KIET GROUP OF INSTITUTIONS

Department of Computer Applications
(MCA)

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Highlights

- The Indian government is preparing a national framework to support the wider deployment of blockchain use cases
- European scientists are using photonics to develop a low emission, 1.6 terabyte-per-second speed internet
- How machine learning is redefining healthcare
- Greenhouse gases rising faster despite global climate efforts
- Toshiba develops method to accurately detect cancers from drop of blood
- Tesla launches Cyber electric truck, but shatterproof window snafu steals the show
- Deep Learning Outperforming Classic Ml Methods, Says Report
- Google's Explainable AI service sheds light on how machine learning models make decisions
- The Person Who Developed the WWW, Comes Up With Plan to Save the Internet
- Artificial intelligence algorithm can learn the laws of quantum mechanics
- Environmental cost of cryptocurrency mines
- An assistive technology that enables individuals to maneuver a powered wheelchair

Designed by:- MCA Deptt.

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The Indian government is preparing a national framework to support the wider deployment of blockchain use cases

Minister of state for electronics and information technology, Sanjay Dhotre said that the government is drafting an approach paper on the National Level Blockchain Framework which discusses the potential for distributed ledger technology and the need for a shared infrastructure for different use cases.

Dhotre made the announcement in a letter addressing questions about blockchain from members of the Lok Sabha, the lower house of the Indian parliament.

In particular, MP Parvesh Sahib Singh Verma asked whether the government had encouraged and conducted research into potential uses for blockchain technologies, and if so what the outcome of this research is.

In response, Dhotre wrote ministry has identified Blockchain Technology as one of the important research areas having application potential in different domains such as Governance, Banking and Finance, Cyber Security and so on."

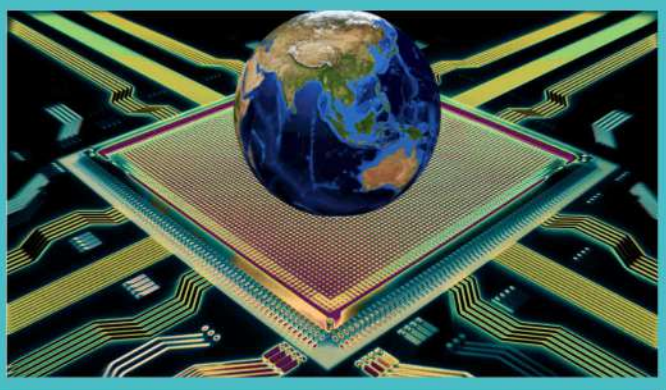
According to the letter, the Indian government has already built the Distributed Centre of Excellence in Blockchain Technology, a project that develops and conducts research on blockchain technologies and their use cases.

The project is executed by government and research institutions, including the Centre for Development of Advanced Computing and the Institute for Development and Research in Banking Technology.

Under this initiative, the institutions have piloted a blockchain system for property registration at Shamshabad District, Telangana State, developed proof-of-concept solutions for Cloud Security Assurance, C-KYC and trade finance.

Other ongoing projects include authentication of academic certificates with a proof-of-existence framework, and vehicle life cycle and hotel registry management.

There has been a slew of blockchain projects under development in India. Last month, India's information technology services provider Tech Mahindra announced it was teaming up with Netherlands-based blockchain application incubator Quantoz to provide secure digital payments.Tata Consultancy Services has also launched a multi-brand consumer loyalty platform on R3's enterprise blockchain Corda the same month. India's defense minister Rajnath Singh also stressed the potential use cases of blockchain in the defense industry in a public speech.



European scientists are using photonics to develop a low emission, 1.6 terabyte-per-second speed internet

Teriphic is developing new optical transceiver modules used in internet data centres that will reduce power consumption by 50% per Gb/s and in turn see lower carbon emissions.

Using light to exchange terabits – or thousands of gigabits per second – the TERIPHIC group expect their new transceivers to solve problems faster and reduce queue times.

Shortening processing intervals for High-Performance Computing, Edge Computing, and machine learning, the new ultra-high-capacity, low power consumption pluggable modules are capable of both 800 Gb/s and 1.6 Tb/s.

Speeds of 1.6Tb/s are the equivalent of downloading 267 HD Netflix movies in one second.

Aiming to surpass current 'gold' standards of 400GB per second, TERIPHIC (or "TERabit optical transceivers based on EML arrays and a Polymer Host platform for optical InterConnects,") expect their modules to cost €0.3 per Gigabyte per second.

