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COMPUTER SCIENCE & APPLICATIONS**

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## **The Significance of Technology Updates in Newspapers:**

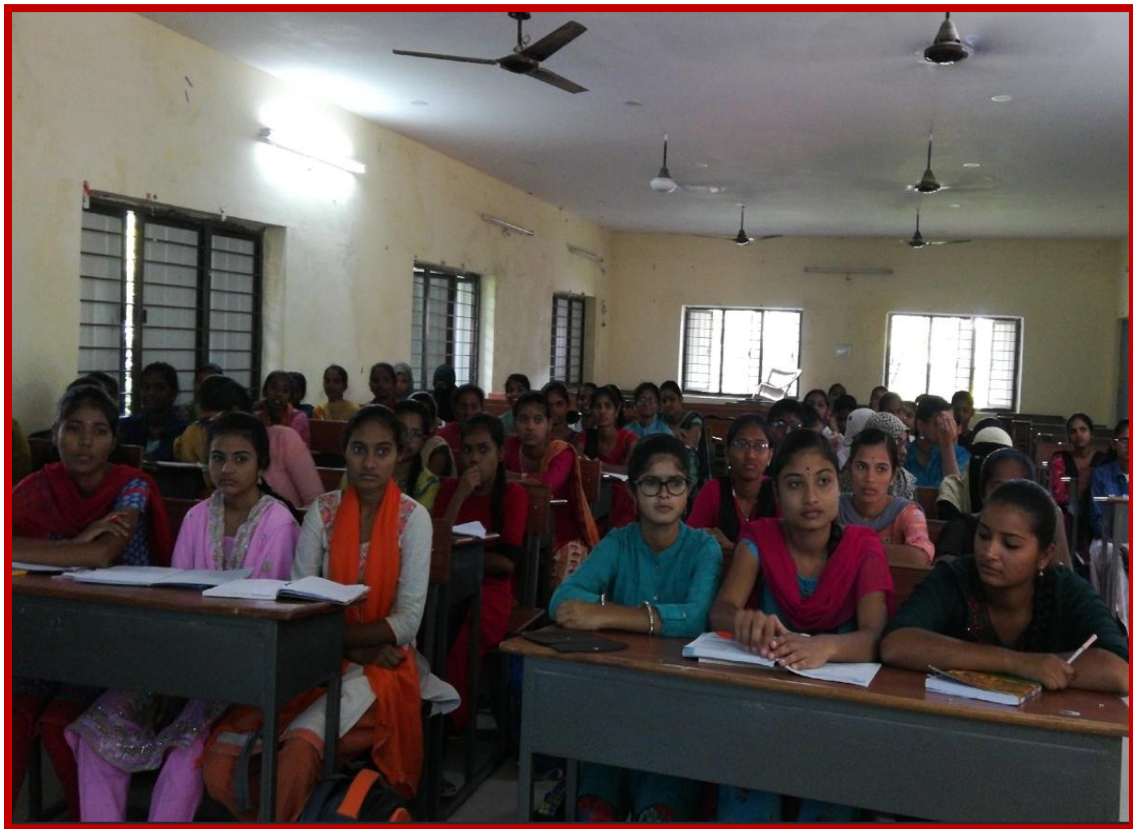
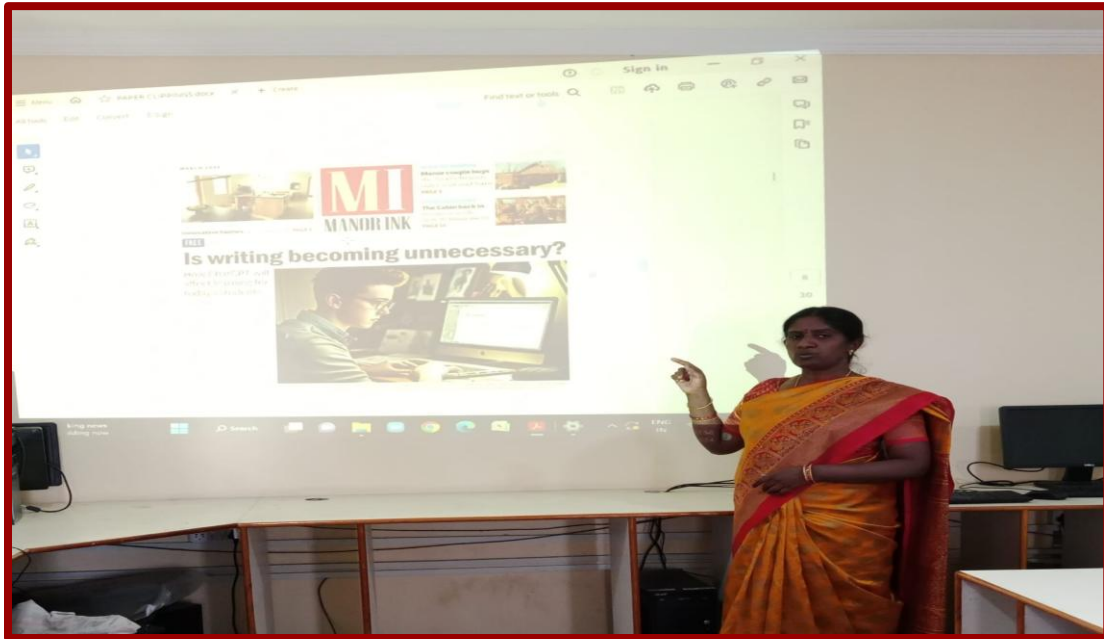
As we navigate the dynamic and rapidly evolving field of computer science, it is crucial for undergraduate students to recognize the pivotal role that technology updates, as published in newspapers, play in shaping the landscape of our discipline. In this context, department of Computer Science & Applications would like to shed light on the profound importance of staying informed about the latest technological advancements through regular engagement with news sources.

Regularly reading about technology updates in newspapers is an indispensable practice for undergraduate computer science students. It not only equips you with the knowledge and skills needed to excel in your academic pursuits but also prepares you for a successful and impactful career in the ever-evolving world of technology.

Following are objectives for conducting this activity at the department level regularly.

- To Stay Current with Industry Trends:
- To Broaden Your Knowledge Base
- To Real-world Applications
- To Enhance Problem-solving Skills

# PAPER CLIPPINGS





# Why Data Analytics is important

**Data Analytics is a good choice for those who enjoy working with numbers, and solving puzzles, writes Rohini R Rao**

**W**e are living in the era of 'datafication,' technology is recording every aspect of our lives as data. People and their devices are constantly connected to the internet and an unprecedented amount of data is being generated. Data recording the daily lives of humans can be integrated, analysed, and put to social use. However, data analysis is not a trivial task, we are in a 'data-rich' but 'information-poor' situation. Although a massive amount of data is being recorded in detail, the data repositories are not being used effectively. Large amounts of data, in various formats, are distributed across repositories. Decision-making is mostly based on intuition rather than information. There is a need to integrate this data, prevent information overload, and use the processed information to make data-driven decisions. There is a need for making sense of the data.

### Story building

Data Analytics is the science of analysing the raw data to summarise and visualise the data. This insight into the data should help the decision-maker interpret it and make 'data-driven' decisions. The first step of the Data Analytics project is to specify the problem and the objective of the project. The objective of the analysis could be to simply summarise the data for an informed deci-

sion. For instance, the analysis could help identify customers for the next marketing campaign. The data can also be used to build predictive models or make personalised recommendations.

The team involved in Data Analytics facilitates the collection of relevant data and its exploration. Sources of data are identified or collected, data is cleaned, converted, integrated, and prepared for analysis. Tools such as Python, R, and MS Excel, various techniques are deployed for the analysis and visualisation. Data Analysts transform the data to interpret patterns and trends, which help the team translate the patterns into actionable items. Data Analysts must have exceptional interpersonal skills, in addition to technical

### Essential skills

To understand the problem, and measure the outcome is crucial. While building predictive models, it is important to declare the level of accuracy of the model. Data from medical records, and patient history could be analysed to predict and quantify the risk of a particular disease. The consequences of incorrect predictions need to be quantified for effective decisions. Programming skills in Python, R, or Matlab are essential. The ability to do data visualisation using matplotlib, seaborn, PowerBI or Tableau is important.

skills like programming, data management, data analysis, and data visualisation tools. Expertise in story building, statistical analysis, data visualisation, machine learning, and a thorough understanding of cloud platforms, is expected. Data Analysts may choose to specialise in a particular domain like business, finance, or healthcare.

### Make a strong CV

Students must hone all the required technical skills. However, the technical tools and programming languages used for the project do not matter. Data Analytics is all about analytical thinking, finding patterns in data and how to use it in decision making. Students can acquire this skill by dabbling in projects and in-

### Data intuition is the most important skill that a data analyst must have to excel

ternships. The focus should be on putting the theory learnt into action. Students can dabble in the numerous datasets hosted online on websites like Kaggle. As freshers, students should pay attention to data pre-processing tasks like dealing with missing or noisy data and encoding and integrating data. Students can participate in playground training competitions that are beginner-friendly. Usually, the objective of the challenge is defined, and the student can work on finding the solution. They can learn from the online notebooks of experts who build industry-grade data analysis solutions. From there on the student could work on datasets wherein they can identify the problem statement, and objectives. The student can dabble in story building using data summaries, and visuals. They can also learn to make recommender systems or prediction models. The student can share their data analytics portfolio online to showcase their abilities.

*(The author is programme coordinator, B.Tech Data Science & Engineering, Department of Data Science and Computer Application, Manipal Institute of Technology, Manipal Academy of Higher Education)*



# AI can help India become global power: Prof Garg



Three-day workshop on AI and deep learning in progress at MITS | EXPRESS

EXPRESS NEWS SERVICE @ Tirupati

**DIRECTOR** of Leadingindia.ai Prof Deepak Garg has said that the power of Artificial Intelligence (AI) is more decisive than nuclear power for the nations in future, in terms of being a global power.

Leadingindia.ai is a nationwide initiative on 'AI and deep learning skilling and research', approved by Royal Academy of Engineering, UK under Newton Bhabha Fund and collaborated by University College, London, Brunel University, London and Bennett University, India.

He was speaking at the three-day workshop on AI and deep

learning at Madanapalle Institute of Technology and Science (MITS), the institutional collaborators in Andhra Pradesh, on Tuesday, Deepak Garg shared his views and explained AI's signifi-

**India is progressing in AI, but in comparison to the US, China and Canada, investments are low. After learning AI's importance, AICTE has recently introduced it in its curriculum. But there is a need for quality teachers**

Prof Deepak Garg,  
Director of Leadingindia.ai

cance and what needed to be done for India to emerge as a global power and compete with world nations.

India is progressing in AI, but in comparison to the US, China and Canada, investments are low. More investments by government and private sectors, upgraded efforts needed to take place in India in comity of nations powered by AI. Developed nations already started integrated AI into their defence projects and we just started thinking about it, he said.

Speedy efforts to match up with those challenges, to imbibe AI skills and research in youngsters are the need of the hour, he added.



# As Facebook bets \$10bn on building a virtual 'metaverse'...

By Danielle Levy

THIRTY years ago, Neal Stephenson's novel *Snow Crash* portrayed the idea of humans escaping from a dystopian nightmare by immersing themselves in a virtual world. At the time it felt like a vision of the world that belonged in science fiction, along with *The Matrix*, the cult movie which showcased on a similar theme of virtual reality.

