informal learning that otherwise might be too latent to easily observe, so that others may follow along the same path.”

“Bye-Bye Amazon delivery guy?”

as Amazon acquires Zoox

Article by,
Vanitha Reddy, 3 July 2020

Amazon, a very popular and renowned company whose mission is “to be Earth’s most customer-centric company, where customers can find and discover anything they might want to buy online, and endeavours to offer its customers the lowest possible prices”, has just taken a very bold step into self-driving vehicles, acquiring the driverless vehicle start-up company named **Zoox**.

Zoox is a six-year-old start-up which will continue to operate as a standalone business within Amazon. It has been developing a bi-directional vehicle with no steering wheel or discernible front or back end, allowing it to comfortably travel in either direction, which the company said would enter testing in 2020.

Their technology includes wheels that can turn sideways for tight manoeuvres, like truly parallel parking.

Did you know??

Amazon isn't really new to this area. The company has been using self-driving trucks developed by Embark to haul some cargo and has also invested in the electric vehicle start-up, Rivian.

Paying drivers to deliver packages remains one of Amazon’s bigger costs. CEO Jeff Bezos has for years been looking to cut those costs - by creating Amazon’s own delivery fleet, by looking into drone and even robot delivery, and now by potentially acquiring driverless car companies like Zoox.

Zoox was valued at over \$3 billion in 2018, but has struggled with management turnover in its efforts to develop a self-driving car. While the acquisition of Zoox is pretty big news, Amazon will have to invest significantly more in the business to eventually bring the technology to market.

So, what does Amazon plan to do with Zoox’s Technology??

Well, it's not clear. However, it's possible that Amazon might use it to offer cheaper and faster delivery, as well as its cashier-less grocery stores.



XENOBOTS

Bots made of your own tissue and moving through your body. No, not creepy at all.

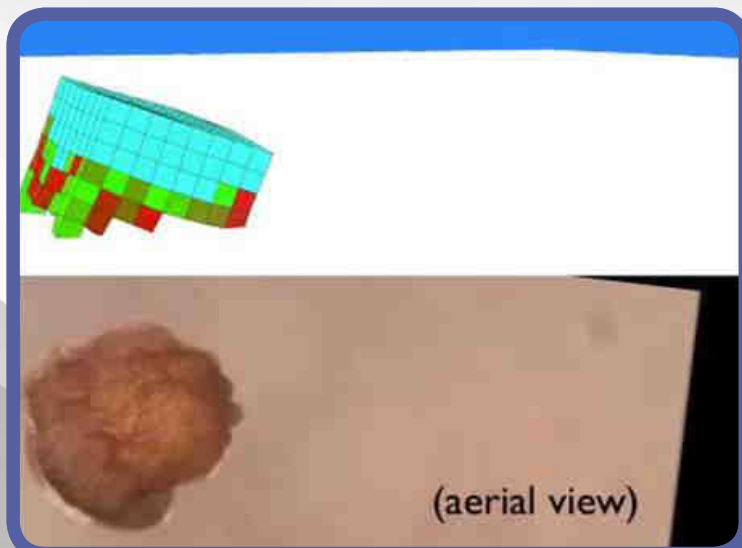
*Article by,
Shubhadarshini Nadar, 3 July 2020*

Xenobots, named after the African clawed frog *Xenopus* (Gk., *xenos*=strange, *pous*=foot), is both a living thing and a machine. It ranges from about 1mm in size, derived from stem cells harvested from early frog embryos. Unlike most other Robots made of plastics and metals, Xenobot is made entirely of organic cellular material. It can move, turn around and spin in circles.

'It is a human-made robot, but it is a life.'

These micro-machines are programmable lifeforms that researchers from the University of Vermont and Tufts University believe could one day help clean micro-plastics from oceans or even repair organs inside our bodies.

"These are entirely new lifeforms. They have never before existed on Earth. They are living, programmable organisms," said Michael Levin, the director of the Allen Discovery Center at Tufts University in Medford, Massachusetts.



But what exactly is a "living robot"??

And should we expect to see them whizzing through our bloodstreams any time soon?

Researchers took two different frog cells both skin cell and heart cell. Heart cells are contractile, conduct impulses and are responsible for contraction. So, the idea was that if we put skin cells and heart cells together in a specific way maybe we can come up with a functional structure that can move. Blue is non-contracting skin cells whereas the green and red one's are contracting heart cells.

It took researchers a long time to get a perfect structure of Xenobot using computer science and evolutionary algorithms. A supercomputer would have made millions of iterations of this combination of skin and heart cells to figure out which combination makes the best movement. In such a way, they end up with a cellular organism that has been designed by humans to act in predictable manners like Robots.

The interesting part is -

Xenobots are emergent in behavior.

Emergent properties are those that arise through interaction among smaller parts that alone do not exhibit such properties.

Picture this, a swarm of Xenobots made using your own cells that are deployed internally in your body and sent to your brain to help remove a brain tumor and because they are your own cells your body won't reject them.

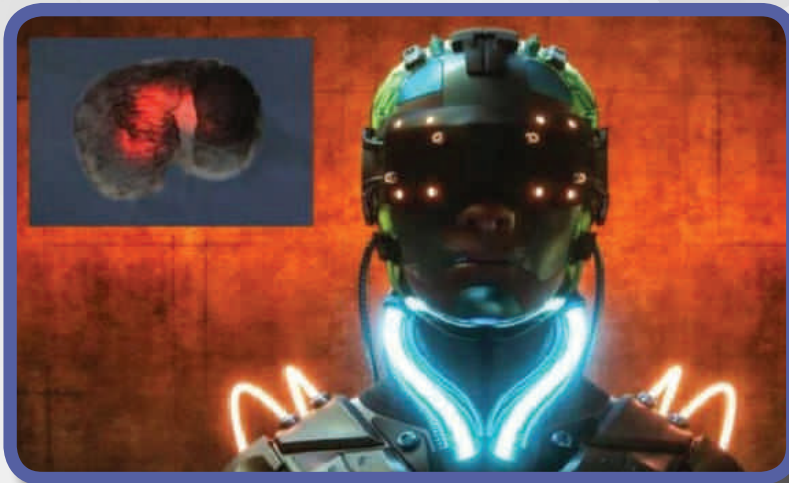
This generation of Xenobots is made using skin and heart cells to help them navigate and understand the environment. Why not build some components from blood vessels, nervous systems, or sensory systems to make a human eye.

Imagine an ocean which is littered with plastic pollution, in particular micro-plastics. These Xenobots are then used to target and breakdown these micro-plastics or collect them together so that it

can be more easily removed and the great part is since they are biological, they will naturally breakdown.

Xenobots do not add additional pollutants or pollutants with side - effects as they work and degrade simply into dead skin cells.