Photonic Integration

Panos Groumas from the TERIPHIC project coordination team, said: "Photonics is essential for the future of datacentres. TERIPHIC intends to develop low-cost terabit optical transceivers through the automation of current photonic integration concepts and processes in commercial assembly machines."

"While 400G is impressive, and was demonstrated in 2018, High-Performance Computing, Edge Computing, machine learning, end-user experiences will not run on existing speeds of 400 Gb/s."

"We are developing mass production compatible 800 Gb/s pluggable modules with 8 lanes and 1.6 Tb/s mid-board modules with 16 lanes having at least 2 km reach," Groumas said.

"When the Gb/s power consumption is reduced, data centres will consume less power, and given that they are powered by power plants relying on various fuel sources including coal, we will see a significant reduction in carbon emissions."

Project Leader, Professor Hercules Avramopoulos said: "TERIPHIC will bring together EML arrays in the O-band, PD arrays and a polymer chip that will act as the host platform for the integration of the arrays and the wavelength mux-demux of the lanes."

"The integration will rely on butt-end-coupling steps, which will be automated via the development of module-specific alignment and attachment processes on commercial equipment.

How machine learning is redefining healthcare

Machine learning (ML) is an application of artificial intelligence (AI) wherein the system looks at observations or data, such as examples, direct experience, or instruction, figures out patterns in data and predicts events in the future based on the examples that we provide.In healthcare, ML has led to exciting new developments that could redefine cancer diagnosis and treatment in the years to come. ML can increase access to treatment in developing countries which don't have enough specialist doctors that can treat certain diseases, it can improve the sensitivity of detection, add more value in treatment decisions, and it can help personalize treatment so that each patient gets the treatment that's best for them. In many cases they can even add to workflow efficiency in hospitals. The possibilities are endless.

Identifying Disease and Diagnosis

With growing populations and increased life expectancy, health systems are quickly becoming overburdened, under-resourced and not equipped for the challenges they face. Scientists have been working on ML models that predict disease susceptibility or aid in early diagnosis of diseases and illnesses. UK-based technology start-up Feebris is using artificial intelligence algorithms for the precise detection of complex respiratory conditions in the field. It connects to existing medical sensors and can be used by non-doctor users to identify respiratory issues early, avoiding complications and hospitalizations. In what could be an absolute game-changer, MIT's Computer Science and Artificial Intelligence Lab has developed a new deep learning-based prediction model that can forecast the development of breast cancer up to five years in advance.

Robotic Surgery

Robotics is changing the way surgery is performed today. The da Vinci robot is designed to facilitate complex surgery using a minimally invasive approach, reducing the length of surgeries and subsequently hospital stays. Various other robotic tools such as Stereotaxis in cardiac catheterization, Medtronic/Mazor in spine and neurology, Accuray in cancerous tumor irradiation, Stryker's Mako in orthopedic hip and knee replacement are improving surgical outcomes for thousands of patients. Even dental implants and hair transplants are being performed by surgical robots today.

AI and ML-based techniques will enhance the precision of surgical tools by incorporating real-time data, feedback from previous successful surgeries and data from electronic medical records during the surgery itself. This can help reduce human error and help general surgeons to perform complex surgeries in resource-limited settings lacking specialists.

Greenhouse gases rising faster despite global climate efforts

The globally averaged concentrations of carbon dioxide (CO2) reached 407.8 parts per million (ppm) in 2018, up from 405.5ppm in 2017. The symbolic 400ppm threshold was breached in 2015 and has been rising steadily ever since.

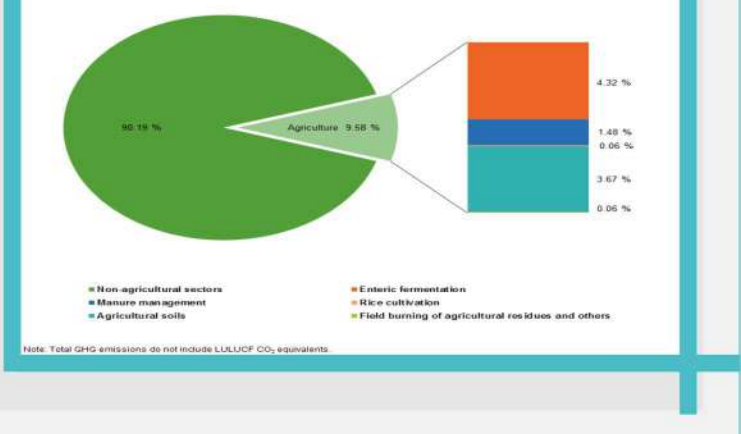
Concentrations of methane and nitrous oxide also surged by higher amounts than during the past decade, according to observations from the Global Atmosphere Watch network, which includes stations in the remote Arctic, mountain areas and tropical islands.

