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IN THIS ISSUE.....

- Alumni Section
- Chandrayaan-2 Moon Mission's Initial Data Released by ISRO
- Scientists use AI-designed serotonin sensor to monitor sleep, mental health: Study
- Indian Cloud Storage Service DigiBoxx Launched by NITIAayog
- ISRO Successfully Launches CMS-01 Communication Satellite on Board PSLV-C50 Rocket
- Data of 7 million Indian Credit and Debit Cardholders Leaked Through Dark Web
- New AI-Based Wearable Tech in Development That Can Quickly Detect Hand Gestures
- Quantum Computers Will Speed Up the Internet's Most Important Algorithm

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Market Research

“The process of gathering, analysing and interpreting information about a market, about a product or service to be offered for sale in that market, and about the past, present and potential customers for the product or service; research into the characteristics, spending habits, location and needs of your business's target market, the industry as a whole, and the particular competitors you face.”

Types of Market Research

While there are a number of market research tools you can use, there are really only two types of market research data:

- **Primary.** Primary data is first-hand information you gather yourself, or with the help of a market research firm. You control it.
- **Secondary.** Secondary data is pre-existing public information, such as the data shared in magazines and newspapers, government, or industry reports. You can analyse the data in new ways, but the information is available to a large number of people.

Using primary or secondary data, there are two types of research studies:

- **Exploratory.** Exploratory market research gathers lots of open-ended data from many people to better understand a problem or opportunity. The goal is to gather perceptions and opinions regarding an issue, so your company can decide how to address it. But first you have to understand how your market sees the issue.
- **Specific.** Once you understand the larger market issues, or opportunities, you can use specific questions to gather information that could lead to a new product or service. Market research firms often use specific questions to gather feedback on a new advertising campaign, or to refine a planned new product.

Primary Market Research Tools

While primary research is more time-consuming and expensive, sometimes it's the only way to get the information you need. The most common primary research tools are:



- **Surveys.** Asking customers, a series of questions to better understand how they feel about a product's features, or about the experience they had during their hotel stay, for example, are two possible uses of a survey. Surveys consist of a list of questions that can be shared with an individual by phone, in person, on a card or paper, or online using a survey software.
- **Focus groups.** Bringing together groups of people with a common characteristic, such as age, hobby, or buying habits, to better understanding their likes and dislikes is a focus group. Focus groups typically consist of 8-12 people with a moderator who poses questions for the group to discuss. They are a useful way of getting feedback on a new product, new features, or new ad campaign.
- **Observation.** When the researcher gathers information simply by watching how a subject interacts with a product, the technique is observation. This is often used in comparing preferences for several types of products.
- **In-depth interviews.** Another market research technique is the one-on-one interview with an individual, during which probing questions are posed to better understand that person's product preferences.

Sources of Secondary Data

When conducting market research to better understand industry trends and broader shifts, secondary research is often a good place to start. Some of the most useful sources include:

- Industry associations and trade groups – most associations publish annual outlooks
- Trade journals specific to your industry
- Government reports - such as the Census or annual federal procurement results
- Industry analysts – these individuals monitor the performance of public companies in your space
- University faculty members – see what research reports they may have published
- Websites – while Wikipedia isn't a reliable source, there may be others that lead you to reputable sources and reports
- Competitor websites and materials – to convince potential customers to buy from them, they may share useful statistics and reports

The purpose of market research is to provide information that will assist you in making better decisions, to help your company be more successful.

Technologies Used for Market Research: Python, CSS, jQuery, JavaScript,HTML5

Python: Is an interpreted, high-level, general-purpose programming language. (The main scripting language used for front end.)

CSS: Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a mark-up language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. (Just to modify the look and feel for the survey page/webpage.)

Chandrayaan-2 Moon Mission's Initial Data Released by ISRO

The Indian Space Research Organisation on Thursday(24-Dec-20) said it has released the first set of data from the country's second mission to the Moon, the Chandrayaan-2, for the general public.