In future clinical applications, such as targeted drug delivery, Xenobots could be made from a human patient's own cells, which would bypass the immune response challenges of other kinds of micro-robotic delivery systems. Such xenobots could potentially be used to scrape plaque from arteries, and with additional cell types and bio-engineering, locate and treat disease.



Extra fact!!

In this study, the Xenobots last for 7-10 days before they stop functioning and breakdown.

Extras (Source: Wikipedia):

Invented: 2020

Application: Medicine, Environmental remediation

Inventor: Sam Kriegman, Douglas Blackiston, Michael Levin, Josh Bongard

Fuel source: Nutrients

Dimensions: Microscale

Components: Frog cells

LIDAR

Discovers an ancient, kilometre-long Mayan structure

*Article By,
S Ananthaselvi, 3 July 2020*

Long ago, people believed that the eye emitted invisible rays that struck the world outside, causing it to become visible to the beholder. That's not the case, however, it's the basic idea behind LIDAR, a form of digital imaging that's proven very useful in everything from archaeology to autonomous cars.

LIDAR stands for "Light Detection and Ranging," also sometimes referred with "Imaging".

Based on echolocation, LIDAR systems use lasers to send out pulses of light just outside the visible spectrum and time how long it takes each pulse to return. When it does, the direction of and distance to whatever that specific pulse hit are recorded as a point in a big 3D map with the LIDAR unit at the center.



Did you know?

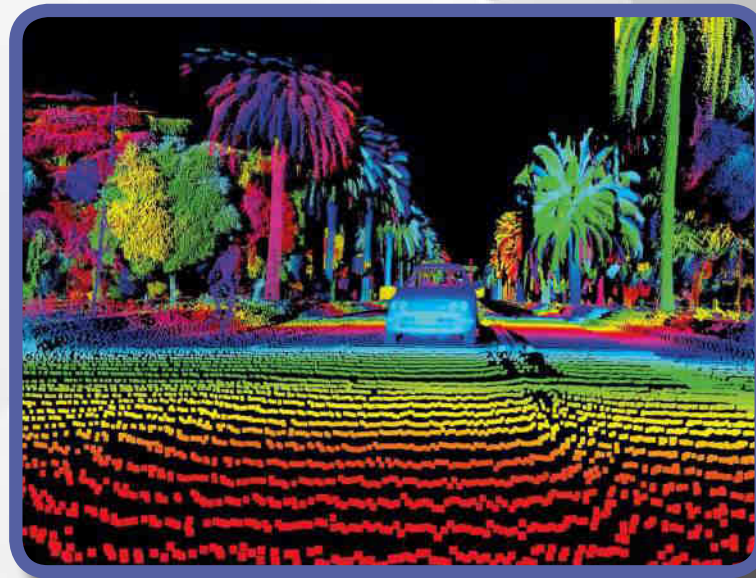
LIDAR units on planes and helicopters can survey the terrain below quickly and accurately during flight; archaeologists can record every detail of a site down to the inch by sending a LIDAR unit through it; and most recently, a computer vision system in an autonomous car or robot can instantly acquaint itself with its surroundings.

This helps in reducing the time of finding a site in archeology to a few hours, which could have taken months, with a lot of effort of machete wielding and manual measurements. The latest such discovery is an enormous Mayan structure, more than a kilometre long, 3,000 years old and seemingly used for astronomical observations.



Now finding such huge structures might seem very easy to you. However, that's not really the case when on ground as these are heavily covered with thick undergrowth. That's where LIDARS' powerful computational techniques come handy, as it can see through the undergrowth and find the level of the ground beneath, producing a detailed height map of the surface.

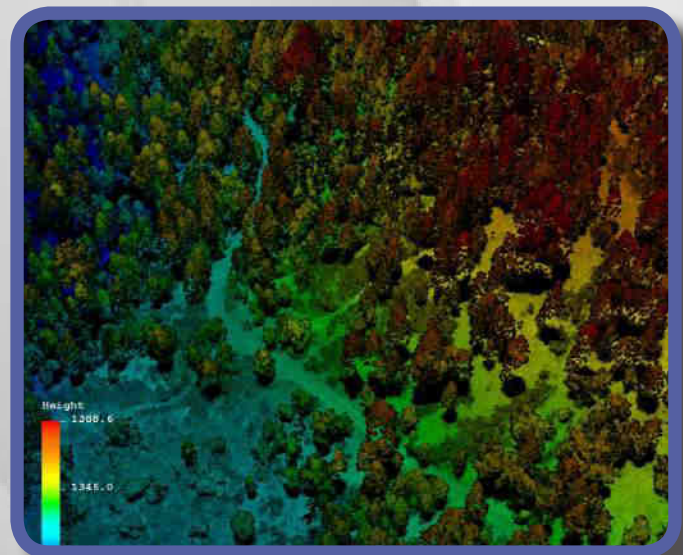
In this case the researchers picked a large area of the Tabasco region of Mexico, on the Guatemalan border, known to have been occupied by early Mayan civilization. A large-scale, low-resolution LIDAR scan of the area produced some leads, and smaller areas were then scanned at higher resolution, producing the images you see here.



LIDAR'S usage in Autonomous Vehicles is becoming a very popular choice.

What emerged was an enormous ceremonial center now called Aguada Fénix, which was used to track the movement of the sun through the seasons and perform various rites.

LIDAR seems to be very promising technology which can be used when it comes to distance and height detection.



NASA + SpaceX

Historic launch of Crew Dragon Demo 2.

*Article by,
Aftaab Sheikh, 2 July 2020*

SpaceX, one of the most ambitious private space company, was founded by Elon Musk in 2002 with a goal of reducing the space transportation cost to enable colonization of Mars. Looking at the achievements of SpaceX, one can say that it is one of the companies that excels in every aspect by which it takes the space research race one more step ahead.

On the other hand, NASA, an American government space agency whose last human space shuttle was launched in 2011 for Mission Atlantis, was in search for a space vehicle which could be used to transport the astronauts from US soil to the International Space Station. For this purpose, NASA was in contract with the Russian Soyuz Spacecraft, which costed around \$90 million a seat to fly to the space station.

There was a need for NASA to find a way to reduce its flying cost so as to have more funds for their research for future interplanetary space missions. At first Boeing, US based aerospace company which was NASA's

partner for generations, introduced its spacecraft named Starliner which was supposed to be used for NASA's crewed missions. However, the Starliner spacecraft encountered many problems during their test flights. This left SpaceX with an opportunity to get ahead.

SpaceX was testing its crew spacecraft known as Dragon from 2009. Yes, this craft had also encountered problems however, being a motivated company, SpaceX conducted several test flights that were successful.