But today the idea that humans can exist and thrive in an alternative virtual world is starting to feel closer to reality. Technology giant Facebook believes so strongly in the concept that it is planning to spend \$10 billion this year developing its own metaverse, a virtual world where people can work, play and live. Facebook has even changed the way it reports its earnings to reflect an aspirational image on the idea of fully immersing yourself in an alternative reality. It has been made possible by the development of virtual reality (VR) headsets in the gaming, education and transportation sectors. VR equipment will also play a role in the metaverse, AR displays, VR to a real setting.

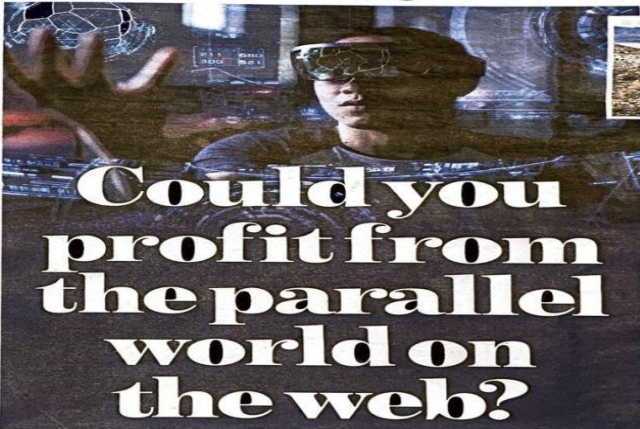
**TIME TO BUILD A WHOLE NEW VIRTUAL IDENTITY**  
The metaverse will enable people to adopt a digital identity via an avatar to play games, see friends, meet new people, attend virtual work meetings, watch events, check out new products, and buy a host of items.

Simon Flower, equity strategist at investment bank Jefferies, says: "A single metaverse could be used to disrupt almost every aspect of human life. It has already been disrupted."

Investment analysts are excited about the potential investment opportunities in the creation of this parallel digital world. They point to progress made in the gaming industry where early users have already been able to earn money — something that hasn't been done before. For example, popular game Roblox has created their own virtual world and social network.

What is particularly striking about these games is the opportunity they have opened up for players to spend money — something that hasn't been done before. For example, popular game Roblox has created their own virtual world and social network.

Virtual worlds have also opened up for digital real estate. Popular with buyers spending millions of dollars in non-fungible tokens (NFTs) — digital assets that can't be copied — and in November a plot of virtual land in the virtual world of Sandbox sold for a record \$4.2 million (£3.2 million), bought by Republic Realm, an investor in virtual real estate.



## Could you profit from the parallel world on the web?

**WHICH COMPANIES WILL DOMINATE NEW WORLD?**

WHILE the development of this virtual world sounds exciting, it is still early days. At this point, there is no way of telling which companies will dominate Facebook has the most resources, but Apple and Google are set to explain what their vision of a metaverse could look like.

Stephen Yu is manager of investment fund that tracks growth. He is convinced that Meta (Facebook) is the most likely to dominate the world of dollars in its metaverse without any guarantee of success. If anything, he says both Apple and Google have a natural advantage over Facebook because they already own the two dominant operating systems for smartphones: Apple iOS

and Android — as well as their respective app stores. These will be key if metaverses. For any metaverse to succeed, virtual reality headsets will need to move into the mainstream, beyond being a niche hobby for gamers.

Investment trust Allianz Technology is not convinced this is going to happen any time soon. He says: "I suspect we are going to see better, more immersive games and less expensive virtual reality headsets, and which company will operate in this space will be the one that everybody is going to move over to this next wave of technology and meet up for virtual reality then."

Ben Rogoff, manager of investment trust Polar Capital Technology, says that of all the well-known technology companies, Apple has the most potential to bring the metaverse to a broader audience, especially if it launches an augmented reality headset. He adds: "As things stand it is not obvious that this is going to happen any time soon."

While it is not clear what an all-encompassing metaverse will look like, we do know that it needs to be built and operated by a single company, listed on the Nasdaq market in the United States, produces content that is commonly used in gaming and dominates its market. Yu adds: "If anything, the pandemic has taught us to crave real experiences and to spend time with people in real life."



**SMART THINKING:** Cucci offers a range of choices for avatars in games. The metaverse is going to come, it will need a lot of Nvidia's cards. It would be a clear winner, however, if it were the metaverse is developed by Facebook, Google or Amazon.

Rogoff also points to the infrastructure needed to support a parallel digital world, particularly servers, memory and semiconductor chips. Potential beneficiaries include Samsung, Micron Technology which produces computer memory and storage, as well as AMD.

**WHY A TECHNOLOGY FUND MAY BE THE ANSWER**

IS it worth having exposure to the metaverse in your investment portfolio? Some experts believe so, including Nathan Spence, deputy chief investment officer at Charles Investment Management. He says: "The metaverse has similarities to the early days of the Internet in terms of investment opportunity, but there will be winners and losers along the way."

Although we are likely to see dedicated metaverse funds popping up, Spence suggests a technology fund may make better sense. For example, investment fund Polar Capital Technology, which includes Apple, Nvidia, Microsoft and Micron, has a portfolio of 100 stocks with a total 0.15 per cent and shares in the fund can be bought on the London Stock Exchange and the New York Stock Exchange.

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## EXPOSED: Huge pay of building world's financial bosses who won't put up rates Financial Mail STARTS ON PAGE 119

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KANNALMOZHI KABLAN

Autism Awareness Month is often full of surprises. From sports events to artistic displays, we find surprises in many expressions of autistic individuals. Surprises because the neurotypical world tends to zero in on what the neurodiverse kind cannot do and so, finds the unexpected in their accomplishments. Hash Hack Code, like many allies, prefer to show the world what people with autism can do and the many things that come to them naturally. The result is a virtual gallery in the metaverse to showcase its students' works in coding, art, music and other talents.

**Artistic codes**  
The metaverse gallery was created to display the different strengths of our autistic students, begins Manu Sekar, Hash Hack Code's CEO and founder. "Mostly, our autistic students who have learnt to code have made these art pieces with coding. Some of them who are good with sketching and drawing have displayed those works. There's some music on display too. The reason we chose the metaverse is because one of the best ways to showcase (diverse) talent is through technology. And this isn't the first time we are doing such a showcase. Last year, three of our students made an accessible COVID-19 data website. So, they are showcasing their skills through technology, proving that they are capable," he explains.

This idea governs the larger purpose of Hash Hack Code, a social enterprise that works with neurodiverse individuals

# NEURODIVERSITY ON DISPLAY IN METVERSE

To challenge the prevailing perception around autism, Hash Hack Code displays the works of its students in a metaverse gallery

be it autistic individuals, people with Down syndrome, ADHD or anyone with different learning abilities — on skill training, especially in tech. "Many of them have good primary and secondary education. When it comes to tertiary education, it is not accessible to most of them. So, they have no opportunity or career they can go for. In this tech age, more than your degree or certificate, your skills are what matter. We want to skill neurodiverse individuals in coding and have them be valued for that," he elaborates. Manu narrates the story of their first student as a living example of this theory: Prem Shankar, a 26-year-old, who started basic coding, learnt web designing and now does accessible websites (like the one for the Covid project).

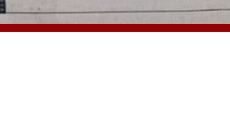
**Success stories aplenty**  
Prem is now working on Shopify and accessible web projects. Saravanan, who also learnt to work on accessible web projects, has moved to Flutter App Development. Pranav now works for a corporate company and does their web design. All of this work with just two years of training and skill building in coding, shares Manu.



putting his data visualisation skills to use. "Most of the time, we think of autism as a linear progression — someone is severely autistic or mildly autistic. But it is more of a spectrum; someone might have great attention skills but poor social skills. He wanted to showcase this phenomenon," shares Manu.

Since it opened up in the metaverse, the exhibition has had a steady stream of visitors. But Hash Hack Code does not stop with just this display. It wants to be able to take this learning to as many neurodiverse individuals as possible. Towards that end, they are preparing a curriculum that schools can adopt for their students. This foundation course is sure to have a larger impact, when it is introduced in September, says Manu.

All this is part of the global effort to go beyond mere awareness this month. "Everybody is aware of what autism is now. Acceptance is what is needed. So, we call it Autism Acceptance Month. We want to show autism in a more positive way," declares Manu, hoping more people will follow through. *Metaverse gallery can be accessed on a laptop or VR headset with this link: <https://bit.ly/HHCAT2022>*



HealthyNation | Tech



Opinion

# How ChatGPT will transform medicine this year

Though still in its initial phase, the platform is already cutting down the time needed to conduct medical scientific research

BY FAUSTINE NGILA

Technologists have long discussed the limits of artificial intelligence (AI), arguing everyday on whether it will ever replace humans, a global discourse that is now cutting across all sectors, including medicine after US-based AI research company OpenAI launched ChatGPT-3, a query messaging service last November. You give it a question and it answers in the most sufficient way it can, better than Google, and even offers five versions of the response.

I used it to search "how to diagnose blood cancer" and it listed five key ways — blood test, bone marrow aspiration and biopsy, lymph node biopsy, imaging test and genetic testing. It ends with a disclaimer that reads "It's important to note that a diagnosis of blood cancer can only be confirmed through examination of a tissue sample. Your doctor may use one or more of the above methods to determine if a biopsy is necessary. Early diagnosis and treatment of blood cancer can improve outcome and survival."

That is just one among billions of medical answers for many health questions stored inside this artificial brain. Its accuracy and contextualised responses mean health practitioners, by assessing the condition of a patient, can use it to deliver better diagnosis and treatment starting this year.

Though still in its initial phase, ChatGPT is already cutting down the time needed to conduct medical scientific research. I agree there are a number of things that need to be improved and further discovered by the platform, but it holds the biggest potential in transforming the global pharmaceutical industry and healthcare industry. Actually, when put to test by researchers last week, the generative AI appeared to pass the US medical licensing exam.

According to chief medical scientist at Microsoft Junaid Bajwa, medical knowledge doubles every 73 days, and with ChatGPT learning everyday about what has been published in medical journals and scientific papers, users of the platform can benefit from more specific, personalised, and result backed healthcare



With ChatGPT, health administrators can now announce an official end to unnecessary scanning of paperwork. PHOTO: FILE

solutions, treatments and consultations.

And with Kenya's tech ecosystem booming, where over 130 health tech startups have sprouted over the last seven years, expect local innovators to use the tool to develop better telemedicine solutions, including medical apps that understand local vernacular languages. That means in future, your grandmother can get a surgical operation done on her by a robot that receives commands from, say Madrid, in Spanish but within milliseconds explains the procedure in Dholuo or Kikuyu so she can hear.

With ChatGPT, health administrators can now announce an official end to unnecessary scanning of paperwork because they can use it to pull out vital patient data from a centralised system, like finding a patient's insurance information before a medical examination.

Hospitals can also use it to maintain a 24-hour customer care service, offering personalised responses to patients' questions with accuracy and relevance. The technology also has a huge promise in improving hospital workflow and creating order in the rather disorderly emergency and ward rooms of countries like Kenya.

This means it can improve efficiency in the pharmaceutical supply chain by automating the process of generating purchase orders, invoices, and delivery notes which can save time and reduce the risk of errors like shipping the wrong medicine.

Many doctors are known to scribble medical notes that have too much jargon. This AI can translate the acronyms that commonly pervade clinical notes to words that are more commonly known to patients.

Its potential could also see the manufacture of new medical equipment this year and the coding of better medicine software to help in the treatment of diseases and health conditions that have been difficult to diagnose and treat such as celiac disease, cancer, fibromyalgia, HIV, multiple sclerosis, Alzheimer's or Huntington's disease. It can generate instructions for a new wearable device, which can help patients with chronic conditions to self-manage their conditions more effectively. This tech can generate protocols for clinical trials of new medical devices, which can help to speed up the development and approval of new treatments.