Chandrayaan-2 was launched on July 22, 2019 from the Satish Dhawan Space Centre at Sriharikota in Andhra Pradesh.

The Orbiter which was injected into a lunar orbit on September 2, 2019, carries eight experiments to address many open questions on lunar science.

"All experiments have been performing well and the data received suggests excellent capability to deliver on the pre-launch promises," ISRO said.

In the period since the launch, payload teams tuned on-board systems for optimal instrument configurations, derived essential in-flight calibration data, revised/updated data processing steps/software and have started to publish early results, it said. The public release data archived at the Indian Space Science Data Centre in Bylalu, near Bengaluru is prepared in the standard, globally followed Planetary Data System 4 (PDS4) format for public release, it added.

The Indian Space Science Data Centre (ISSDC) is the nodal centre of planetary data archive for the planetary missions of ISRO. The Chandrayaan-2 data is required to be in the Planetary Data System-4 (PDS4) standard, and is required to be peer reviewed scientifically and technically before acceptance as PDS archives and declared ready for sharing with the global scientific community and the general public, ISRO said.

This activity has been completed and hence the first set of data from the Chandrayaan-2 mission is now being released for the wider public use through the PRADAN portal hosted by ISSDC. The ISRO Science Data Archive (ISDA) currently holds data sets acquired by Chandrayaan-2 payloads from September-2019 to February-2020 from seven instruments.

Data sets from the Imaging Infra-Red Spectrometer (IIRS) payload will be added to this shortly, it said, adding that this release has Level-0 and Level-1 basic data sets prepared using Planetary Data System (PDS) version 4 standards.

The Chandrayaan-2 mission was India's first attempt to land on the lunar surface.

ISRO had planned the landing on the South Pole of the lunar surface. However, the lander Vikram hard-landed in September last year. Its orbiter, which is still in the lunar orbit, has a mission life of seven years.

ISRO Chairman K Sivan had recently said that the work on the Chandrayaan-3 mission, comprising a lander and a rover, was in progress.

Scientists use AI-designed serotonin sensor to monitor sleep, mental health: Study

Researchers have described how they used advanced genetic engineering techniques to transform a bacterial protein into a new research tool that may help monitor serotonin transmission with greater fidelity than current methods.

In an article in *Cell*, National Institutes of Health-funded researchers described how they used advanced genetic engineering techniques to transform a bacterial protein into a new research tool that may help monitor serotonin transmission with greater fidelity than current methods. Preclinical experiments, primarily in mice, showed that the sensor could detect subtle, real-time changes in brain serotonin levels during sleep, fear, and social interactions, as well as test the effectiveness of new psychoactive drugs.

The study was funded, in part, by the NIH's Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative which aims to revolutionize our understanding of the brain under healthy and disease conditions.

The study was led by researchers in the lab of Lin Tian, Ph.D., principal investigator at the University Of California Davis School Of Medicine. Current methods can only detect broad changes in serotonin signaling. In this study, the researchers transformed a nutrient-grabbing, Venus flytrap-shaped bacterial protein into a highly sensitive sensor that fluorescently lights up when it captures serotonin.

Previously, scientists in the lab of Loren L. Looger, Ph.D., Howard Hughes Medical Institute Janelia Research Campus, Ashburn, Virginia, used traditional genetic engineering techniques to convert the bacterial protein into a sensor of the neurotransmitter acetylcholine. The protein, called OpuBC, normally snags the nutrient choline, which has a similar shape to acetylcholine.

For this study, the Tian lab worked with Dr. Looger's team and the lab of Viviana Gradinaru, Ph.D., Caltech, Pasadena, California, to show that they needed the added help of artificial intelligence to completely redesign OpuBC as a serotonin catcher.

The researchers used machine learning algorithms to help a computer 'think up' 250,000 new designs. After three rounds of testing, the scientists settled on one. Initial experiments suggested that the new sensor reliably detected serotonin at different levels in the brain while having little or no reaction to other neurotransmitters or similarly shaped drugs. Experiments in mouse brain slices showed that the sensor responded to serotonin signals sent between neurons at synaptic communications points.