SpaceX's final test was in collaboration with NASA. The mission was then named Demo 2..

DID YOU KNOW??

The idea of beaming the internet from space is one of the ways to utilize outer space even better than we are utilizing it now. Musk's SpaceX has launched a Starlink project that envisages the launch of as many as 42,000 satellites into orbit. That's 5x the number of all the satellites orbiting Earth right now. But that's just one part of the project, the other is a million ground stations to receive the signal. For now, it looks unprofitable. But who knows what will happen in a decade?


*- Info contributed by
Surendra Ediga*



The idea of Demo2 was that it will carry 2 astronauts named Bob Behnken and Doug Hurley to ISS and was planned for 27th May 2020. It would be the first crewed orbital space flight launched from the US soil since 2011, also the first ever mission operated by a commercial agency.

The Dragon spacecraft is one of the most comfortable spacecrafts compared to previous spacecrafts used. Before the day of the launch both astronauts underwent their simulation flight with full gear (space suits) to ensure no problems on launch day. The mission which was supposed to launch on 27th May 2020 was postponed to 30th May 2020 due to unfavourable weather conditions.

30th May 2020, Saturday, marked a historic day for the SpaceX team and NASA, which successfully launched their first ever crewed mission in collaboration with a private space company.



SpaceX's first astronaut launch is NASA's most-watched online event ever.

Also, The joint NASA-SpaceX launch was broadcast across multiple platforms and gained at least 10.3 million concurrent viewers.

During the launch, both astronauts seemed to be very relaxed on board and showed their stuffed animals they had taken along on the mission to show their kids as they continued their journey to ISS.

“We couldn’t be happier about the performance of Dragon”

-said Doug Hurley (one of astronauts on-board).

Everything about the first crewed SpaceX mission appeared to be picture perfect from its time of lift off to its rendezvous with ISS. This has definitely opened opportunities for SpaceX and for their spacecraft Dragon.

Now why is this so important?

After the successful launch of the mission, the dream of going to space will come true as Dragon will be the first capsule to take private passengers to space to rotate in orbit and to visit the ISS. The dream of humans to colonize Mars also doesn’t seem distant as the modified version of the Dragon spacecraft will be used as the vehicle for interplanetary transportation and many more feats. This was a huge step for SpaceX and the race to colonize space continues.

Extras (Source: Wikipedia):

Launch date : 30 May 2020

Docking date : 31 May 2020, 14:27 UTC

Docking port : Harmony PMA-2

Mission duration :

-Planned : 64 days;

-Elapsed : 30 days, 2 hours and 4 minutes

Rocket : Falcon 9 Block 5 (B1058.1)

Members : Doug Hurley, Bob Behnken

Richard Feynman and his 60-year-old Prophecy of Nanotechnology

Article by Arfah Upade, 3 July 2020



Richard Feynman (11 May, 1918 – 15 February, 1988) was born in Queens, New York and made pioneering contributions to research in fields such as Quantum Electrodynamics, Superfluidity, and Particle Physics.

He was awarded Nobel Prize in Physics in 1965 along with Julian Schwinger and Shin'ichiro Tomonaga for his contributions to the development of Quantum Electrodynamics. In his last days, he was diagnosed with cancer where his last words were: "I'd hate to die twice. It's so boring"

In today's article, we pay a tribute to the one and only Richard Feynman who is one of the greatest minds in Physics and had an imagination that saw the emergence of one of the most important advancement in the field of Science and Technology.

Here, we write about the prophetic talk that he delivered on 29 December 1959. This talk was delivered by Feynman at the Annual meeting of the

American Physical Society at Caltech. He addressed it as "There's Plenty of Room at the Bottom – An Invitation to Enter a New Field of Physics"

What was that field you ask?

Well, Feynman predicted that matter at nanoscale has many more features to offer and would be of great use to Technical Applications.

The reason?

Nano materials behave differently than bulk materials due to the fact that, the type of interactions between atoms, vary at nanoscale.

Have you guessed it? It's none other than Nanotechnology.

Now when Feynman was introducing this field to the audience, he began with a question: "Why cannot we write the entire 24 volumes of Encyclopaedia Britannica on the head of a pin?"

He then explained how it was actually possible to do so at nano level! Not only that, but he further went on to explain how it could also be read with an advanced electron microscope, a topic that Feynman impressed upon as he was convinced that the understanding and questions of nature, atoms and Biology can be solved if it could be seen directly.

This was made possible by different microscopes such as electron microscopes, Tunneling Electron Microscopes (TEM), Reflection Electron Microscope, Scanning Transmission Electron Microscope (STEM), High Resolution TEM (HRTEM), and the Scanning Tunneling Microscope (STM)

Did you know?

Richard Feynman is also very well known for the Feynman Technique, which is very useful when you want to learn something new.

THE FEYNMAN TECHNIQUE



STEP 1: PICK A TOPIC AND STUDY IT

Writing down a topic or concept and related knowledge is the first step in the learning process. Gathering information and trying to memorize all definitions and formulas instead of actually understanding them is a bad approach.

STEP 2: EXPLAIN THE TOPIC TO SOMEONE

Explain or pretend to explain the idea of outsourcing in business to a child. Remember that you need to use simple language as well. Try to utilize examples to show how a certain concept actually works.

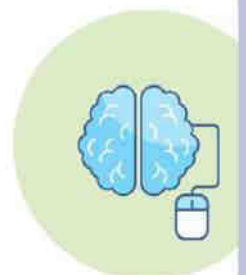


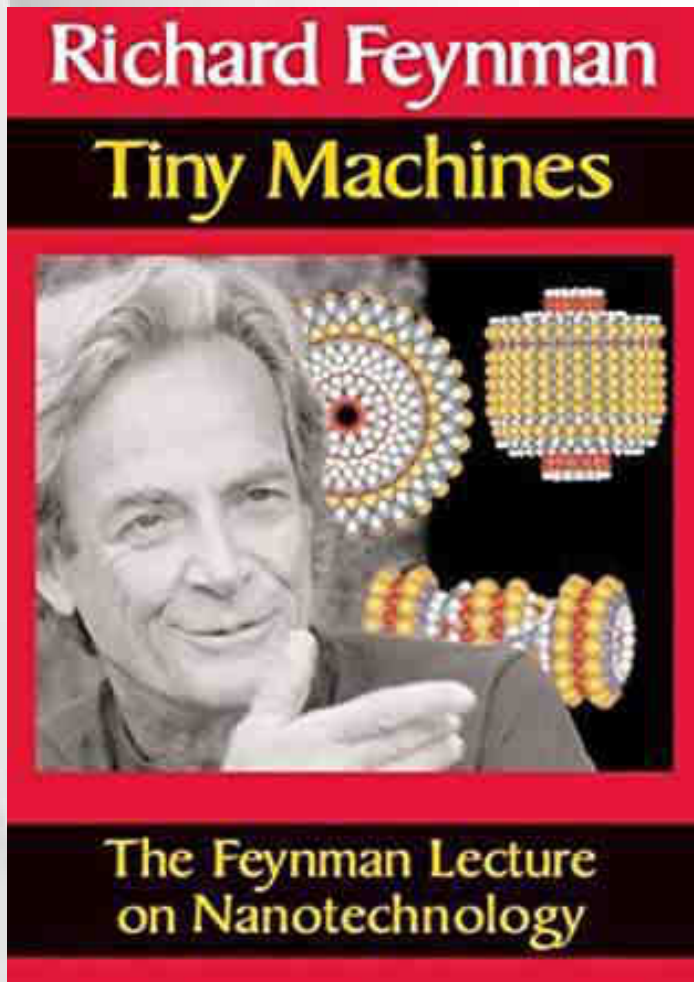
STEP 3: ELIMINATE GAPS IN UNDERSTANDING OF THE TOPIC.