Doctors can use it in anesthesia to de-

velop clinical decision support systems, deliver pre-operative education, and assist with the management of post-operative pain.

Using the voluminous medical data on ChatGPT, researchers can discover new drugs, providing a paradigm shift towards drugs that arrest diseases faster and with less side effects.

They are already leveraging deep learning and biomedical machine reading via natural language processing (NLP) models, with the target of achieving advanced self-supervised learning this year, like conducting task-agnostic biomedical language model pre-training and proposing a general framework for task-specific supervision.

OpenAI has announced it will launch ChatGPT-4 by the end of this year which will be supported by 100 trillion parameters, so expect all glitches in ChatGPT-3 to be resolved as the technology moves to artificial general intelligence (AGI) where machines become more intelligent than humans.

The writer is the Africa tech correspondent at Quartz. [fnigila@qz.com](mailto:fnigila@qz.com)

Monday, February 6, 2023

# Chatbot technology and its implications for HR

opinion 19

The dramatic rise in global prominence of artificial chatbot technologies (and primarily that of 'ChatGPT') over the past three months has significant implications for the field of human resources.

Originating in the early 1990s, artificial chatbot technologies now have the potential to revolutionise the way human resource (HR) departments operate. These technologies use natural language processing and machine learning to simulate human-like conversations with employees, candidates, and other stakeholders. This can improve the efficiency and effectiveness of HR processes, as well as the employee experience.

One of the most significant implications of chatbot technology for HR is the automation of repetitive and time-consuming tasks. For example, chatbots can be used to answer frequently asked questions from employees and candidates, such as information about benefits and company policies. This can free up the time of HR staff to focus on more strategic and value-added activities, such as talent management and employee development. Additionally, chatbots can be used to automate onboarding processes, by providing new hires with information about the company and their role, and guiding them through documentation and compliance requirements.

Another important benefit of chatbot technology for HR is improved employee engagement and self-service. By using chatbots, employees can access information and services at any time and from any location,



Johnathan Cumberbatch, HRMATT member

without having to wait for assistance from an HR representative. This can increase employee satisfaction and retention, as well as reduce absenteeism and turnover. Moreover, chatbots can also help to provide a consistent experience to every employee by answering their queries in the same way, reducing biases and improving on the perceived fairness.

Chatbot technology can also help to improve the candidate's experience and increase the efficiency of recruiting processes. By using chatbots to screen and pre-qualify candidates, HR teams can save time and reduce the administrative burden of the hiring process. Additionally, chatbots can provide candidates with quick and easy access to information about the company and the job, improving their understanding of the role and increasing their likelihood of accepting an offer.

Also, chatbots can also help improve compliance and reduce risks in HR processes. For example, chatbots can be used to quickly provide employees with information about their rights and responsibilities under labour laws, helping to ensure compliance with legal requirements. Additionally, chatbots can be used to provide employees with confiden-

employee and candidate data, it is important to ensure that this data is protected from unauthorised access and breaches. Another potential challenge is the risk of job loss as a result of automating repetitive and time-consuming tasks. This can lead to resistance from employees and their representatives and could create a negative impact on employee morale and engagement. Furthermore, when the HR staff are not well-trained in the use of chatbot technology, it may result in a lack of trust from employees and candidates, and cause hesitation to adopt the technology.

In conclusion, chatbot technology has the potential to revolutionise the way HR departments operate by automating repetitive and time-consuming tasks, improving employee engagement and self-service, and increasing the efficiency of recruiting processes. However, it is important to manage the potential challenges and risks

associated with it to ensure the implementation is successful.

The human resource function remains the main support of organisational culture, ethics and employee satisfaction, and as with previous technological innovations, chatbot technology should be seen as a supplement and not as a replacement.

The Human Resource Management Association of Trinidad & Tobago (HRMATT) is the leading voice of the Human Resource Profession locally. HRMATT Says is a column meant to address issues and concerns of professionals and the general public focused on Human Capital Development. Today's article is written by HRMATT member and volunteer on the PR Committee, Johnathan Cumberbatch. Learn more about HRMATT by visiting all our website: [www.hrmattdt.com](http://www.hrmattdt.com) Follow us on Facebook, LinkedIn, Instagram and Twitter. Contact us at: 687-5523 or via email: [hrmattdt@hrmattdt.com](mailto:hrmattdt@hrmattdt.com)

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**Build cyber warriors**

Educational institutions need to cultivate a cybersecurity mindset in students, both in schools and colleges

any of us are digital natives, and our children are innately digital. They may not be born with a device in hand, but find themselves in front of a screen from an early age. The preliminary stage of education is steered through technology, where children learn their ABCs and calculus by utilising devices and apps in school. Moreover, the epidemic has shown us how quickly we can adapt and thrive in a digital-first world. But the question is: is this safe? If it isn't, how do we make it safe?

To answer the first question, no, it isn't safe. Children are smart, inquisitive, and just as keen to explore the digital world as the physical one. But the digital world has fewer safeguards. In the physical world, we do not need to worry that an adult on another continent can pretend to be a child and talk to our children. But this is a well-founded worry in the digital space.

Dangers of cyberspace Digital addiction and online bullying can have adverse and even life-threatening impacts on children. If this is the world our children are growing up in, what will it be like when they become adults?

and efforts are already underway to educate children on the dangers of cyberspace. These are like any other subject that is taught in school. And with similar results: children are bored and incentivised to focus on marks rather than applying the knowledge. Also, whatever they learn is theoretical and far removed from reality. This may not be a big problem with other subjects but not so with cybersecurity. Children need to be cyber secure every day of their childhood and need to practise cyber hygiene as soon as they can use a computer or phone without adult assistance. We need something better than the modern equivalent of a chalk-and-talk lecture to help them acquire these skills.

Two-stage solution The solution requires a two-stage approach: Stage One is the formation of an advisory council of cybersecurity and education experts, as well as professionals from other disciplines, who will act as an apex body that frames appropriate school cybersecurity policies for real-world impact; establish what cybersecurity measures should be taught and how they should be taught; provide advice on cybersecurity technology and proactive updates on threat trends, and facilitate the creation of counselling/grievance redressal processes that will give children a reliable and comforting authority

they can turn to when they encounter online bullying or have other concerns regarding online behaviour that they cannot discuss with the other adults they know.

Stage Two involves the creation and delivery of cybersecurity awareness programmes that will cater to young minds based on guidance from the advisory council. The textbook-homework-exam model should be strictly avoided in favour of engaging content, interactive presentations, and gamification of lessons. Cybersecurity should be glamorised the way movies glamorise superheroes saving the world from destruction; it should be presented as something noble and valiant and not a chore that ruins the fun of having a computing device.

It may be possible for a well-resourced school to implement these stages by itself but, realistically, this will require government, academia, and industry to come together to secure the next generation. The effort will be justified as the outcome will be more than just safer children. A study by (ISC)2 reveals a worldwide shortage of 3.4 million cybersecurity professionals. Cultivating a cybersecurity mindset in children will help them access lucrative cybersecurity careers and the nation benefits from a highly skilled workforce.

The writer is founder and President of RT Consulting

**COMPUTERS / HIGH-TECH**

# Introducing the well-trained computer

Now that we've all learned everything there is to know about our everyday, ordinary computers, the horizon that promises to begin the learning process anew. It's called neurocomputing.

A neurocomputer differs from the one sitting on your desk in a very important way: It is trained rather than programmed. According to the experts, it eventually will be much faster and less expensive to train the machine than to program it.

The operations of today's computers are based on algorithms, which are detailed series of steps the machine must follow to solve a problem or process information. Once programmed, the computer can only repeat the same process over and over again.

Tomorrow's neurocomputers will be based on "adaptive" technology, in which the machine will develop its own algorithms based on the information fed into it. It will analyze, manipulate and present information in a variety of ways and configurations not predetermined by the computer operator.

This description and the name itself conjures up visions of a pulsing, biological mass encased in a metal cabinet, performing brainy stunts to prove its superiority over its human operator.

Not so, says Dr. Robert Hecht-Nielsen, co-founder of HNC Inc., a 4-year-old, San Diego company that already is designing and building neurocomputers for a number of Fortune 500 companies.

"There's nothing biological or magical about neurocomputing — it's just mathematics," he says.

The term "neurocomputing" comes from the fact that many of the key innovations in this new field originally were developed by researchers as computer models used to simulate the workings of the human brain. Although none of these models has yet been shown to accurately duplicate

**WALTER SCHUCH**  
Special for The Republic

spread to the medical, transportation, telecommunications, retail, robotics and manufacturing fields, Hecht-Nielsen said.

Although the idea of neurocomputing dates from the 1940s, when scientists first predicted brainlike computers, the technology began a rapid growth in the mid-1980s as much more powerful computer hardware became widely available, Hecht-Nielsen said.

"Today, three-fourths of the Fortune 500 companies have neurocomputing-application investigations under way, and virtually every major university (including Arizona State) in the world is offering courses in neurocomputing," he said.

Hecht-Nielsen, who received bachelor's and doctorate degrees in mathematics from ASU, has been involved in neurocomputing for 15 years. Before founding his own company, he set up and managed neurocomputing research-and-development programs at Motorola Inc. and TRW Inc. He also is the author of the definitive textbook on the subject, *Neurocomputing*.

Hecht-Nielsen was in Phoenix this past week to hold a seminar on neurocomputing for a group of local high-tech industry leaders assembled by Dr. Lex Alera, director of ASU's Center for Solid State Research.

Alera is seeking industry and government funding for additional faculty positions in neurocomputing and for setting up a "Center for Adaptive Systems Science and Engineering."

**Tour by computer**

In July, Flagstaff will become the first municipality in the state to offer tourists the opportunity to learn what there is to see and do around town by consulting a computer.

The city has contracted with a Flagstaff software company, *Recreative Ink*, to produce interactive computer terminals that will be placed in kiosks in several strategic locations. Visitors will be able to access color photos, descriptions, directions and maps to such places of interest as the Grand Canyon, the Navajo and Hopi reservations, Oak Creek Canyon and other nearby attractions.

*Recreative Ink* President Ed Locke said the company is developing similar systems for possible use by the nine national forests in Arizona and New Mexico.

**Avanti survives fire**

Avanti Circuits Inc., a Phoenix printed-circuit-board company that promises its customers delivery of custom products within 24 hours of ordering, had to perform a quick turnaround for itself recently.