Meanwhile, experiments on cells in Petri dishes suggested that the sensor could effectively monitor changes in these signals caused by drugs, including cocaine, MDMA (also known as ecstasy), and several commonly used antidepressants.

Finally, experiments in mice showed that the sensor could help scientists study serotonin neurotransmission under more natural conditions. For instance, the researchers witnessed an expected rise in serotonin levels when mice were awake and a fall as mice fell asleep. They also spotted a greater drop when the mice eventually entered the deeper, R.E.M. sleep states.

Indian Cloud Storage Service Digi Boxx Launched by NITI Aayog

DigiBoxx, an Indian data storage and management platform, was launched today by NITI Aayog to promote Atmanirbhar Bharat initiative. It is an indigenous digital asset management and storage platform that has been initially planned for an August 15 launch. It comes with affordable pricing for individual users and has different plans for enterprise users as well. The DigiBoxx team stated at the launch that all data will be stored within India and the service is available on Web and Android, with iOS support coming soon.

The DigiBoxx cloud storage service was launched by NITI Aayog CEO Amitabh Kant who worked with the DigiBoxx team to make the indigenous cloud service possible. According to the app description, DigiBoxx boasts of connection encryption with files being encrypted at a database level and claims all data is stored within the country.

It allows users to easily share files with an email ID and mobile number. DigiBoxx is available on Android and the team says that an iOS version will be available in the coming days. The service is available on its Website, and a desktop app is in the works as well.


Some of the features include on-demand, real-time access and editing, ability to apply metadata for easy search, support for multiple formats and sizes, and organising assets with labels, sections, and filters. It also allows users to share heavy files with InstaShare.

DigiBoxx is available in monthly and yearly plans starting as low as Rs. 30 per month. For individuals, there is a free account as well that comes with 20GB storage, a 2GB maximum file size, Gmail integration, and unlimited external collaborations. The Rs. 30 per month plan entails up to 5TB of storage and 10GB max file size. For SMBs, the Rs. 999 plan includes up to 50TB storage with 10GB max file size, and is meant for up to 500 users.

How to Use DigiBoxx

To use DigiBoxx, users will need to create a free or a paid account on the website or Android app. They will be asked to enter a name for your Digispace and then share credentials including email address, phone number, residence address industry, among other things. You can save your own files using the app or the website, and then access them from other locations.

For sharing files via InstaShare, head to the website and enter the receiver's email address, your email address, and your phone number. You can drag and drop files on the page or click on the '+' icon. You will be required to enter an OTP, which is quite slow right now and takes multiple tries. With InstaShare, you will be able to send files up to 2GB and these files will stay on DigiBoxx for 45 days.



ISRO Successfully Launches CMS-01 Communication Satellite on Board PSLV-C50 Rocket

India successfully launched its latest communication satellite CMS-01 on board its Polar rocket from the spaceport here on Thursday(24-12-20), the second and last launch this year amid the COVID-19 pandemic. ISRO's trusted polar satellite launch vehicle, PSLV-C50, injected the satellite into the predefined orbit around 20 minutes after the lift-off from the second launch pad at the spaceport of Sriharikota.

CMS-01 is the 42nd communication satellite of the space agency and it is envisaged for providing services in Extended-C Band of the frequency spectrum covering India, Andaman and Nicobar, and Lakshadweep islands.

The satellite is functioning "very well", ISRO Chairman K Sivan said. The solar panels of the satellite, a crucial operation, have been deployed, he said, addressing scientists from the Mission Control Centre.

"I am extremely happy to declare that the PSLV-C50 successfully injected CMS-01 communication satellite precisely into the predefined sub-Geosynchronous Transfer Orbit. In another four days from now, the satellite will be placed into the specified slot into the GTO," he said. Sivan said the satellite is going to function as a replacement for communication satellite GSAT-12 which was launched 11 years ago. CMS-01 will have a lifespan of over seven years, according to ISRO.