You already noticed what caused difficulties during explanation. It's time to answer them by reviewing sources, course materials, your notes, and possible examples and applications again.

STEP 4: MAKE EVERYTHING SIMPLE.

Simplifying is the key to use the Feynman technique really effectively. The simpler terms and language are used, the better you understand the meaning of what is being said. Consequently, you will memorize it much better than just trying to learn complex definitions by heart.





In his talk Feynman, also spoke about the miniaturizing of computers. “Why can’t we make them very small, make them of little wires, little elements.” In which he also addressed his idea of building sub-atomic computers with capabilities such as facial recognition.

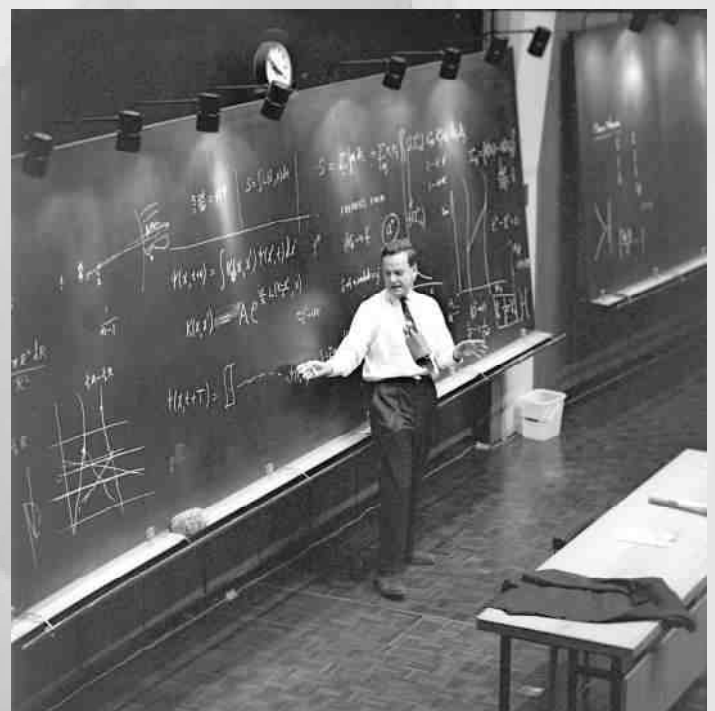
Now this was back in 1959, remember that!

He mentioned a possibility that his friend Albert R. Hibbs suggested which was: “It would be interesting if you could swallow the surgeon. You put the mechanical surgeon inside the blood vessel and it goes in to the heart and ‘looks’ around. It finds out which valve is the faulty one and takes a little knife and slices it out.”

Nanomedicine and Nano surgery are now proving how, at that time “an unbelievable suggestion”, has turned into reality.

It has been 60 years to this talk and will become 61 years on 29 December 2020, Tuesday. In all these years, there has been multiple advancements and machines being built to work at Nano Scale.

Bionanotechnology emerged, which uses biomolecules for applications in nanotechnology. Molecular Nanotechnology emerged, where nanoscale machines operate at molecular scale. An experiment conducted by Wilson Ho and Hyojune Lee at Cornell University in 1999 proved the possibility when they tried to use STM to move an individual Carbon Monoxide molecule to an individual iron atom.



The revolutionary growth on nanotechnology within the past 60 years has been astonishing and we'd like to end here by quoting Feynman with words that resonate so deeply,

“So, as we go down and fiddle around with the atoms down there, we are working with different laws, and we can expect to do different things. We can manufacture in different ways.....The principles of Physics, as far as I can see, do not speak against the possibility of maneuvering things atom by atom. It is not an attempt to violate any laws; it is something, in principle, that can be done; but in practice, it has not been done because we are too big.”

(Source: Feature Article – Sixty Years of Feynmans Prophecy - By, Sanjay D. Jain, Girish G. Sahasrabudhe, Vivek M. Nanoti, Kishorchandra Rewatkar Science Reporter, Edition December 2019)

**"SURELY YOU'RE JOKING,
MR. FEYNMAN!"**

Feynman, also termed as the “Prankster Physicist” wrote a book titled “Surely You're Joking, Mr. Feynman!”. All his tales can be found in his book,

(Image Below):

Richard Feynman educates and entertains his audience during a coffee hour at Caltech in 1964. Credit: Caltech Archives



The results of Google's ML-powered #AndroidDevChallenge 2020 are here!

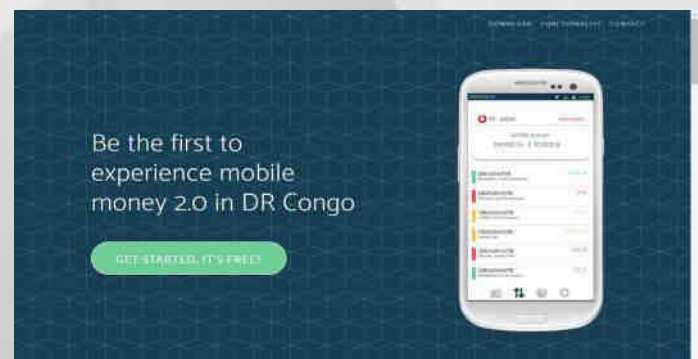
Article by Arfah Upade, 4 July 2020

It's been about 10 years since the Android SDK was launched. With ML, and the recent 5G coming up, there seems to be so many more opportunities and innovations that can be created!