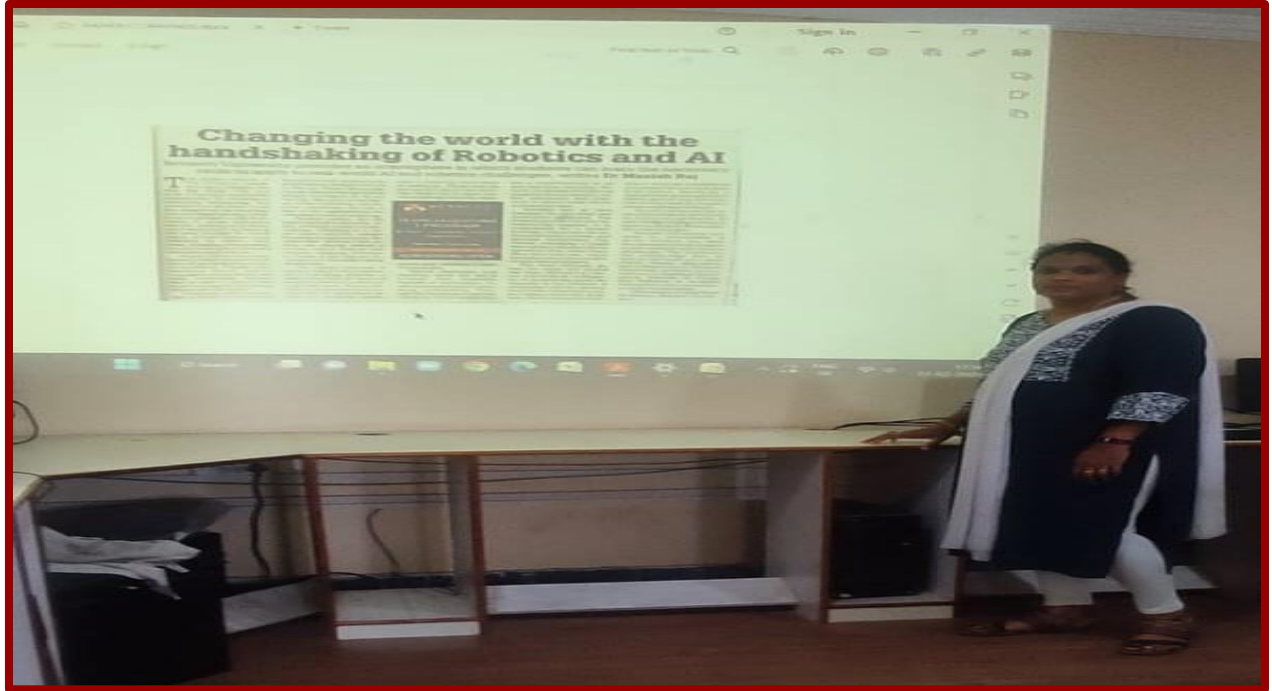
On a Sunday evening, May 6, a fire broke out in the company's nickel-gold plating line, causing extensive damage. By Monday evening, the company was back in business in all areas except for the plating line. By Thursday, the plating room was completely rebuilt and re-equipped.

"We had great cooperation from our suppliers, including Great Western Chemical and Circuit Supplies, and tremendous support from our managers and supervisors," said Bill Makase, president of the company.

A preliminary report blamed the fire on a faulty backup heater controller.

Avanti began as a family operation in 1982 with 3,000 square feet of production space. The company now occupies 14,500 square feet at 176-50 N. 23rd Ave. and has 70 employees and annual sales of about \$3.5 million.

Walter J. Schuch is editor of the semi-monthly *Southwest Technology Report* newsletter and the annual *Arizona High-Tech Directory*. He can be contacted at 946-7-9444 in Tempe.



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# Engineering rank list out today

## High Demand For IT, AI; Colleges Cut Civil, Mechanical Seats

TIMES NEWS NETWORK

**Chennai:** The Tamil Nadu Engineering Admissions (TNEA) committee will release the rank list for 1.87 lakh engineering aspirants on Monday.

Around 1.5 lakh seats are likely to be available in 440 engineering colleges this year, and the number of aspirants is 18,610 more as compared to the previous year. TNEA will release the number of eligible applicants along with the rank list.

Though the competition is expected to be slightly tougher with more applicants this year, experts predict that toppers may opt for other streams such as electronics and communication engineering (ECE) besides IT and computer science



**Around 1.5 lakh seats are likely to be available in 440 engineering colleges this year, and the number of aspirants is 18,610 more as compared to last year**

engineering (CSE) courses this year.

Anticipating more demand for IT courses, engineering colleges have increased more than 8,000 seats in AI, data science and computer science courses. On the flip side, more than 2,000 seats have been cut in branches such as civil and mechanical engineering.

Career consultants expect that the increase in intake by engineering colleges may bring down the cut-off for CSE

and other courses.

"Due to the slowdown in recruitment by IT companies, we can expect more students opting for ECE this year. The new BTech Electronics (VLSI design and technology) will be in demand this year," career consultant Jayaprakash Gandhi said.

Anna University has decided to give conditional extension of affiliation to 96 colleges with poor facilities and infrastructure. They got less than 50 out of 100 in six parameters in-

cluding qualified principal, faculty, library, classrooms, labs and admissions.

"The AICTE is yet to give approval for around 90 engineering colleges. After getting the approval only we know the total seats available for the counselling," an official from Anna University said.

As many as 486 colleges including engineering colleges, standalone MBA and architecture colleges have sought affiliation for the 2023-24 academic year. The university had exempted 27 top engineering colleges from physical inspection which fulfilled two criteria - coming within the top 200 NIRF rankings or 60% of their UG departments accredited by NBA and average enrolment should be above 80% in the past four years.



pany that is based out of tion R&D at IIT-Madras, d Mele SPM in 2017, the vehicle for smaller, also using 3D printing to inby cutting down on d successfully completed xy's 3D-printed rocket ce Darter in ivanathapuram. rding to the company, et is the world's first s. It is designed to carry rned small satellite pment) and payloads of bit. The company also nched, designed and rhots.

## Watch out for these deeptech STARTUPS IN 2023

With a new year fast approaching, we thought it would be a good time to showcase a few deeptech startups based out of India that have made waves during the last year. Experts at Nasscom and Deloitte (the latter through their annual technology fast 50 ranking list) were kind enough to help us whittle down the plethora of startups in India to these handful. This list is in no way exhaustive or definitive, but should give you a starting point to gauge the deeptech startup landscape in India in the coming year.

### BRIDGE THE SKILL GAP FOR MORE INNOVATION

**RAMKOMAR NARAYANAN** | Chairman, Institute of Product Research, and ex-technology & ops, VMware India

India is a growing hub of innovative deep-tech startups with tremendous opportunities to develop world-class products and solutions, not just for India, but for the world. As India sees a surge in product-based companies built on deep tech foundations, there is an acute skill shortage in areas such as product management, design, analytics, product marketing, and product sales along with cross-domain skills in line with the need for a deep tech ecosystem. These are the skill sets that we need to focus on and develop on an urgent basis. In 2023, I hope organisations will invest in training their employees on emerging technologies and build industry-academia partnerships to help bridge the skill gap.



**S**ecurelyShare was founded by Prakash Baskaran in 2017, as his sixth start-up, with a vision to be the global norm for communicating sensitive data in a secure, trusted and intelligent manner. His previous company Pawaa Software was acquired by Cisco in 2015. Baskaran later discovered the potential white spaces in secure exchange of sensitive data. And so, with an objective to

protect sensitive data from rampant data breaches without hampering user experience and productivity, Baskaran

#### SecurelyShare

started SecurelyShare with a team of seasoned technical professionals. The company says it is an R&D-based, innovation driven company with a focus on


providing unique tools and technologies for varied data security and privacy needs. Their technology is backed by seven US-granted patents and provides security, privacy, and confidentiality in storing and communicating an organisation's structured and unstructured datasets internally or externally.

**Founder: PRAKASH BASKARAN**  
**HQ: Bengaluru**

# In AI's unlimited potential, the benefits and the risks

When Artificial Intelligence radically transforms workplaces and institutions, how can productivity be evaluated and excellence of individuals and institutions be measured?

T. Pradeep

 On July 28, 2022, Google's DeepMind released the structure of 200 million proteins, literally everything that exists. This is said to be the most important achievement of AI ever, namely a 'solution' to the protein-folding problem.

Proteins are composed of a linear chain of amino acids and their 3D structures determine their functions. Structure determination is laborious. One way to know the optimal folded structure of the protein computationally is to sample all its possible configurations, composed of specific angles between peptide bonds.

However, this is an impossible task as a typical protein may have about 10,000 configurations and even if a million of them were examined per second, the overall time needed will be unimaginable. That helped save about 1,000 million man-years.

DeepMind's AlphaFold made an important breakthrough in 2020. It accurately predicted the structures of about 100 proteins to atomic resolution, and no other solution came close to this feat. Many believe that the protein-folding problem is over.

Besides publishing the work in *Nature*, DeepMind also decided to place the research outcomes – source code, structures of unknown proteins – easily accessible so more discoveries can happen. Already, this has assisted the Drugs for Neglected Diseases Initiative (DNDD) in addressing deadly Chagas disease

## A game changer

While AI will help in democratising knowledge, cutting-edge science and applications are unlikely to develop in resource-limited settings

- The protein-folding problem may be over with the achievement of DeepMind's AlphaFold in accurately predicting the structures of proteins
- Drug discovery, especially for rare diseases, has become faster due to AlphaFold
- In 2020, a robotic synthesiser read a research paper and made the compound described in it
- UNEP's World Environment Situation Room (WESR) used AI to analyse real-time sensor data from sensors in over 140 countries to predict glacier mass, sea level rise etc
- AI-modified figures and images can become a nightmare for journals publishers who are already struggling with image manipulation, duplication
- On the downside, AI can dramatically widen the gap between the haves and have-nots, and the proliferation of AI could further accentuate inequality



**Humongous:** On July 28, 2022, Google's DeepMind released the structure of 200 million proteins

and Leishmaniasis.

Since drug discovery has become faster due to AlphaFold, new drugs for rare diseases, which are of little commercial interest to pharma companies, have become possible.

### Other benefits

In 2020, a robotic synthesiser read a research paper and made the compound described in it. With giant advances in computational science and 3D protein structures, discovery labs will shrink to 'AI synthesizers'.

Thousands of molecules or processes may be screened for specific functions rapidly. Robots will characterise them to 'discover' an optimised strategy, directed by non-human 'agents'. This could change chemistry.

The UNEP's World Environment Situation Room (WESR) collects and analyses, using AI, real-time sensor data from thousands of sensors spread ov-

er 140 countries to predict carbon dioxide concentration, glacier mass, sea level rise, biodiversity loss, etc.

Ultimately, we understand the health of the planet from a holistic perspective.

Large Language Models that built the likes of ChatGPT can create excellent text, music, and art. But they are not yet good at writing complicated chemical equations or new mathematical formulae to explain phenomena. When AI will eventually get there, when creativity is not exclusive to humans, the age of machines will appear.

### New risks

For the scientific enterprise, in the era of 'discoveries' by 'agents' made of silicon, authorship may become meaningless. Those owning 'agents' may own knowledge.

Scientists warn that AI products must be used with caution. Tools such as

ChatGPT can assist in literature search but cannot provide deep analysis and may miss profound insights central to articles.

Intrinsic biases of scientific enterprise can underrepresent minority views and could lose original thoughts, due to poor citations. Some journals have suggested authors to declare the use of AI tools in publications and have discouraged ChatGPT from being an author, with exceptions.

As compiling information and presenting them coherently by AI is easy, new paper factories may proliferate. Thankfully, such text can be identified by a new tool. AI-modified figures and images can produce a conundrum of 'data', making a nightmare for publishers.

However, AI can be an excellent aid in helping authors in better visualisation, effective communication and compiling known facts, if used judiciously.

AI helps in the democratisation of knowledge. But 'knowledge-to-things' transformation will need infrastructure and resources. Advanced medicine and cutting-edge science are unlikely to develop in resource-limited settings. This is known historically, but there is a significant difference now.

### The AI-Chasm

Infrastructure enabling advanced science is increasingly sophisticated and the gap between the haves and have-nots is widening dramatically. Clearly, proliferation of AI could concentrate wealth, breeding inequality.

The 'AI being' can write music, poems, and manuscripts faster, and possibly, even better. This could create polymath 'beings'. It could radically transform workplaces and institutions. How would one evaluate productivity in the AI era? What could be the measure of excellence for individuals and institutions? The AI-divide will be far deeper than the digital-divide.