Congratulating the space agency's launch and satellite vehicle teams, the chairman said "I am sure that this satellite will be doing all the functions as planned successfully." Outlining ISRO'S future missions, Chandrayaan-3, flagship mission Aditya L-1, and Gaganyaan, he said they were planning to have missions at the earliest.

These included the much awaited GSLV(Geosynchronous Satellite Launch Vehicle) and SSLV (Small Satellite Launch Vehicle) missions. "Series of missions are on hand and as usual team ISRO will rise to the occasion..," he said.

PSLV-C50 is the 22nd flight of PSLV in "XL" configuration (equipped with six strap-on motors), and it was the 77th launch vehicle mission from Sriharikota, about 120 km from Chennai.

It follows the successful launch of PSLV-C49 (EOS-01) earth observation satellite and nine customer spacecraft on November 7 which was ISRO's first mission of the year amid the COVID-19 pandemic. Today's launch is the last one of 2020 for ISRO.



Data of 7 million Indian Credit and Debit Cardholders Leaked Through Dark Web

Sensitive data related to around seven million credit and debit cardholders has surfaced online through dark Web, according to a security researcher. The data included not only the names of affected Indian cardholders but also their mobile numbers, income levels, email addresses, and Permanent Account Number (PAN) details. It is available for download through a Google Drive link. The link is open for public access and is said to be in circulation on the dark Web for some days now.

Cybersecurity researcher Rajshekhar Rajaharia discovered the Google Drive link from the dark Web earlier this month. It was in circulation with the title “Credit Card Holders data” by some anonymous people, Rajaharia said.

The link, that was shared with Gadgets 360, included 59 Excel files that contained the data including the full names, mobile numbers, cities, income levels, and email addresses of cardholders. It also included PAN card numbers, employer details, and type of bank account linked with the employers of the affected credit and debit card users. However, the leaked data doesn't include the bank account and card numbers of the victims.

Rajaharia told Gadgets 360 that he was able to verify some names listed in the Excel files by finding them on LinkedIn or searching the surfaced mobile numbers on caller ID app Truecaller. He even found his name there while verifying the details.

Although the data doesn't contain any clear references to the banks whose cardholders' details have been leaked, it includes the first swipe amount for most of the cardholders. There are also details to show whether the affected cardholders enabled mobile alerts on their phones. The exact period from which the data has been leaked is unclear. However, it is likely to include details from mostly between 2010 and early 2019. In some cases, though, the data exposed cardholders' information dating back to 2004.

“The data is related to financial products, and since most of the people exposed are professionals, it's quite expensive,” noted Rajaharia. Experts believe that being a financial data leak, the information available through the dark Web could be used by attackers for phishing and malware attacks. Karmesh Gupta, CEO of cybersecurity firm WiJungle, told Gadgets 360 that the data surfaced might also used to initiate fraud calls.

This is not the first time when sensitive information of a large number of individuals in India has been exposed online. In October, the personal website data of Prime Minister Narendra Modi surfaced on the dark Web. The data leak reportedly included names, email addresses, and mobile numbers of lakhs of individuals. Last year, debit and credit card data of over 1.3 million Indian banking customers was also put on sale on the dark Web by cybercriminals.

New AI-Based Wearable Tech in Development That Can Quickly Detect Hand Gestures

Researchers at University of California, Berkeley have created a new device that combines wearable biosensors with artificial intelligence (AI) software to recognise what hand gesture a person intends to make based on electrical signal patterns in the forearm. As per the research published on the UC Berkeley website, the device paves the way for "better prosthetic control and seamless interaction" with electronic devices. It essentially means that the technology can be used for carrying complex robotic medical procedures or other daily tasks such as typing or even gaming without actually using your hands.