The WMO is a UN agency and its latest findings are expected to guide discussion at a climate change summit being held in Madrid next week. “There is no sign of a slowdown, let alone a decline, in greenhouse gases' concentration in the atmosphere, despite all the commitments under the Paris Agreement on Climate Change,” said Petteri Taalas, WMO secretary-general.

“This continuing long-term trend means that future generations will be confronted with increasingly severe impacts of climate change, including rising temperatures, more extreme weather, water stress, sea level rise and disruption to marine and land ecosystems”. “It is worth recalling that the last time the Earth experienced a comparable concentration of CO2 was 3-5 million years ago. Back then, the temperature was 2-3°C warmer, sea level was 10-20 metres higher than now.”

Since 1990, there has been a 43 per cent increase in total radiative forcing – the warming effect on the climate - by long-lived greenhouse gases. CO2 accounts for about 80 per cent of this, according to figures from the US National Oceanic and Atmospheric Administration quoted by the WMO.

It added that global emissions are not estimated to peak by 2030 under the current ambitions set forth by countries, let alone by the hoped for date of 2020. Irrespective of future policy, carbon dioxide stays in the atmosphere for centuries, locking in warming trends.



Toshiba develops method to accurately detect cancers from drop of blood

The Japanese firm, who developed the diagnostic tool with the National Cancer Center Research Institute and Tokyo Medical University, said they hope to commercialise the device in "several years" after beginning a trial next year.

According to the Toshiba scientists, the method is designed to examine the types and concentration of micro RNA molecules secreted in blood from cancer cells. Other companies such as Toray Industries Inc — a Japanese company who specialise in technologies in organic synthetic chemistry, polymer chemistry, and biochemistry — have previously developed technologies to diagnose cancer using micro RNA molecules from a blood sample.

"Compared to other companies' methods, we have an edge in the degree of accuracy in cancer detection, the time required for detection and the cost," said Koji Hashimoto, a chief research scientist at Toshiba's Frontier Research Laboratory.

According to the researchers, the test will be used to detect a wide variety of cancers, including but not limited to: gastric, oesophageal, lung, liver, biliary tract, pancreatic, bowel, ovarian, prostate, bladder and breast cancers, as well as sarcomas and gliomas.

The scientists said the tool, which consists of a chip and a small device, can conduct the diagnosis in less than two hours . A blood test using it is expected to cost 20,000 yen (£142) or less, it added.

Furthermore, the company said that the device will be used in health check-ups and believe it could also reduce the cost of cancer screening. In its five-year business strategy from April 2019, Toshiba positioned medical businesses, including genome analysis and cell diagnosis, among key growth pillars along with automation, batteries and digital solutions using artificial intelligence.

There have been several companies that have already ventured into the detection of early stages of cancer with a simple blood test; however, some companies have previously undergone scrutiny over the technology developed.

In 2003, a blood-testing start-up Theranosclaimed it would be able to diagnose fatal diseases with just one drop of blood. However, once the company rolled out the technology commercially, these available tests often took far longer than a couple of minutes to carry out, and also returned false positives. In more promising results, in 2016 Microsoft founder Bill Gates backed a DNA sequencing firm, called Illumina, who were developing technology which would detect fragments of cancer genes released by tumours into the bloodstream.

Tesla launches Cyber electric truck, but shatterproof window snafu steals the show

Tesla says the vehicle has "more utility than a truck, with more performance than a sports car", while Musk attempted to show off its ruggedness with a live demonstration. As part of the unveiling, Franz von Holzhausen, Tesla's head of design, threw a metal ball at two of the vehicle's supposedly shatterproof windows. Unfortunately for Musk, both windows instantly shattered.

"At least it didn't go through", Musk said somewhat sheepishly, while admitting there was "room for improvement". With a starting price of $39,900 (£31,000), the Cyber truck is less expensive than initially thought, but its unusual design could limit its broader appeal.