### Act quickly

Governments at all levels must urgently assess the impact of AI on societies. They must form advisory groups and come up with AI and data-governance policy guidelines to direct institutions, industry, and society. Similar efforts must happen in each institution. An interdisciplinary environment is needed for responsible AI development. Surely, early movers will have a greater advantage.

(T. Pradeep is an Institute Professor at IIT Madras. pradeep@itm.ac.in)

# BUSINESS TALKZ

Software development is all about addressing unique needs of businesses by providing a range of ground breaking tech solutions.

## Blugate Software Technologies Pvt. Ltd.

Blugate Software Technologies Pvt. Ltd. is a distinguished system integrator and software development organization, established in 2010 and headquartered in Bengaluru, India. Their core expertise lies in delivering exceptional software solutions, providing consulting services, and offering comprehensive design and development capabilities across diverse industries and segments. With an unwavering commitment to excellence, the primary areas of focus encompass turning ideas into tangible products and undertaking platform development endeavours. They indulge in architecting, designing, developing, and delivering solutions that enable clients to be more efficient and productive. Over the past decade of operations, the team has serviced various organizations across healthcare, banking, clinical research, and smart cities. A process-oriented approach, vast technology skills, and experience have enabled them to provide innovative solutions to clients with quick implementation cycles.

The technical prowess includes native and hybrid mobile app development and responsive web



**Manjunath Basrur**

app development using Java Spring Boot, Python, Angular, and other Rapid Application Development frameworks. Blugate stands out with its processes, tools, and result-oriented operations that deliver true business value to its clients. This company is committed to providing the highest degree of quality in services, products, and solutions. The goal is to raise the level of commitment and loyalty of employees, thereby creating excellent products and services, that can help gain trust from customers. This is fiercely protected by Blugate among its staff, clients, and suppliers.

They excel in executing projects with agility and exert a profound influence on their clients, encouraging them to embrace Agile methodologies for their internal processes. The company adeptly tackles prevailing concerns, extends comprehensive services, and facilitates a seamless transition to Agile workflows.

Manjunath Basrur, the Founder, Managing Director and CEO of Blugate Software Technologies Pvt. Ltd., is an accomplished IT professional with rich industry experience, specializing in software application development for enterprise and business domains. With a unique ability to bridge the gap between business and technology and provide elegant technical solutions that address diverse organizational needs. His superior skills in people and project management, leadership, communication, and presentation set high standards of excellence. He is skilled in building, retaining, and motivating highly talented IT professionals and aims to build dynamic, world-class software products and services for enterprise businesses.

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PABLO PICASSO

# Hindustan Times

## Workshop on low-cost teaching aids conducted

**MUMBAI:** Mahatma Education Society's Pillai College of Education and Research, Chembur, organised an insightful workshop for student teachers in collaboration with the Vigyan Setu Foundation. The workshop focused on educating budding teachers on how to use low-cost teaching aids to teach science concepts effectively and making science education more engaging.

The chairman and CEO of Mahatma Education Society, Dr K M Vasudevan Pillai, felicitated the resource persons and highlighted the crucial role of quality science education in shaping the future of the nation. The principal of Pillai College of Education and Research, Chembur, Dr Renu Francis, played a pivotal role in organising the highly commendable workshop.

Dr Misema Sharma, retired head of physics department, K J Somaiya College of Science and Commerce, Vidya Vihar, and Dr Lali Sharma, managing trustee of Vigyan Setu Foundation, conducted the workshop. The resource persons demonstrated to the participants how low-cost teaching aids can be used to teach physics concepts related to mechan-



The workshop focused on educating teachers on low-cost teaching aids. PHOTO BY ANITA

ics, optics, and sound. The participants were introduced to various concepts such as Newton's laws of motion, atmospheric pressure, surface tension, centre of gravity, Bernoulli's effect, and many more, using simple and cost-effective means.

The participants were encouraged to create their teaching aids themselves using the materials provided by the Vigyan Setu Foundation. Through hands-on activities, the participants learned how to create simple and

effective teaching aids that could be used in their classrooms to teach science concepts. The session was filled with fun activities such as making a self-made helicopter with just paper and scissors and flying it, understanding concepts using cups and coins, balloons, matchbox, and coins.

They appreciated the efforts and left the workshop with newfound knowledge and inspiration to make science education more enjoyable for their students.

BY KILUM PRIVANTHA



Today we all live in an environment where with a network economy and borderless markets, people are digitally connected and all stakeholders are no longer so much separated. In such an environment, organisations need to grab dynamic customer requirements. On the other hand, we all are digitally connected and our actions are visible to everyone in a few seconds.

### Role of Pricing and Sales Person

Marketing mix variables are key in marketing plan in any organisation and price is obviously a major element in the marketing mix which brings revenue to the company. Sales are always working with the price of the product or service. The price does not or cannot be decided in isolation. One should not be too flexible and one should think many times before discounting. If not, it could be a wrong product or service with the wrong pricing strategy. If it is not intended to discount frequently, if there are some elements it could require due to competition, however, if only a few players, there are many aspects to think about before discounting. Especially in the service industry there is significant and multiplicative cost which has to be covered with pricing. On the other hand, sales team should be the bridge between the company and the customer and one of the main elements that connect the customer and the company. In certain instances, the sales team could be a brand ambassador, communication, single point of contact, adviser and consultant etc. As such, if they do not prepare a complete approach to meet the customer to identify the features and benefits of the service offers, identify correct customer needs, and pitch the right product to the right customer, a company may not reach the required growth. If there are no sales in the customer base, it may

# SELLING WITH ENTREPRENEURIAL MINDSET

is each expected monthly quantities but not the net growth which is much essential.

### Brand and ROI

Any brand in the world develops its brand value over time, and there is a margin to the price to brand value. Each employee of the company should be aware of this and the sales team needs to justify it at every instance. On the other hand, one of the main components within the price is the cost portion. Cost margins and profit are not the same. Price or even low levels even for any business, selling a large number of products at a low cost or free may not bring the required value for the company if the entrepreneur does not have a better idea of what to do and what the value of it, how it creates as a profitable product or service, the segment it reaches, customer loyalty, brand, service, high or low, can't we get discount or free? going back to the other side, transparency of volume will also be part of the product or service. However, it is not the case if we know the value and scope behind the offer. Companies are capitalising on increasing the brand over the years and it connects with many factors such as promises, experiences, quality, reliability and consistency, etc. On the other hand, especially in the service industry, services are delivered on an instant order and pricing would be probably done with an expectation of customer retention and cost would cover the minimum period for the sales and profits (extra beyond the minimum period to stay). However, if in any instance customer retention is not clearly acquired customers after the minimum expected period or even within the minimum expected period, what would happen next? For something, some data amount on them without an expected return. Therefore, identifying the

right customer at the right time and building on long-term relationships is very much important in the service industry.

### Customer today

Startups are now think we can sell more if we offer free of charge. However, the most important part here to realise is whether we are adding free of charge to the right customer? Do they really need our product or service? Will they come back as far as long term? Customers today are very knowledgeable and they are easy sources of information before they take any buying decision. However, on the other hand, if we are very weak in these channels of information where customers obtain information, it could have a fast impact. Thinking beyond traditional time and brand, there is very important. When the customer changes start the fun of searching information and whether company has grabbed the opportunity to build their information base by the customer may not be the best. The challenge, if only company A provides such information and if many people and only one of company A, probably company B may lose the opportunity. Probably customers may not even start to check whether company B also offers similar or better solutions or services if company B was looking to making those customers aware of its services, capabilities etc. Therefore, what is much needed is to "listen, learn, and deliver" about new product or services to the customer, as much as possible.

We are in changing environment. Markets are dynamics. Technologies are rapidly changing. In such an environment, being a popular brand may not be enough if you are not creating public awareness of what the brand consists of, what the new brand values are, how it differentiated



Both competitors, how it fulfills emerging customer needs, how resources are to grab the attention of more customers, to engage and retain existing customers, etc. Therefore, just using engagement is not sufficient. When the customer connects with the brand it would bring more value to the company.

### Entrepreneurship

An entrepreneur is looking at many angles before making any decision. They would see future of long-term impacts rather than short-term benefits. To be a successful entrepreneur, returns on investment is very important. They would analyse and see which investment is more effective and which is not. It cannot be decided in isolation. It is decided only by analysing a number of factors including price and costs. If there is looking at it from one angle, sometimes for or the may be selling. But the decision by an entrepreneur is not correct. That would be the differentiating factor for an entrepreneur.

To identify whether what we have done is correct or not, whether we have implemented our strategies or tools on the right way or not, how we are followed what we expected or not, and whether or not, there were any other strategies or tools that we should

An entrepreneur is looking at many angles before making any decision. They would see future of long-term impacts rather than short-term benefits. To be a successful entrepreneur, returns on investment is very important.

have applied to achieve better results. What we have done, why we were there and why we have not done and why we have not done certain things? And, if we have not done what we haven't, what could be the result? Therefore, sales is a game that is not easy. People who do sales have to think consistently. That could be the main reason why salespeople need to have an entrepreneurial mindset. As a result, they will be able to close profitable deals or reduce all the processes. Doing sales sales may be better for an organisation than a number of non-profitable sales. Sales are required to bring revenue to the company and could flow to other important. Therefore, for business, profitability and operational sales team with an entrepreneurial mindset is vital.

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# Gaming hardware: Pushing the boundaries of possibility in 2023

From powerful desktops to sleek laptops, explore the cutting-edge innovations reshaping the gaming experience



PHOTO: ISTOCK

**Pooja Mahimkar**  
@timesgroup.com

**W**hether you seek to conquer virtual realms, engage in intense battles, or embark on awe-inspir-

ing adventures, owning the right gadget with the right specs is crucial. With advancements in technology, gaming hardware continues to evolve, pushing the limits of what is possible. From

Gaming computers have long been the go-to choice for avid gamers seeking top-tier performance and unrivalled graphics. The latest gaming rigs have raised the bar even higher, boasting cutting-edge hardware and revolutionary features. At the heart of these powerhouses, we find high-octane processors, providing blistering speeds and seamless multitasking capabilities. Additionally, graphics cards deliver breathtaking visuals, utilising real-time ray tracing, and high-resolution capabilities. Furthermore, these computers often incorporate liquid cooling systems, enabling optimal thermal management during intense gaming sessions. The

**In the current gaming landscape, gamers have high expectations from their gaming devices. They seek a balance between factors like width, weight, power, and portability. As per latest insights, modern gamers require more than just a device solely dedicated to gaming.**

combination of these technologies ensures an immersive and lag-free experience, redefining the boundaries of gaming performance. The best part about computers is the fact that you can customise them the way you want.

Coming to laptops, as gaming becomes increasingly mobile, gaming laptops have emerged as the preferred choice for gamers on the go. The focus now is on launching sleek and portable gaming laptops that packs a punch. The aim is to offer a desk-

top-like performance, albeit in a compact form. High-refresh-rate displays, up to 4K OLED are in focus to provide stunning visuals, along with a precision-engineered keyboard and impressive battery life. While on a desktop one has the option of installing additional cooling fans, the laptop lacks to offer such an option. Thus, ensuring that the laptop has a robust cooling system is key. To complement the enhanced hardware, gaming laptops often come with high refresh rate displays and narrow bezels, providing an immersive visual experience. Furthermore, advancements in battery technology have extended gaming sessions, ensuring uninterrupted gameplay.

"Gamers seek a balance between factors like slimness, lightness, power, and portability. As per our insights, modern gamers require more than just a device solely dedicated to gaming. They seek a solution that caters to their diverse needs, which include content creation, everyday tasks, and social connectivity," shares Vickram Bedi, senior director (personal systems) of a leading global tech company known for their computers.