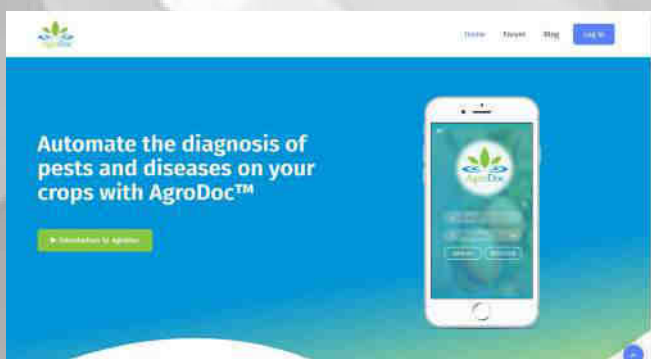
The Android Developer Challenge dates back to the first SDK Launch and is an opportunity for developers around the world to build something that leaves an impact, by using Android and the latest features. Google then selects 10 projects that they then guide.

This year, the ML-focused #AdroidDevChallenge has pretty interesting results, here they are:

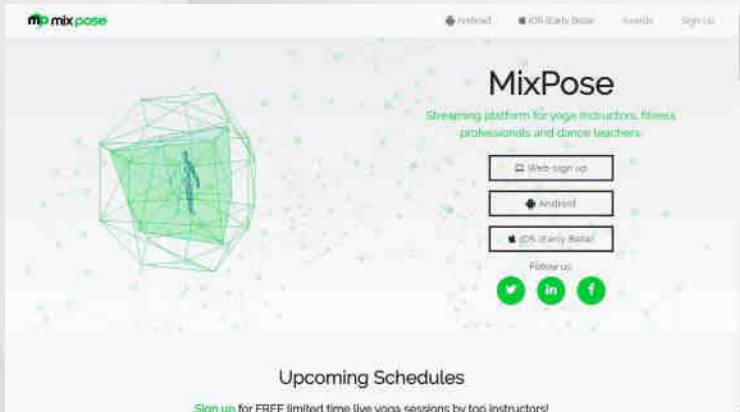
- **AgriFarm:** helps farmers detect plant diseases and prevent major damage in fruits and vegetables such as tomatoes, corn and potatoes. [**Balochisan, Pakistan**]
- **Eskke:** streamlines mobile money management for people in the Congo, letting them transfer money, pay bills, buy subscriptions and essential airtime through SMS. [**David Mumbere Kathoh; Goma, Democratic Republic of Congo**]
- **AgroDoc:** helps farmers diagnose plant disease and make treatment plans. [**Navneet Krishna; Kochi, India**]



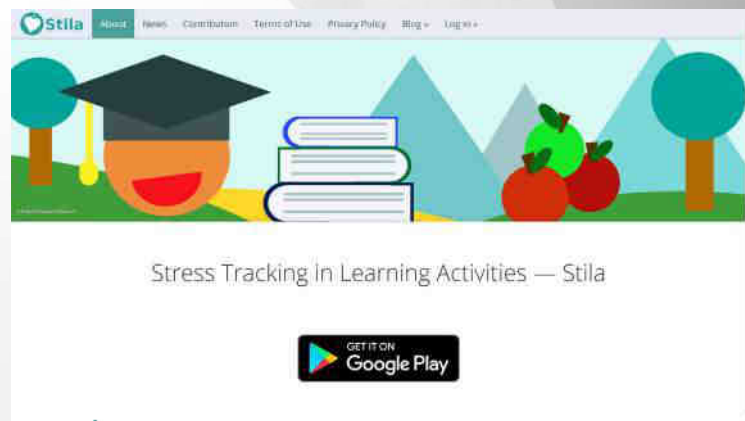
- **Leepi:** helps students learn hand gestures and symbols for American Sign Language. [**Prince Patel; Bengaluru, India**]
- A report with demo, can be found here: <https://devpost.com/software/leepi>



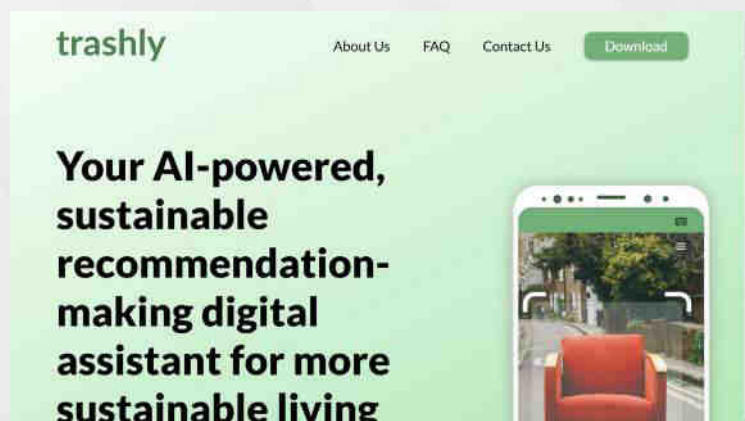
- **MixPose:** is a live streaming platform that gives yoga teachers and fitness professionals the opportunity to teach, track alignment, and give feedback in real-time. [Peter Ma; San Francisco, California, USA]



- **Pathfinder:** could help people with visual impairments navigate complex situations by identifying and calculating the trajectories of objects moving in their path. [Colin Shelton; Addison, Texas, USA]
- **Snore & Cough:** helps you identify and analyze snoring and coughing, to help provide info to users seeking assistance from a medical professional. [Ethan Fan; Mountain View, California, USA]
- **Stila:** pairs with a wearable device, like the Fitbit wristband or a device running on Wear OS by Google to monitor and track the body's stress levels. By monitoring stress levels over time, you have the chance to better understand and manage stress in your life. [Yingdin Wing; Munich, Germany]



- **Trashly:** makes recycling easier. Just point the on-device camera at an item, and through object detection, the app identifies and classifies plastic and paper cups, bags, bottles, etc. [Elvin Rakhmankulov; Chicago, Illinois, USA]