The truck was unveiled at a launch event in Los Angeles, where it emerged other versions will be priced at $49,900 and $69,900, with the most expensive model offering a range of over 500 miles (800km). Production is expected to begin in late 2021.

"We need sustainable energy now. If we don't have a pickup truck, we can't solve it", Musk said. "The top three selling vehicles in America are pickup trucks. To solve sustainable energy, we have to have a pickup truck".

Tesla also said the top of the range, triple electric motor version of the CyberTruck would be capable of going from zero to 60 miles an hour in 2.9 seconds - comparable with many sports cars. The truck's hulking, sharp, geometric body was made from stainless steel, set atop massive tires and had windows made from armoured glass.

Musk has been teasing the idea of creating a truck for some time, first tweeting about such an idea in 2012 before including it in his so-called "master plan" for the company, published in 2016. "It will be a niche product at best and poses no threat in the pickup market as we know it today," wrote Matt DeLorenzo, senior executive editor at automotive research company Kelley Blue Book.

Musk also claimed the truck's "ultra-hard" exterior "won't scratch and dent", despite the armoured glass snafu. The vehicle marks the first foray by Tesla into pickup trucks, a market dominated by Ford's F-150, along with models by General Motors and Fiat Chrysler. Tesla's Model 3 sedan is the world's best-selling battery electric car. In April this year, Musk said that Tesla was less than two years away from producing a fully driverless vehicle.

Deep Learning Outperforming Classic MI Methods, Says Report

A report "Deep Learning: Opportunities and Best Practice" by Peltarion which is a leading AI innovator and creator of operational deep learning platform and AI knowledge Network CognitionX, organizer of the CogX festival of AI and emerging technology, illustrates that deep learning is overtaking more classic ML methods.

The study is based on the research and interviews with other AI industry players across the European region including Amazon, Google, DeepMind, and JP Morgan. The report also depicts that, several challenges still exist like – cost, complexity, and skills which are yet to be solved to enable market growth.

The report will serve as a handbook for those who have little knowledge about deep learning and a guide for those who have more experience. It gives a better understanding of deep learning, where it's moving, and best practices from the field.

The co-founder of CognitionX, Tabitha Goldstaub stated, "At a time when so many organizations are debating the risks and rewards of using AI, I'm thrilled to see this report give some practical guidance to businesses on where deep learning can be applied, along with options on how to deliver this technology and some pointers on where the technique will go in the future. This is a good starting point for business leaders who are thinking about adopting AI."

The study odes a brief history of artificial intelligence in general and detailed comprehension of deep learning. It also incorporates the case stories of real-world applications from different verticals, such as – Pattern-recognition in healthcare diagnostics; Real-time prediction of fraudulent transactions; and Automation of complex tasks in manufacturing workflows.

For deep learning to meet such potential, it still has to overcome certain challenges. As the report quotes – "As with any large-scale IT project, deep learning projects often fail due to factors such as complexity, failure to clearly define requirements and lack of proper communication between business and technical teams." If an organization's data is not in order, and it lacks talent in its team, these challenges get worse when tools are expensive and complicated.

Scott Penberthy, Director of Applied AI at Google and report contributor, said – "We believe there are about 10,000 people in the world who really understand DL. There are about 100,000 deep learning practitioners and a million data scientists."

Additionally, Luka Crnkovic-Friis, the Co-Founder and CEO of Peltarion, and deep learning expert believes that for deep learning to reach its full potential, it needs to be operationalized. He further added that "AI and DL will save millions of lives and improve the lives of billions. The technology will fundamentally impact health, food production, energy, business, and creativity. But if the true potential of AI and deep learning is going to be reached, it needs to be practically accessible by innovators across the world – the many, not just a few. One of the suggested routes to making deep learning more accessible is via a platform model, which simplifies and automates many tasks and provides the capability for managing the end-to-end DL workflow in one place, with an easier transition to running these models in live production environments."

Google's Explainable AI service sheds light on how machine learning models make decisions

Google LLC has introduced a new "Explainable AI" service to its cloud platform aimed at making the process by which machine learning models come to their decisions more transparent.

The idea is that this will help build greater trust in those models, Google said. That's important because most existing models tend to be rather opaque. It's just not clear how they reach their decisions.
Tracy Frey, director of strategy for Google Cloud AI, explained in a blog post today that Explainable AI is intended to improve the interpretability of machine learning models. She said the new service works by quantifying each data factor's contribution to the outcome a model comes up with, helping users understand why it makes the decisions it does.