"Editing videos and photographs, streaming videos, rendering animation and videos, and providing the extra horsepower needed to complete intensive tasks quickly are key in today's world," says Pujan Chadha, director - product marketing, consumer and small business of a leading global tech brand.

"Fast refresh rate, appropriate brightness, response time, colour calibration, cooling systems are vital when selecting the right laptop," shares Arnold Su, vice president, consumer and gaming PC, system business group of a leading tech company, which also has a sub-brand dedicated to creating gaming hardware and software.

# INDAIA: How To Lead The Coming Tech Revolution

Startups, techies, industry acceptance, government backing: the elements are all there. India, which just hosted a global AI meet, will simply have to build on them

**Amitabh Kant**



The India-hosted Global Partnership on AI concluded yesterday. Here is a heart-warming story on this new tech. Deep in the densely forested heartlands of India, at the border of Maharashtra and Telangana, an innovative Indian startup is weaving a tale of transformation. UdyogYantra, a New Delhi based venture is quietly revolutionising nutrition in Etapalli, a remote block in Gadchiroli district.

**Food for thought** | A pilot project started in one school in the block has an AI-enabled machine built by the startup. It takes photographs of young children with their plate of mid-day meals. Without any human intervention, the machine assesses the quality of the food in line with the specific nutritional requirements of the child. This has helped the district administration identify not only malnourished children but also critical nutrients lacking from meals, as well as quantity and quality issues.

**Grassroots reach** | This is just one stellar example of how the benefits of cutting-edge AI are reaching grassroots. Through the AI-powered Bhashini application, GOI is helping citizens access digital services in over 121 Indian languages. The PM KISAN scheme now has an AI chat-bot, which will be available in 22 languages and will assist and empower farmers.

**Opportunity, not threat** | The world is gripped by anxiety around AI disrupting the job market as it stands. India, given its success in taking technology to the last mile, can turn this into an opportunity. AI can reshape India's economic landscape. We have the richest demographic dividend and the highest penetration of AI talent in the world. India's workforce must be equipped with the right skills to ride and rise with the AI wave.

**AI-economy** | AI is predicted to contribute nearly a trillion dollars to India's economy by 2035. In the near term, it is poised to inject approximately \$450-500 billion into the nation's GDP by 2025, representing a significant 10% of India's goal of achieving a \$5 trillion GDP.

**New job market** | In a recent survey covering over a thousand Indian employers, an astounding 85% of organisations predict that AI will generate new job opportunities in the next 1-5 years, and enhance the quality of jobs. Additionally, 77% of employers believe AI will boost job security and career development. This sentiment is shared by the workforce, with job seekers expecting AI to increase work efficiency, aid in skill development, enable complex problem-solving, and prioritise employment based on skills over experience.

**Roles of the future** | As India Inc deploys AI, India will need more AI experts. Roles such as data scientists, machine learning engineers, AI researchers, and algorithm developers will become the jewels of the job market. The emergence of 'prompt engineers', a term that was virtually non-existent a few years ago, is a great example of new jobs. These experts, adept at harnessing the potential of Large Language Models, have rapidly ascended to become highly sought-

after professionals in today's job market.

**Boost upskilling and reskilling** | A study by ServiceNow and Pearson forecasts that by 2027, a remarkable 16.2 million workers in India will be reskilling and upskilling to keep pace with technology. The study highlights that this technological wave is anticipated to generate over 4.7 million new technology jobs. It is crucial to recognise that the transformative influence of AI extends far beyond the technology sector, equalising opportunities across various fields like healthcare, education, manufacturing, retail and banking.

**Indian AI pioneers** | AI-focused entrepreneurship is the other growth area. From just 18 AI-centric startups in 2021, there are 60-plus generative AI startups in India in 2023. Millions of dollars of investment have flown in. Dehaat is providing agricultural finance solutions to farmers. Artpark is a not-for-profit driving technology milestones in AI and robotics for social good. Atom360 is working to make healthcare affordable and accessible to all.

**A revolution India can lead** | In the 19th century, India missed a major opportunity to lead the era of innovation following the first Industrial Revolution. However, this time we are better prepared to be at the helm of the approaching revolution. India has the capability to become the world's premier incubator for exceptionally skilled AI workers.

*The writer is G30 Sherpa, India. Views are personal*



# Shaping future programmers

Raspberry Pi 4 Schools, an initiative to improve the quality of computer education in Goa aims to get students curious about computers and lay foundations for skilled programmers of the future

JAY JOSHI

With increasing use of technology in all aspects of life, the times today are changing, and there is a need to make people from non-technical backgrounds familiar with computing as well. While the responsibility to educate young students about computers lies with schools, reports suggest that 72% of Goa schools lack proper functioning computers.

This dire situation prompted Vincent Toscano, Managing Partner at Uzoorba Technologies, Cherao, and his team to take an initiative to help upgrade the computer labs in schools around Goa using the low-cost Raspberry Pi device which, along with covering the basic school syllabus, also enables the students to learn about robotics and basic programming. This initiative named Raspberry Pi 4 Schools has so far upgraded the labs of over ten schools around Goa, with its benefits reaching over 1000 students.

"In September 2015, we at Goa IT Professionals (GITP) began working to improve computer education in Goa. When we reached out to some schools, we found that their computer labs were in a terrible state. The keyboards, monitors and mice were reusable, but the CPU units were beyond repair," says Toscano while elaborating on the origins of RPI-4-Schools programme from GITP's Project GEIT (Goans Empowered with IT). "A GITP member, Anay Kamat, proposed the idea of using the low-cost Raspberry Pi microcomputer to replace these dead CPUs," adds Toscano



Work began with the GITP members approaching the state government under the then Chief Minister Laxmikant Parsekar, but the path ahead wasn't easy. "The minister showed interest and inclination to implement the programme, but there were some lobbies within the government who were opposed to this low-cost upgradation of school labs," Toscano states. Unfazed by government apathy, Uzoorba team and the GITP members nevertheless decided to embark on the project using their own finances, but this time, there were other problems. "At one of the schools, we found that the students had stolen almost all Raspberry Pi devices!" recounts the technocrat. "Later, we designed a steel cage which is used to fix the Raspberry Pi to the table or

to the wall, and resolved this problem." Uzoorba team deduced that such situations occurred because the schools did not value the free social service being provided by IT professionals. Next, they tried financing the programme through Corporate Social Responsibility (CSR) programme, but unable to find sponsors, they chose to turn to crowdfunding, and also chose to make the venture into a paid service.

Later, presentations were made to Chief Minister Manohar Parikar in 2018, but his illness put progress in a slow gear. "I will stress however that even when he was ill, and through his treatment in Mumbai and US, Parikar kept following up on the initiative," narrates the IT professional. The team from Chief Minister's office facilitated

## Programme outcomes

School labs fixed: 11  
Raspberry Pi used: 68  
Students reached: 1400+

meetings of the team with various other departments and the team drafted a proposal, but the optimism was short-lived. "Ultimately, the government wrote to us stating that it will approve running of the programme as a pilot project in five schools of South Goa and five schools of North Goa with its cost to be borne by us!" Toscano informs.

Elaborating more on the issues, Toscano states that such problems arise because of our attitude towards computer education today. "Our education system treats computers as a secondary subject and thus programmes such as ours will be seen as low priority. This has to change."

Under the RPI4Schools, Uzoorba promises to upgrade a school's computer lab in just five hours, and offers workshops to those interested in learning more. "If the students and teachers express interest, we offer workshops on what more can be done using the devices. If we want to witness good programmers in the future, it is essential to conduct camps dedicated to the subject. That is the next goal of this programme" he says.

Most revolutionary developments in arts and humanities today are fueled by advanced computational capabilities

# ANYTHING + COMPUTING will be the future of education

Sneha Harthana@timesgroup.com

What is common to a biology major engaged in computer-aided drug designing, an artist helping the artificial intelligence (AI) tool DALL-E generate digital art, or a high-frequency trader using algorithms to crack deals? These are people who went a step ahead in their areas of passion to learn the latest in computing.

With digital technologies ubiquitous today, most revolutionary developments in arts and humanities, including areas like political science, urban studies, and anthropology, are fueled by advanced computational capabilities. Academicians and industry experts say there is a clear need to combine domain expertise with basic computing knowledge right at the undergraduate level. This interdisciplinary approach, first pioneered by giants such as Stanford, is now a common theme across universities in the West and is slowly making its way to India.

John Mitchell, professor and chair of the department of computer science (CS) at Stanford University, who was in Chennai earlier this month, calls this the 'CS-X' model. He notes how driven and the analysis of its images have become indispensable to mapping our culture and architectural history.

## IGNITE YOUR CAREER

In politics, technology is enabling data mining and sentiment analysis in ways that could not be done earlier. In anthropology, it's become vital for researchers to look at areas like why things go viral on the internet, and how tech is impacting attention spans of people on content.

"CS-X degree programmes allow students to major in computer science and one humanities discipline... At Stanford, we were taught to build a CS-X major. Computer science plus music was the first one we tried, and then we went on to add a few other ones," Mitchell said in a lecture organised by the Sai University.

With exponential advances in AI in the form of ChatGPT and applications in healthcare, banking, security etc, ensuring ethics, fairness, and equity in applying AI to business has become critical. "We need people from all disciplines - social sciences, literature, law, public policy - to come together to understand the deeper impact of these technologies and how to manage them," B Ravindran, faculty at the department of computer science and engineering at IIT-Madras, says. He goes a step ahead of the 'CS-X' model and says 'AI-X' should be part of the core curriculum of various technical and non-technical fields.

Prabhu Kumar Aggarwal, vice-chancellor of Bennett University,

What's going to be most exciting in the next decade is that computing is going to solve complex problems, but for that we will need our data scientists to team up with arts, science, humanities, and other domain experts.



As a technological myself, I feel it's essential for our future techies to have freedom of academic expression promoted by an interdisciplinary approach.



which is part of the Times Group that publishes TOI, says programming and quantitative techniques are part of the core subjects in the university's BA liberal arts programme. "The university also houses a Centre for Law and Computing Technology - a joint initiative of its school of law and computing to address issues at the intersection of law and technology," he says.

KV Ramani, founder of Sai University and a co-founder of Nasscom, says the university offers liberal education across three schools - school of arts and sciences, school of computing and data science, and school of law.

Sankhya Sharma, head of the humanities and social sciences department at IIT Guwahati, says aspects like database management and retrieval have already changed how archival research is conducted. At IIT Guwahati, she says, new flagship courses like the Master's programme in liberal arts brings together courses in philosophy, literary theory, linguistics etc, with the emerging concept of 'digital humanities', and imparts technological skills to students.

Liberal education institution Krea University says that right from the

The importance of computing in humanities and social sciences cannot be overstated.



AI-X should be part of the core curriculum of various technical and non-technical fields.



To retain our edge as human beings, all of us should learn ways to augment our abilities using the amazing technologies at our disposal.



first year, students at the undergraduate school - School of Interwoven Arts and Sciences - are introduced to data and its applications. "Through a mandatory data analytics course, students are offered training in collecting, cleaning, and validating data," Nir-mala Rao, vice-chancellor of Krea University, says, adding that another introductory computer science course promotes logical thinking, mathematical reasoning, ethics, and design.

Big tech too has tapped the interdisciplinary approach. Giants like Apple, Meta, and Microsoft have hired teams of artists, writers, and anthropologists in their R&D teams for new product development. In India too, many conversational AI companies are looking to set up a complementary team of technologists and humanities experts for better customer experiences.