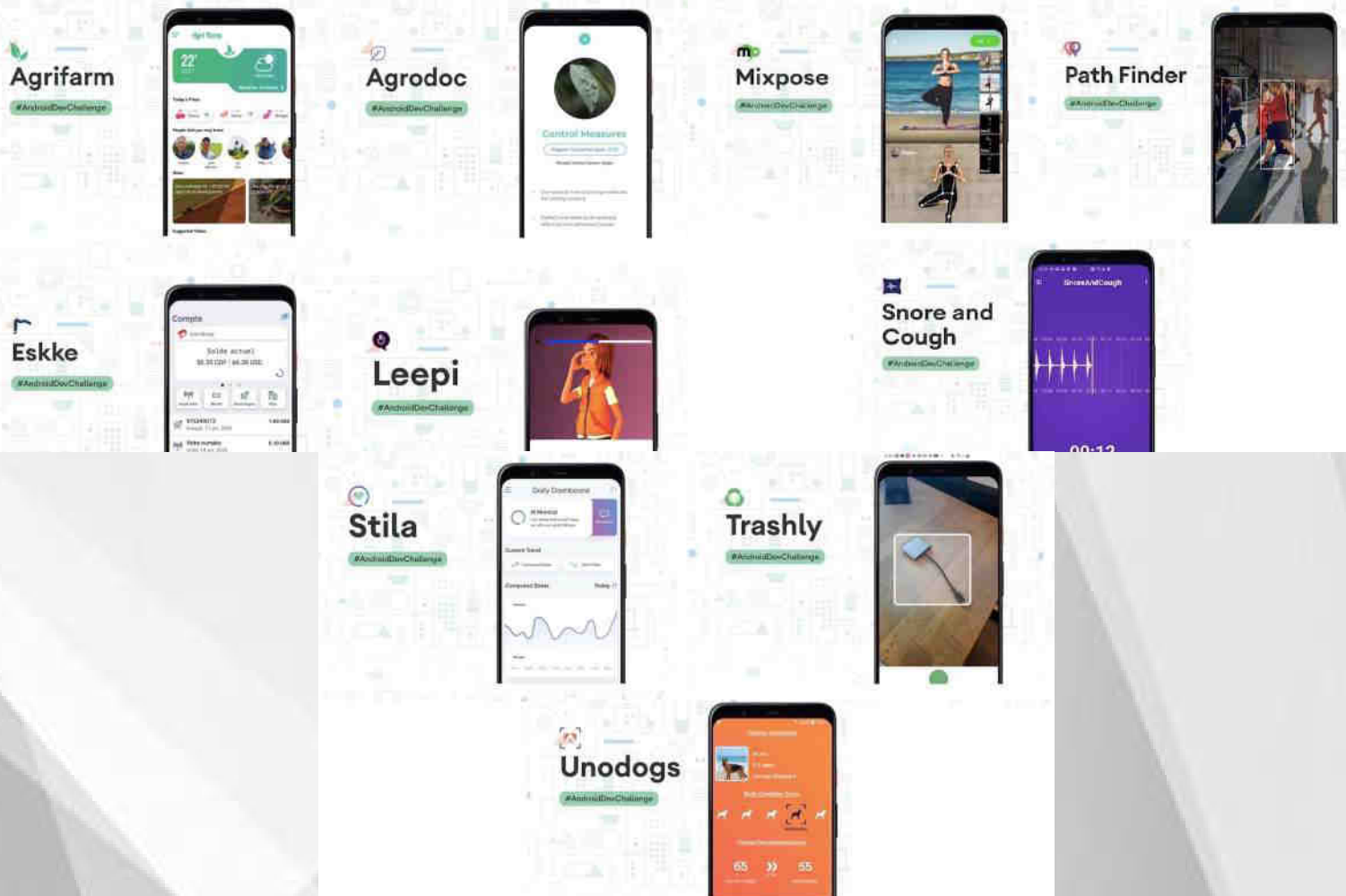
- **UnoDogs:** helps owners better support their pet's wellness, providing customized information and fitness programs. [Chinmany Mishra; New Delhi, India]





Android Developer Challenge

Helpful Innovation



To know more about the Android Developer Challenge:
<https://developer.android.com/helpful-innovation>

Want to know more about the Android Developer Community?
Have a look at their blog:
<https://android-developers.googleblog.com/>

The Strength of water

New Droplet-Based Electricity Generator: A Drop of Water Can Light Up 100 LED

Bulbs

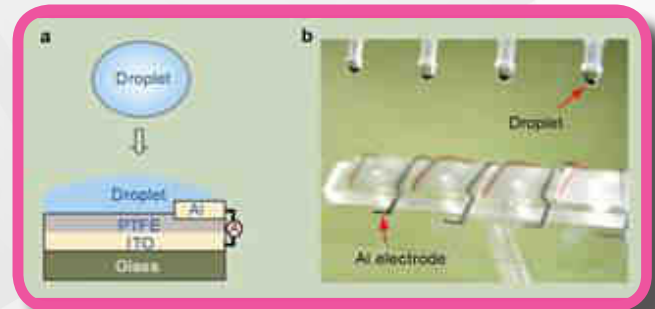
*Article By,
S Ananthaselvi, 3 July 2020*

A research team led by scientists from the City University of Hong Kong (CityU) has recently developed a droplet-based electricity generator (DEG), featured with a field-effect transistor (FET)-like structure that allows for high energy-conversion efficiency and instantaneous power density increased by thousands of times compared to its counterparts without FET-like structure. This would help to advance scientific research of water energy generation and tackle the energy crisis.

The research was led together by Professor Wang Zuankai from CityU's Department of Mechanical Engineering, Professor Zeng Xiao Cheng from University of Nebraska-Lincoln, and Professor Wang Zhong Lin, Founding Director and Chief Scientist from Beijing Institute of Nanoenergy and Nanosystems of Chinese Academy of Sciences. Their findings were published in the latest issue of the highly prestigious scientific journal Nature, titled

“A droplet-based electricity generator with high instantaneous power density.”

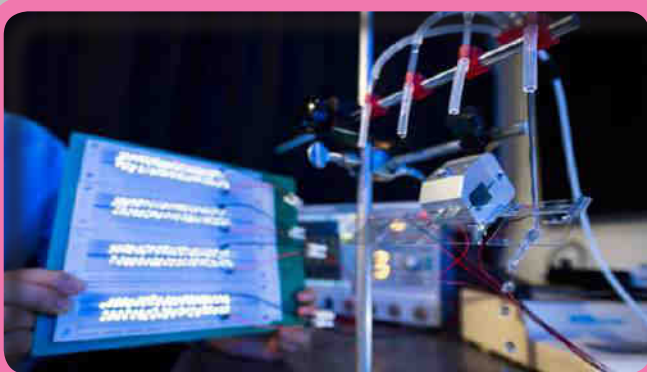
Hydropower is nothing new. About 70% of the earth's surface is covered by water. Due to limitations in current technology, low-frequency kinetic energy contained in waves, tides, and even raindrops are not efficiently converted into electrical energy.



Research Facts!!

“Research shows that a drop of 100 microliters (1 microliter = one-millionth liter) of water released from a height of 15 cm can generate a voltage of over 140V. And the power generated can light up 100 small LED light bulbs,”

-By Professor Wang.



In order to improve the conversion efficiency, the research team has spent two years developing the DEG.

Professor Wang from CityU pointed out that there are two crucial factors for the invention. First, the team found that the continuous droplets impinging on PTFE, an electret material with a quasi-permanent electric charge, provides a new route for the accumulation and storage of high-density surface charges. They found that when water droplets continuously hit the surface of PTFE, the surface charges generated will accumulate and gradually reach a saturation.