The researchers claim that the team succeeded in teaching the algorithm to recognise 21 individual hand gestures, including a thumbs-up, a fist, a flat hand, holding up individual fingers and counting numbers. The device is not ready for commercial usage yet, though it could be available soon with few tweaks, researchers said. The research paper adds that there are other ways to improve human-computer interaction through cameras and computer vision, but the new device ensures an individual's privacy as it stores all data locally. Engineers claim that not only does this speed up the computing time, but it also ensures that personal biological data remain private.

"When Amazon or Apple creates their algorithms, they run a bunch of software in the cloud that creates the model, and then the model gets downloaded onto your device," said Jan Rabaey, Professor of Electrical Engineering at UC Berkeley and senior author of the paper. "In our approach, we implemented a process where the learning is done on the device itself. And it is extremely quick. You only have to do it one time, and it starts doing the job. But if you do it more times, it can get better. So, it is continuously learning, which is how humans do it," he noted.

The team collaborated with Ana Arias, a Professor of Electrical Engineering at UC Berkeley to create the hand gesture recognition system. Together, the team designed a flexible armband that can read the electrical signals at 64 different points on the forearm. The electrical signals are then fed into an electrical chip, which is programmed with an AI algorithm capable of associating these signal patterns in the forearm with specific hand gestures. Additionally, the device uses a type of advanced AI called a 'hyperdimensional computing algorithm' that is capable of updating itself with new information. "In gesture recognition, your signals are going to change over time, and that can affect the performance of your model. We were able to greatly improve the classification accuracy by updating the model on the device," said Ali Moin who helped design the device as a doctoral student.

Lastly, researchers claim that the uniqueness of the device is that it integrates biosensing, signal processing and interpretation, and AI into one system that is relatively small and flexible and has a low power budget.

Quantum Computers Will Speed Up the Internet's Most Important Algorithm

The fast Fourier transform (FFT) is the unsung digital workhorse of modern life. It's a clever mathematical shortcut that makes possible the many signals in our device-connected world. Every minute of every video stream, for instance, entails computing some hundreds of FFTs. The FFT's importance to practically every data-processing application in the digital age explains why some researchers have begun exploring how quantum computing can run the FFT algorithm more efficiently still.

“The fast Fourier transform is an important algorithm that's had lots of applications in the classical world,” says Ian Walmsley, physicist at Imperial College London. “It also has many applications in the quantum domain. [So] it's important to figure out effective ways to be able to implement it.”

Mathematician Peter Shor at AT&T Bell Laboratories discovered the first proposed killer app for quantum computers— finding a number's prime factors— in 1994. Shor's algorithm scales up its factorization of numbers more efficiently and rapidly than any classical computer anyone could ever design. And at the heart of Shor's phenomenal quantum engine is a subroutine called—you guessed it—the quantum Fourier transform (QFT).

Here is where the terminology gets a little out of hand. There is the QFT at the center of Shor's algorithm, and then there is the QFFT—the quantum fast Fourier transform. They represent different computations that produce different results, although both are based on the same core mathematical concept, known as the discrete Fourier transform.

The QFT is poised to find technological applications first, though neither appears destined to become the new FFT. Instead, QFT and QFFT seem more likely to power a new generation of quantum applications.

The quantum circuit for QFFT is just one part of a much bigger puzzle that, once complete, will lay the foundation for future quantum algorithms, according to researchers at the Tokyo University of Science. The QFFT algorithm would process a single stream of data at the same speed as a classical FFT. However, the QFFT's strength comes not from processing a single stream of data on its own but rather multiple data streams at once. The quantum paradox that makes this possible, called superposition, allows a single group of quantum bits (qubits) to encode multiple states of information simultaneously. So, by representing multiple streams of data, the QFFT appears poised to deliver faster performance and to enable power-saving information processing.

The Tokyo researchers' quantum-circuit design uses qubits efficiently without producing so-called garbage bits, which can interfere with quantum computations. One of their next big steps involves developing quantum random-access memory for preprocessing large amounts of data. They laid out their QFFT blueprints in a recent issue of the journal *Quantum Information Processing*.

“QFFT and our arithmetic operations in the paper demonstrate their power only when used as