Programming and quantitative techniques are part of the core subjects in BU's BA liberal arts programme. In addition, students are encouraged to take online Swayam or MOOC courses as value-added courses.



Rajendra Dandapani, director of technology at Zoho Corp, says that Zoho Schools (Zoho's educational initiative) realises the importance of all-round development, and irrespective of the stream a student has chosen (technology, design or business), they get a foundation in programming basics and communication skills.

# The future lies in your fingerprints

Studying genetic coding via fingerprint mapping, researchers can find out precisely what your child can grow up to be



## ALL ABOUT DERMATOGLYPHICS

Dermatoglyphics is the study of the skin patterns on fingers and hands. These patterns are unique and heavily linked with one's genetic composition, and are closely related to the central nervous system. The study has absolute scientific basis, and has been analysed and proved with evidence in anthropology, genetics, medicine and statistics.

Tests based on Dermatoglyphics can reveal our intrinsic qualities and talents, enhance learning experiences by identifying learning styles, personalise academic and extra-curricular programs, reveal hidden talents, build confidence and make academic and career choices easier.

Ismat Ishaan

Generic aptitude and personality tests are passé. Now there's a new method of evaluating one's inborn intelligences through simple biometrics, where fingerprints hold the key to your future. The concept is being touted as the next big future-mapping trend to hit the country.

### Scientific backing

Ideally aimed at school-going children, the method is based on the scientific premise that the patterns on one's fingertips are in sync with the patterns on an individual's left and right brain. These in turn can point out the inborn potential of a person.

After a simple method of collecting all 10 fingerprints, the results are then collated into a detailed report based on the Theory of Multiple Intelligences — which states that everyone is intelligent in at least eight different ways and can develop each aspect of intelligence to an average level of competency. These intelligences show whether your logical skills are higher than your linguistic ones. If you're rhythmically inclined, a naturalist or if you are left brain thinker (someone who analyses everything) or a right brain one (artistic).

Says Sejal Vora, a consultant affiliated to an international institute that has brought the technique to the city, "Who wouldn't want to understand their own mind, or what their kids are best suited to career-wise? You may want your child to become an engineer, when he may be more musically inclined, but because of parental pressure the child may not achieve his or her full potential as a person and a professional."

There's no doubting its accurate results as compared to assumptive IQ tests either. "It's 110 per cent correct," adds Vora. "After all, how can your fingerprints be wrong?"

### 'Adults should do it too'

Says Hira Bhesania of New Activity High School in the city, whose students have tried it out. "I have found this method very good and have tried it on myself. I would definitely advise children to try it out."

Socialite Elina Meswani too has done the evaluation for herself, her son Ishan and daughter Gayatri. "I was skeptical initially, but my husband (corporate head honcho Nikhil Meswani), heard about it on a trip abroad and convinced me to try it. I found the test results enlightening. I think adults should try it out too, as it can change lives."

# DMIT can change your life

Dr Sara Chimthanawala and Pratiksha Patwari of Breakthrough Career Counselling And Guidance say intelligence quotient can be raised by practicing certain things. DMIT helps one not only to improve IQ or skills, but also on several counts including behaviour.

■ By Vikas Vaidya

**R**AJESH Tilpule (name changed) is an IT professional. As any employee expects promotion or elevation in his profession, he too was expecting the same. He was not getting the desired success. Finally, he went for Dermatoglyphics Multiple Intelligence Test (DMIT) and he got to know his loopholes. Dr Sara Chimthanawala of Breakthrough Career Counselling and Guidance not only explained to him those loopholes but also guided him how to overcome those. Rajesh surprisingly got excellent results and within six months, he experienced a change in his thinking and personality.

Dr Sara Chimthanawala and Pratiksha Patwari says, intelligence quotient can be raised by practicing certain things. People say after certain age one cannot acquire skills or can not raise their intelligent quotient which is not true. DMIT not only help one to improve IQ or skills, but on several counts including behaviour.

These are just a few of the cases mentioned, Breakthrough has been successful in guiding all who have come for the DMIT and counselling. Breakthrough aims to give the right training and grooming to your children, so that they can be the architects to build a better, healthier, peaceful and stronger tomorrow.

The results of the Class X and XII are just out. Both parents and the children are in a dilemma about their future careers. Today, there are so many professions and careers that it is difficult to make the right choice. Breakthrough helps to guide and counsel the students through the Dermatoglyphics Multiple Intelligence test, which



Dr Sara Chimthanawala



Pratiksha Patwari

gives the actual inborn strength to enable them to make the correct choice.

The children of today are the future of our nation. Are we grooming them to lead the country to a better tomorrow? Are we giving them the right direction to help them choose the right path in life? Are we aware of their true potentials? Are we ourselves equipped to nurture them to blossom? Breakthrough Career Counselling and Guidance offers the latest, scientific, Dermatoglyphics Multiple Intelligence test for children of all ages from 4 yrs onwards, to give them their inborn talents, strengths and weaknesses. This test helps parents to

the learning styles and acquiring styles, whether the child is visual, auditory or kinaesthetic and whether he is cognitive or reflexive. It also gives the IQ, EQ, CQ and AQ.

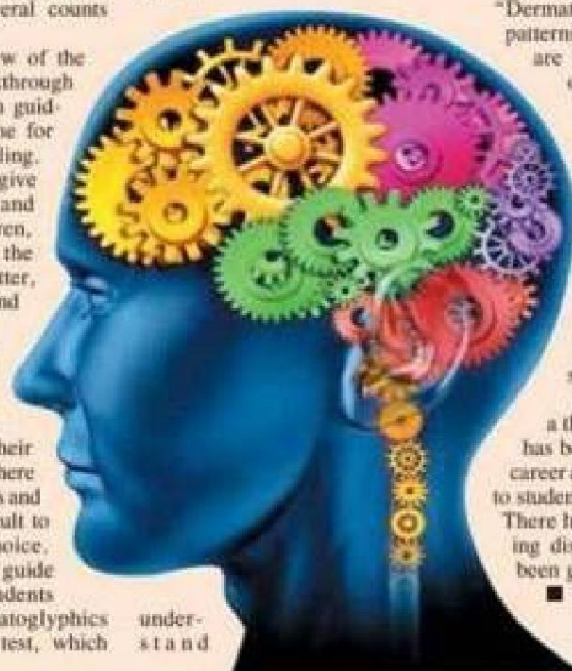
It tells whether the child is more logical (left brain) or creative (right brain). It helps the parents know the multiple intelligence of their child and so how to groom and guide their child in the right direction. Browsing 'www.wellnessvision.org' or sending email on 'visionsarac@gmail.com' one can get proper information.

Dr Chimthanawala and Pratiksha Patwari informed that promoting first-of-its-kind brain analysis through Dr Howard Gardner's MI (Multiple Intelligence) theory in which children of all age groups can know their inborn learning styles, personality traits, innate characteristics, etc. which would help them improve and enhance their personality and move towards the right acquiring and learning styles which brings out the genius in the child.

Pratiksha said, "Dermatoglyphics is the study of patterns on the finger tips, which are unique and linked with one's genetic composition and are closely related to our nervous system.

In other words, Dermatoglyphics can reveal our intrinsic qualities and talents. It also helps in the selection of right life partner or to know and understand your spouse, thus improving relationship.

We have done more than a thousand DMIT cases and has been able to give the right career and professional guidance to students and even some adults. There have been about 20 learning disorder cases which have been given proper guidance."



understand

# Counting On Your FINGERTIPS

Parents And Schools Are Employing Biometric Scans To Psychometric Tests To Nudge Children Onto The Right Career Track



**CHARTING THE COURSE:** Students get their fingerprints analysed to identify their skills and pursue a course best suited to them

Ramini Mathai | two

**W**hile some children can't seem to put a finger on what they want to do in life, there are others who are doing just that — putting their finger on it.

From biometric fingerprint scanning and psychometric tests to career discovery programmes that map a child's interests and skills, parents and schools are trying various approaches to find the best career options.

Dermatoglyphics, a branch of science that studies the patterns of ridges on fingers, is one of the ways. "We do a biometric scan of a child's fingerprints because the ridges on the tips of the fingers are connected to the eight multiple intelligences — linguistic, interpersonal, logical, musical,

kinesthetic, visual or spatial, naturalistic and existential. An analysis of the ridges helps children and parents understand what career or subjects may be best for them," says Uma Veeerappan, who runs Chennai-based E-Ridges, which conducts the Dermatoglyphics Multiple Intelligence Test (DMIT). Children are presented with a report on how strong they are in each area, she says. There is a counsellor to help parents and children decipher the

report. "Earlier, a child's career was decided based on the growing environment, the parent's profession, a cursory look at trends, or what the classmates were doing. Today, several parents are approaching it more professionally," says education consultant K R Manalathu.

Former investment banker Priya Mohan's company Vid-yartha.com, for instance, has career discovery programmes for children and schools. Children

are given aptitude-based tests at regular intervals as well as counselling sessions. "In schools, we get children thinking about their future from class 9 onwards," says Mohan. In class 11, students are encouraged to identify careers they are interested in. In class 12, the search is for the right college. "It's the academic version of a medical history," says Mohan, who runs programmes in schools in Chennai, Bangalore and Hyderabad.

At the Chennai-based Bodhi, a people-development consultancy, counsellors and psychologists are working with several CBSE and international schools. "We conduct psychometric tests that give us an insight into their aptitude and attitude," says Dr Nitesh Mohan, a behaviourist scientist and founder of Bodhi. He says that last year around 8,000 students took the test, with 500 following it up with counselling. "We assess students from class 9 onwards," says Dr Raj.

So far, Bodhi has only given assessments on a child's multiple intelligence and internal motivators. From this academic year they plan to get more specific by spelling out which stream is best for a student. "Children and parents keep asking us whether they should take science or include math. So this year we are decoding our reports further and correlating the tests to the various streams offered in the school," says Dr Raj.

Parents say the assessments help them understand their children better. For Chennai-based housewife Uma Manohar, the DMIT seems to have helped with her sons' career choices. "My eldest son had an interest in management, but wasn't sure if that was the right choice. The test showed that he was stronger in interpersonal skills and this helped him make up his mind," says Manohar. She decided to send her younger son for cricket coaching. "He has been telling me he would be good at cricket and wanted coaching but I never listened. When the DMIT results gave him a high rating for sports related activity, I signed him up and now he is happy," she says.

Dr Raj says that the tests are one aspect to making a career choice. "They are a scientific way of encouraging the child or mapping the path. If parents are not willing to listen to children and take their opinions into consideration, tests are not going to help. Parents play the most important role. So they need to spend time with the child, and make the effort to keep communication lines open," he says.

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## TALENT MAPPING

There are many ways to analyse interests and aptitudes

- ▶ Dermatoglyphics Multiple Intelligence test scans fingerprints and analyses ridges to map various intelligences
- ▶ Psychometric tests that give an insight into aptitudes and attitudes
- ▶ Career counselling is provided in schools and by many counsellors

# Introducing the well-trained computer

**N**ow that we've all learned everything there is to know about our everyday, ordinary digital computers, there's a new technology looming on the horizon that promises to begin the learning process anew. It's called neurocomputing.

A neurocomputer differs from the one sitting on your desk in a very important way: It is trained rather than programmed. According to the experts, it eventually will be much faster and less expensive to train the machine than to program it.

The operations of today's computers are based on algorithms, which are detailed series of steps the machine must follow to solve a problem or process information. Once programmed, the computer can only repeat the same process over and over again.