Another key feature of their design is a unique set of structures similar to a FET, which is a Nobel Prize in Physics winning innovation in 1956 and has become the basic building block of modern electronic devices nowadays. When a falling water droplet hits and spreads on the PTFE/ITO surface, it naturally “bridges” the

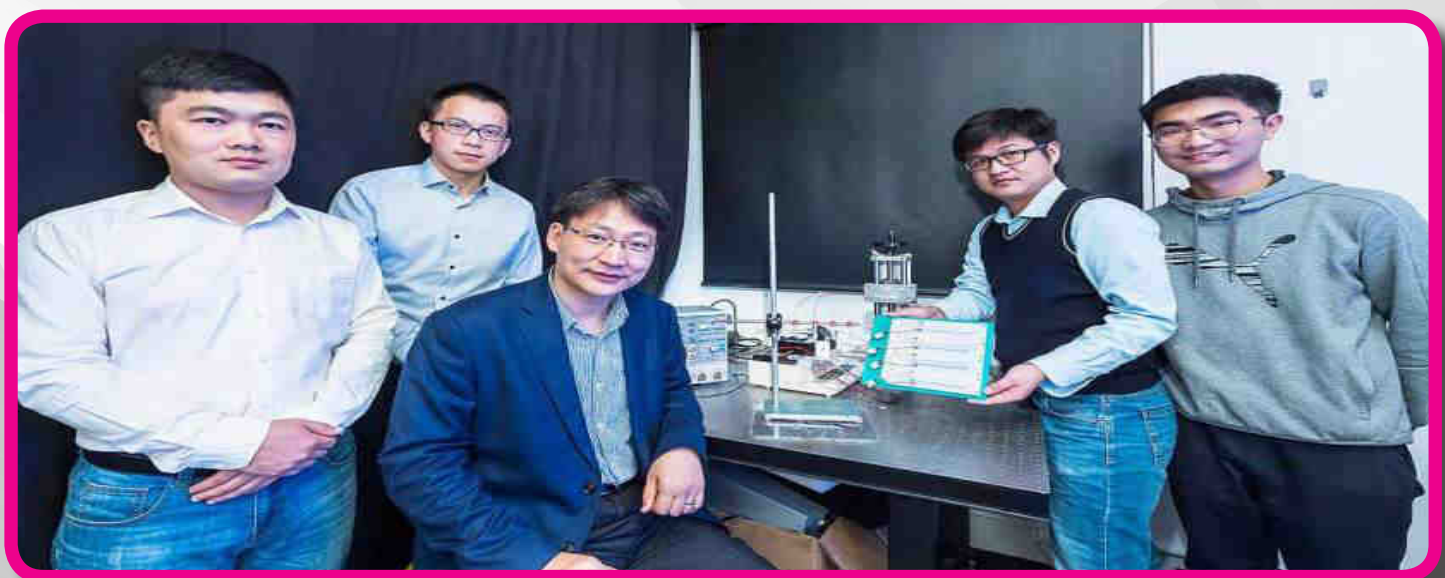
aluminum electrode and the PTFE/ITO electrode, translating the original system into a closed-loop electric circuit

When the spreading water connects the two electrodes, all the stored charges on the PTFE can be fully released for the generation of electric current.

Their research also shows that the reduction in relative humidity does not affect the efficiency of power generation. Also, both rainwater and seawater can be used to generate electricity.

Professor Wang hoped that the outcome of this research would help to harvest water energy to respond to the global problem of renewable energy shortage. “Generating power from raindrops instead of oil and nuclear energy can facilitate the sustainable development of the world,” he added.

He believed that in the long run, the new design could be applied and installed on different surfaces, where liquid in contact with solid, to fully utilize the low-frequency kinetic energy in water.



Members of the CityU research team: (from left) Mr Zheng Huanxi, Mr Xu Wanghuai, Professor Wang Zuankai, Dr Zhang Chao and Song Yuxin.

Amazon's Distance Assistant

The way it's telling warehouse workers if they're too close

Article by,
Aftaab Sheikh, 3 July 2020

Covid-19 (Novel Coronavirus) began in December 2019, in the region of Wuhan, China, a new ("novel") coronavirus began appearing in human beings.

This new virus spreads incredibly quickly between people and due to its newness, having the immunity to fight it is quite rare. While it was initially seen to be an epidemic in China, the virus spread worldwide within months. The WHO declared Covid-19 a pandemic in March and by the end of the month, the world saw more than a half million infected and nearly 30,000 deaths.

With the coronavirus pandemic, people all over the world have become more aware of the best practices during a pandemic, from careful hand-washing to social distancing. Countries across the world declared mandatory stay-at-home measures, closing schools, businesses, and public places.

Tech Giants started online hackathons and discussion forums to find a way to reduce the spread of this coronavirus pandemic using latest technologies.

Amazon, one of the major tech giants in the world who has been a constant innovator in every sector from retail market to AI, keeps developing its AI sector so it can deal with every type of problem.

Amazon has rolled out an Artificial Intelligence-based tracking system in its warehouse and in offices that enforce social distancing between humans to reduce the spread of the virus. This System is named as

"Amazon Distance Assistant" which uses camera footage to help identify heavy traffic areas in their office.



Monitors have been placed throughout the facilities that highlight workers keeping safe distance in green circles and those who are too close in red.

The standalone unit uses Machine Learning models to differentiate people from their surroundings and it uses depth sensors to create an accu-

Amazon's Unknow facts...

The company was originally called Cadabra, like the magic term "abracadabra." But Jeff Bezos' lawyer told him that the magic reference was too obscure, and when you say it out loud, "cadabra" could be mistaken for "cadaver." Eventually, they came up with the name Amazon, a reference to the river in South America. The idea was that their selection of books would be vast and wide, just like the world's largest river. They did have many other names in mind and still own one of the domains. If you type in Relentless.com in your browser, you will be redirected to Amazon.com

rate distance measurement between the people travelling in the facility.

As employees walk past the camera, a monitor displays the live video and overlays either a green or red colour ring around the person's feet. Individuals remaining 6 feet apart are highlighted with green circles whereas those who are less than 6 feet apart from each other are highlighted with red circles. Amazon makes sure that this device uses a simple standard electricity outlet, and can be quickly deployed in building entrances and other highly populated areas like lift, lobby, cafeteria, etc.

Amazon has also begun its process to open source the software and the AI behind the innovation so that anyone can create their own Distant Assistant.

Amazon's Distance Assistance is one of the many ideas which were provided. All these devices can encourage humans



to deal with this pandemic but to really destroy the virus we all need to listen to the authorities and doctors instead of staying irresponsible and creating more problems.