In other words, it won't be explaining things in layman's terms, but the analysis should still be useful for data scientists and developers who build the machine learning models in the first place. Explainable AI has further limitations, as any interpretations it comes up with will depend on the nature of the machine learning model and the data used to train it.

"Any explanation method has limitations," she wrote. "For one, AI Explanations reflect the patterns the model found in the data, but they don't reveal any fundamental relationships in your data sample, population, or application. We're striving to make the most straightforward, useful explanation methods available to our customers, while being transparent about its limitations."

Nonetheless, Explainable AI could be important because accurate explanations of why a particular machine learning model reaches the conclusions it does would be useful for senior executives within an organization, who are ultimately responsible for those decisions. That's especially true in the case of highly regulated industries where confidence is absolutely critical. For many organizations in that position, Google said, AI without any kind of interpretability is currently out of bounds.

In related news, Google also released what it calls "model cards," which serve as documentation for the Face Detection and Object Detection features of its Cloud Vision application programming interface.
The model cards detail the performance characteristics of those pre-trained machine learning models, and provide practical information about their performance and limitations. Google said the intention is to help developers make more informed decisions about which models to use and how to deploy them responsibly.

The Person Who Developed the WWW, Comes Up With Plan to Save the Internet

The Internet is like a double-edged sword. There are the more benefits it has, the more disadvantages are coming forth. Fake news and deepfake videos are the latest examples of these disadvantages. Despite millions of efforts, it is becoming increasingly difficult to restrain them. In such a situation, the person who invented the WWW has now appeared.

Sir Tim Berners Lee, the inventor of the World Wide Web i.e. WWW, has now launched an action plan to protect the Internet. In the last few years, there has been a lot of increase in fake news, rumors and privacy violations on the Internet. Data leaks are now common and social media is full of fake news.

WWW founder Tim Berners Lee has introduced a web plan to deal with fake news and internet fraud. Its World Wide Web Foundation together with 80 organizations of the world are working on the digital policy agenda. For this, the policy has also been worked on for more than a year. The aim of the contract for the web is to bring government institutions, companies and end-users together and develop them by implementing policies.

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Artificial intelligence algorithm can learn the laws of quantum mechanics

Artificial Intelligence can be used to predict molecular wave functions and the electronic properties of molecules. This innovative AI method developed by a team of researchers at the University of Warwick, the Technical University of Berlin and the University of Luxembourg, could be used to speed-up the design of drug molecules or new materials.

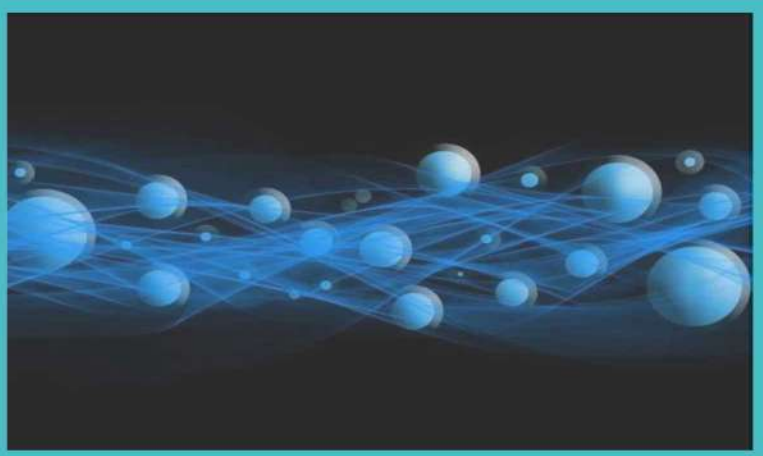
Artificial Intelligence and machine learning algorithms are routinely used to predict our purchasing behaviour and to recognise our faces or handwriting. In scientific research, Artificial Intelligence is establishing itself as a crucial tool for scientific discovery.

In Chemistry AI has become instrumental in predicting the outcomes of experiments or simulations of quantum systems. To achieve this, AI needs to be able to systematically incorporate the fundamental laws of physics.

An interdisciplinary team of chemists, physicists, and computer scientists led by the University of Warwick, and including the Technical University of Berlin, and the University of Luxembourg have developed a deep machine learning algorithm that can predict the quantum states of molecules, so-called wave functions, which determine all properties of molecules.

The AI achieves this by learning to solve fundamental equations of quantum mechanics as shown in their paper 'Unifying machine learning and quantum chemistry with a deep neural network for molecular wavefunctions' published in *Nature Communications*.