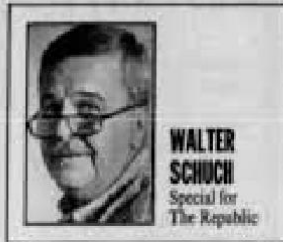
Tomorrow's neurocomputers will be based on "adaptive" technology, in which the machine will develop its own algorithms based on the information fed into it. It will analyze, manipulate and present information in a variety of ways and configurations not predetermined by the computer operator.

This description and the name itself conjures up visions of a pulsing, biological mass encased in a metal cabinet, performing brainy stunts to prove its superiority over its human operator.

Not so, says Dr. Robert Hecht-Nielsen, co-founder of HNC Inc., a 4-year-old San Diego company that already is designing and building neurocomputers for a number of Fortune 500 companies.

"There's nothing biological or magical about neurocomputing — it's just mathematics," he says.

The term "neurocomputing" comes from the fact that many of the key innovations in this new field originally were developed by researchers as computer models used to simulate the workings of the human brain. Although none of these models has yet been shown to accurately duplicate



**WALTER SCHUCH**  
Special for  
The Republic

brain activity, computer engineers have discovered that some of them contain previously unknown and powerful information-processing capabilities.

At the heart of a neurocomputer is an internal "neural network" consisting of a group of information-processing elements that communicate with each other and work together in manipulating large volumes of complex data.

Hecht-Nielsen says there are 200 to 300 different neural-network configurations in various stages of development throughout the world. The most advanced work is being done in the United States, Japan, France and the Soviet Union, he said, and rapid progress is being made in both hardware and software development.

"While neurocomputing is not a big deal in terms of economic activity today, the eventual payoff from this technology will be great," he said.

Neurocomputing will emerge slowly and unobtrusively, and won't create the kind of revolution the personal computer did nearly a decade ago, he said.

The first applications for the new technology are being developed for use in the defense, finance, banking, securities and insurance fields.

Hecht-Nielsen's venture-capital-funded company is developing systems for several large banks and finance companies to use in credit-application scoring and statistics-generation activities.

Over time, neurocomputing will

spread to the medical, transportation, telecommunications, retail, robotics and manufacturing fields, Hecht-Nielsen said.

Although the idea of neurocomputing dates from the 1940s, when scientists first predicted brainlike computers, the technology began a rapid growth in the mid-1980s as much more powerful computer hardware became widely available, Hecht-Nielsen said.

"Today, three-fourths of the Fortune 500 companies have neurocomputing-application investigations under way, and virtually every major university (including Arizona State) in the world is offering courses in neurocomputing," he said.

Hecht-Nielsen, who received bachelor's and doctorate degrees in mathematics from ASU, has been involved in neurocomputing for 15 years. Before founding his own company, he set up and managed neurocomputing research-and-development programs at Motorola Inc. and TRW Inc. He also is the author of the definitive textbook on the subject, *Neurocomputing*.

Hecht-Nielsen was in Phoenix this past week to hold a seminar on neurocomputing for a group of local high-tech-industry leaders assembled by Dr. Lex Akers, director of ASU's Center for Solid State Research.

Akers is seeking industry and government funding for additional faculty positions in neurocomputing and for setting up a "Center for Adaptive Systems Science and Engineering."

## Tour by computer

In July, Flagstaff will become the first municipality in the state to offer tourists the opportunity to learn what there is to see and do around town by consulting a computer.

The city has contracted with a

Flagstaff software company, *Recreative Ink*, to produce interactive computer terminals that will be placed in kiosks in several strategic locations.

Visitors will be able to access color photos, descriptions, directions and maps to such places of interest as the Grand Canyon, the Navajo and Hopi reservations, Oak Creek Canyon and other nearby attractions.

*Recreative Ink* President Ed Locke said the company is developing similar systems for possible use by the nine national forests in Arizona and New Mexico.

## Avanti survives fire

Avanti Circuits Inc., a Phoenix printed-circuit-board company that promises its customers delivery of custom products within 24 hours of ordering, had to perform a quick turnaround for itself recently.

On a Sunday evening, May 6, a fire broke out in the company's nickel-gold plating line, causing extensive damage. By Monday evening, the company was back in business in all areas except for the plating line. By Thursday, the plating room was completely rebuilt and re-equipped.

"We had great cooperation from our suppliers, including Great Western Chemical and Circuit Supplies, and tremendous support from our managers and supervisors," said Bill Malone, president of the company.

A preliminary report blamed the fire on a faulty backup heater controller.

Avanti began as a family operation in 1982 with 3,000 square feet of production space. The company now occupies 14,500 square feet at 17650 N. 25th Ave. and has 70 employees and annual sales of about \$3.5 million.

Walter J. Schuch is editor of the semi-monthly *Southwest Technology Report* newsletter and the annual *Arizona High Tech Directory*. He can be contacted at 967-7444 in Tempe.



# NEWS FLASH

**Nanavati**  
Super Speciality Hospital  
a passion for healing...

EST Healthworld

From The Essence Times

## Today the entire continuum of care rests on advanced technologies : Dr. Rajendra Patankar

Advanced technologies such as Robotics, 3D C-Arm among others are being adopted by health institutions to administer best quality treatment and care



By Dr. Rajendra Patankar  
COO, Nanavati Super  
Speciality Hospital, Mumbai

To achieve Universal Health Coverage with a focus on affordability, accessibility, and quality, the Indian healthcare sector is undergoing a major transformation in terms of use and adoption of newer technologies. The prime objective of the sector is to administer the best quality of care. Over the years, health institutions have been adopting cutting-edge technologies. Integrated electronic health records, apps, wearable, artificial intelligence (AI), 3D printers, telemedicine, genomics and robots are being absorbed into clinical environments, with greater frequency.

Today, medical technology is solving complex global problems. Specialty health institutions, in the last couple of years have equipped them with the most advanced technologies which are supporting entire continuum of care. Patient-centric approaches combined with best practices, procedures, and people is yielding positive results.

The all-new inclusion of the latest surgical technologies, such as the Robot-assisted minimally-invasive surgery techniques has come as a boon for patients. In minimally-invasive techniques of surgery, doctors can operate with greater control and vision. It provides a magnified, 3-D view of the surgical site and helps the surgeon operate with precise surgical procedures, flexibility and control, allowing them to perform safe and less-invasive. Patients have been operated through robotic surgery and results are encouraging.

Unlike traditional open surgeries, in robot-assisted surgery, surgeons operate from a console equipped with two master controllers that manoeuvre four robotic arms. By viewing a high-definition 3-D image on the console, the surgeon is able to see the surgical procedure precisely than ever before. Computer software takes the place of actual hand movements and can make the surgery precise.

Robotic Surgery is the most revolutionary and the newest form of Minimally Invasive or Laparoscopic surgery performed by an expert surgeon with the assistance of a computer-controlled robot. The Da Vinci Xi is the world's most advanced robotic surgical system and is regarded as the disruptive innovation of minimally-invasive surgery. This technology is specially designed for performing highly sophisticated, multi-quadrant surgery and also relatively simpler single-quadrant surgery, offering a high level of comfort for patients and surgeons alike. Though expensive compared to conventional surgeries, robotic surgery requires a shorter hospital stay, thereby considerably decreasing the hospitalization cost. It also provides faster recovery, enabling patients to return to their normal life quicker.

Even though the surgery is performed by the robot, the entire procedure is in complete control of the surgeon. Surgical robots are self-powered, computer-controlled devices that can be programmed to aid in the positioning and manipulation of surgical instruments. It helps the surgeon to perform complex surgical tasks through small incisions. Ultimately, in a robotic surgery, the surgeon gets the liberty to execute a

surgery with better accuracy, flexibility and control. Now robotic surgeries are being done in several specialties and subspecialties such as Gastro-Intestinal (GI), Oncology, Cardiology, Renal, and Gynaecology.

Another disruptive technology which is making a huge difference is 3D C-Arm. This best-in-class imaging technology has transformed the way we perform surgeries. In the last decade, spinal surgery has gone through numerous technological innovations. The field has witnessed advancements in operative techniques, implants, biologics and equipment such as computer-assisted navigation and surgical robotics. Also, with the arrival of real-time image guidance and imaging ability to process and reconstruct these data into an interactive three-dimensional spinal "map", a surgeon is now better equipped than ever in terms of understanding the complications in a surgical field.

### New Trends

In the past decades, the world has witnessed a colossal revolution in healthcare. But that in no way implies that the traditional healthcare practices are thrown out of the window. It simply means that the new innovations and discoveries in the healthcare universe are simplifying the medical processes and carefully wiping off the idea of "impossible" from the medical history. However, the implementation process is taking a time delay owing to the fact that the process involves a huge budget. Robotic surgeries, 3D C-Arms, and other new medical technologies clearly prove that the changing clinical practices with new technologies are providing better outcomes and patient safety.

## Changing the world with the handshaking of Robotics and AI

Bennett University provides an atmosphere in which students can learn the necessary skills to apply to real-world AI and robotics challenges, writes Dr Manish Raj

The global impact of the Covid-19 pandemic has changed the way we think, live, and work. It has also created the opportunity to investigate emerging technology and prospects in all areas. It has also improved the modification and deployment of Artificial Intelligence (AI) & Robotics to assist numerous sectors, making AI & Robotics a key player in defining the new normal. In recent years, AI has become more common in robotic solutions, bringing competencies and versatility to formerly inflexible applications.

AI and robotics are considered to help mitigate the effects of an ageing agricultural workforce. Thanks to autonomous drones, self-driving agricultural robots, and other technology, farmers may be able to spend more time focusing on cultivating sustainable harvests.

Computer vision technology is used in autonomous

flying to avoid obstructions and follow a straight course in the air. These flying machines are becoming increasingly intelligent as AI advances. Security surveillance, video recording, and rescue operations are just a few of the applications for overhead view monitoring.

Today's robots use AI, high-precision cameras, Lidar, and high computer processing, resulting in a rather good security system for several applications. Researchers believe that robots can merely defend a certain region. Robots that employ mapping software to create a geo-fenced boundary are currently being developed.

The sports business is embracing AI and robotics. AI is assisting athletes in improving their fitness and assisting teams in discovering new talent. Robot referees are already in use in various sports, and smart devices are assisting specta-

tors in locating their seats at stadiums. Those who do not want to go to the crowded stadiums to have fun, can still keep their fan expe-

rience and redefine it with VR headsets.

Virtual assistants and chatbots move the world forward with incredible degrees of automation, lowering expenses and increasing productivity. Through the imitation of human dialogue, virtual assistants

are a manifestation of AI and machine learning. Natural Language Processing capabilities are used in virtual assistants and chatbots to make them follow automated rules.

Robotics and AI have changed the industrial and production industries. The primary goal of AI in the manufacturing business is to compensate for a worker shortage, streamline the entire production process, and increase productivity. Previously, managing a single task system required the cooperation of an entire team. After bots took over, manufacturers were able to increase manufacturing pace.

The way computer games are made and played has been affected by robotics and artificial intelligence. AI is assisting game developers in the creation of characters and the generation of their behaviour to mimic human behaviour. In games, the fundamental objec-

tive of artificial intelligence is to collect and process data from players. Above all, it has allowed game makers to create games that are tailored to their specific requirements and expectations.

AI and robots are the niche technologies of the future. In the coming decade, AI and robots will surely lead to some incredible technological breakthroughs.

Bennett University provides an atmosphere in which students can learn the necessary skills to apply to real-world AI and robotics challenges. The University has cutting-edge labs, as well as the most up-to-date robots, drones, simulators, and infrastructure. Bennett University provides specialisations in Artificial Intelligence, Internet of Things and Robotics to students who want to learn more about niche technologies.

(The author is Assistant Professor, Bennett University)

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