To see the open source code for distant assistant checkout the following link

<https://github.com/amzn/distance-assistant>



PULSE

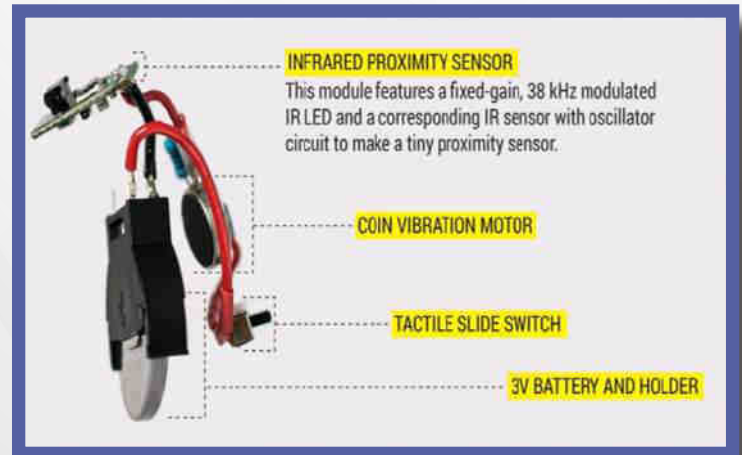
A pendant that doesn't allow you to touch your face!

Article by,
Shubhadarshini Nadar, July 3 2020

On 15th May 2020 California Institute of Technology (Caltech) published a device named PULSE. The research was carried out at the Jet Propulsion Laboratory, California Institute of Technology (Caltech), under a contract with the National Aeronautics and Space Administration (NASA).

The main motto behind this is to minimize the spread of the COVID-19 virus, which can be transmitted upon an individual touching an infected surface with their hand and then touches either their eyes, nose, or mouth.

PULSE is a wearable device that vibrates when a person's hand is nearing their face, reminding them to avoid touching these entryways in order to reduce potential infection. When it came to creating a proper casting for the pendant, Dan Kolenz joined the team as the CAD mechanical designer. After working through sluggish online parts ordering, coupled with frequent late-night texting among the team, facetime sessions, and 3D print



ing in the garage, the designers managed to create an operating prototype.

Pulse is comprised of simple, low-cost parts placed within a 3D printed case. To detect motion, it uses an infrared proximity sensor with up to 12 inches of range. Once motion is detected, a vibration motor is triggered. The closer the moving object is to the sensor, the stronger the vibration.

Why this??

Designed to be reproduced by anyone with simple maker skills, this low-cost, wearable device can help stop the spread of infection and keep us healthy.



How it's Worn

Other colors and pendant designs can be used. The 1.8" pendants are worn 6"-12" below the chin when attached by an 18"-24" necklace. When the wearer's hand approaches their face, the movement is detected and the vibrating motor is activated. As the hands get closer, the response becomes stronger.



Until a reliable vaccine is made available, PULSE can be seamlessly integrated into our everyday life as we return to our workplace.



Warning!!

PULSE cannot be a substitute for masks or respirators, but can only be a warning device that your hands are moving past the pendant towards your face.

For additional information, watch the working of PULSE, here: <https://youtu.be/vdIBC7C6r8o>

Kerala startup launches IoT based mask disposal device !

Article by,
Vanitha Reddy, 3 July 2020

Amidst the pandemic, Cochin-based start-up VST Mobility Solutions has launched an automated mask disposal machine, named BIN-19 and UV SPOT as part of efforts to develop products helping to combat the COVID-19 pandemic. These automated products would also help in preventing the environmental damages and will also solve the problem of disposal of used masks.

Using UV (ultra-violet) light which has significantly proven to disinfect surfaces, a disposal device was developed using Chitra UV based face mask disposal bin technology. This technology was formally launched from the Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST).

VST Mobility Solutions also launched UV SPOT, an UV light-based multipurpose disinfectant, to combat the COVID-19.

• *The BIN-19*

In simple words the Internet of Things is “A network of Internet connected objects able to collect and exchange data”.

BIN-19 was launched by Ernakulam District Collector S.Suhas after a unit was installed at his office. It was developed at Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum which is an institute of national importance under Department of Science and Technology, Government of India.

The device has been successfully tested and proven effective under microbiological tests conducted by Sree Chitra Lab. The lab is one of the testing agencies for UV light-based devices in the country as per the guidelines of the Indian Council of Medical Research (ICMR).



Ernakulam District Magistrate S Suhas launching IoT-based used mask disinfection disposal smart Bin19 and disinfection device (UV SPOT) in the presence of Alvin George, CEO of VST Mobility Solutions.



BIN-19

• Working

The used masks will be dropped inside a container of the bin which will be first disinfected by a process. The disinfected masks which are dropped in the BIN-19 will be transferred to another container inside the Bin. The person dropping the mask can sanitize their hands with the help of the automatic sanitizer dispenser attached to the Bin-19. The user does not need to touch/operate any switches on the Bin. All functions are automated through hands-free equipment for the safety of users and health workers.

The IoT Features of BIN-19 are as follows:

- Auto Sanitizer Dispenser
- Mobile Application to navigate/find Bin-19
- Web Portal for Status Alerts
- Power ON/OFF alerts
- Box open alerts

• UV Spot

UV SPOT is a UV light-based multipurpose disinfectant having internal reflective surfaces and ultraviolet disinfection lamps and is capable of disinfecting a broad range of microorganisms. The UV-based device is mainly used for the disposal of contaminated or used face-mask and for reusing the UVC

stable metallic products. It is a device with ultraviolet disinfection lamps.

The products are registered with the Central Drugs Standard Control Organization (CDSCO) & were tested by SC-TIMST as per the guidelines of the Indian Council of Medical Research (ICMR).



About VST Mobility Solutions:

Headquarters- Cochin (Ernakulam),
Kerala

Chief Executive Officer (CEO), Founder & Managing director (MD)

– Alvin George

About SCTIMST:

Headquarters- Thiruvananthapuram
(Trivandrum), Kerala

President- Vijay Kumar Saraswat

Director- Asha Kishore

TechScience WordSearch

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

Clues:

1. *Russia's state space corporation that's going to allow two tourists to the ISS in 2023 – and one of them will spacewalk.*
2. *Privacy-focused search engine that has been restored in India after being unreachable for many users since July 1st.*
3. *India's Reliance Jio's Video conferencing platform.*
4. *A term that Microsoft-owned GitHub is going to remove.*
5. *Flex CEO that Uber recently added to their Board of Directors.*

5 of 5 words were placed into the puzzle.
 Created by Puzzlemaker at DiscoveryEducation.com

Answers:

- | | |
|---------------|--------------------|
| 1. ROSCOSMOS | 4. MASTER |
| 2. DUCKDUCKGO | 5. REVATHIADVAITHI |
| 3. JIOMEET | |