Solving these equations in the conventional way requires massive high-performance computing resources (months of computing time) which is typically the bottleneck to the computational design of new purpose-built molecules for medical and industrial applications. The newly developed AI algorithm can supply accurate predictions within seconds on a laptop or mobile phone.



Environmental cost of cryptocurrency mines

Bitcoin, Ethereum, Litecoin and Monero -- the names of digital-based 'cryptocurrencies' are being heard more and more frequently. But despite having no physical representation, could these new methods of exchange actually be negatively impacting our planet? It's a question being asked by researchers at The University of New Mexico, who are investigating the environmental impacts of mining cryptocurrencies.

"What is most striking about this research is that it shows that the health and environmental costs of cryptocurrency mining are substantial; larger perhaps than most people realized," said Benjamin Jones, UNM Researcher and asst. professor of economics.

Cryptocurrency is an internet-based form of exchange that exists solely in the digital world. Its allure comes from using a decentralized peer-to-peer network of exchange, produced and recorded by the entire cryptocurrency community. Independent "miners" compete to solve complex computing algorithms that then provides secure cryptographic validation of an exchange. Miners are rewarded in units of the currency. Digital public ledgers are kept for "blocks" of these transactions, which are combined to create what is called the blockchain. According to proponents, cryptocurrencies do not need a third party, or traditional bank, or centralized government control to provide secure validation for transactions. In addition, cryptocurrencies are typically designed to limit production after a point, meaning the total amount in circulation eventually hits a cap. These caps and ledgers are maintained through the systems of users. But the mechanisms that make these currencies so appealing are also using exorbitant amounts of energy.

In a new paper titled 'Cryptodamages: Monetary value estimates of the air pollution and human health impacts of cryptocurrency mining' published in the journal, *Energy Research & Social Science*, University of New Mexico researchers Andrew Goodkind (asst. professor, Economics), Benjamin Jones (asst. professor, Economics) and Robert Berrens (professor, Economics) estimate the environmental impact of these cryptocurrency mining techniques. Using existing data that assessed energy use on cryptocurrency, and a battery of economic valuation techniques, the three were able to put a monetary figure on the mining practices.

An assistive technology that enables individuals to maneuver a powered wheelchair

An assistive technology that enables individuals to maneuver a powered wheelchair or control a mouse cursor using simple tongue movements can be operated by individuals with high-level spinal cord injuries, according to the results of a recently completed clinical trial.

"This clinical trial has validated that the Tongue Drive system is intuitive and quite simple for individuals with high-level spinal cord injuries to use," said Maysam Ghovanloo, an assistant professor in the School of Electrical and Computer Engineering at the Georgia Institute of Technology. "Trial participants were able to easily remember and correctly issue tongue commands to play computer games and drive a powered wheelchair around an obstacle course with very little prior training."

At the annual conference of the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) on June 26, the researchers reported the results of the first five clinical trial subjects to use the Tongue Drive system. The trial was conducted at the Shepherd Center, an Atlanta-based catastrophic care hospital, and funded by the National Science Foundation and the Christopher and Dana Reeve Foundation.

The clinical trial tested the ability of these individuals with tetraplegia, as a result of high-level spinal cord injuries (cervical vertebrae C3-C5), to perform tasks related to computer access and wheelchair navigation -- using only their tongue movements.

At the beginning of each trial, Ghovanloo and graduate students Xueliang Huo and Chih-wen Cheng attached a small magnet -- the size of a grain of rice -- to the participant's tongue with tissue adhesive. Movement of this magnetic tracer was detected by an array of magnetic field sensors mounted on wireless headphones worn by the subject. The sensor output signals were wirelessly transmitted to a portable computer, which was carried on the wheelchair.

The signals were processed to determine the relative motion of the magnet with respect to the array of sensors in real-time. This information was then used to control the movements of the cursor on a computer screen or to substitute for the joystick function in a powered wheelchair. Ghovanloo chose the tongue to operate the system because unlike hands and feet, which are controlled by the brain through the spinal cord, the tongue is directly connected to the brain by a cranial nerve that generally escapes damage in severe spinal cord injuries or neuromuscular diseases.

Compiled by:-
Naman Kumar (MCA II year)
Shivam Nerwal (MCA I year)
Arya Mishra (MCA I year)

Coordinated by:-
Ms. Shalika Arora (Asst. Prof.,MCA)