

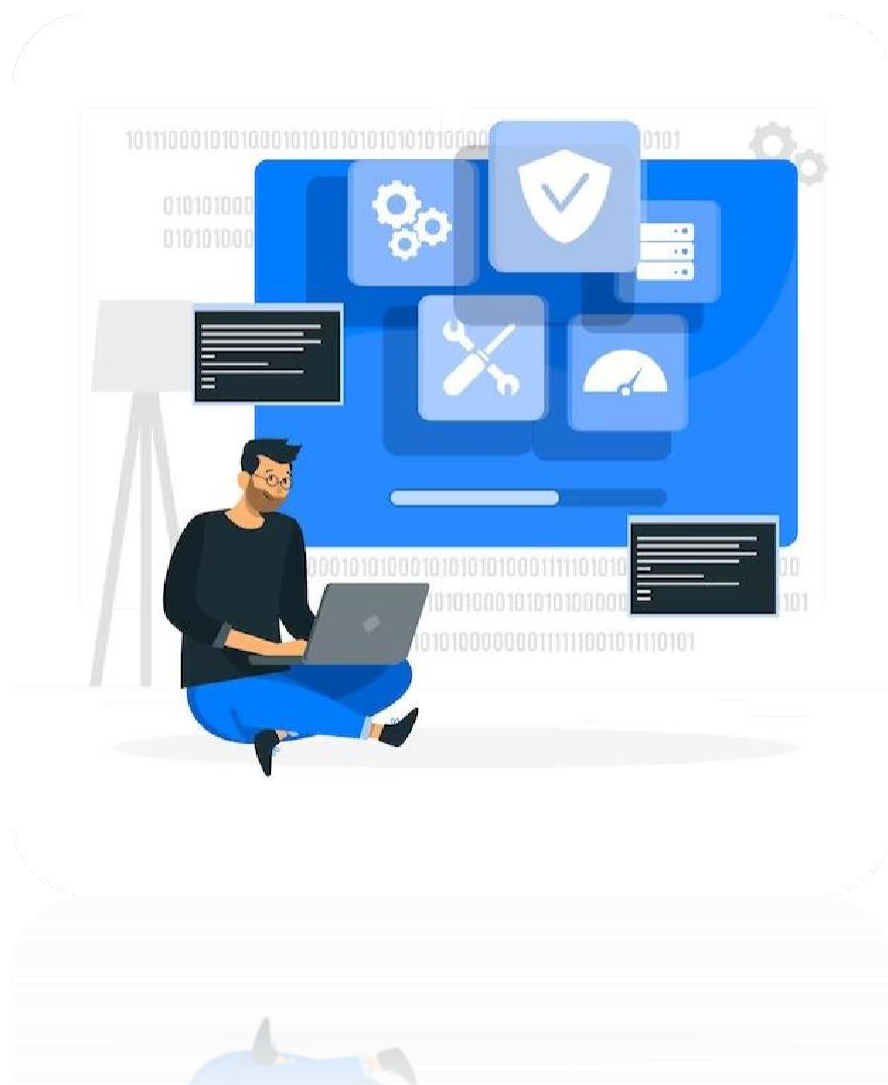
‘BOOT OF COMPUTER’

Best of Outstanding Technology

Department of Computer Science & Engineering Institute of
Engineering and Science

IPS Academy, Indore

2022-23





CSE Department Information

Name and address of the department:

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PRINCIPAL MESSAGE



Technical Education is the most potential instrument for socio-economic change. Presently, the engineer is seen as a high-tech player in the global market. Distinct separation is visible in our education between concepts and applications. Most areas of technology now change so rapidly that there is a need for professional institutes to update the knowledge and competence.

Institute of Engineering and Science, IPS Academy is a leading, premium institution devoted to imparting quality engineering education since 1999. The sustained growth with constant academic brilliance achieved by IES is due to a greater commitment from management, dynamic leadership of the president, academically distinctive and experienced faculty, disciplined students and service oriented supporting staff.

The Institute is playing a key role in creating an ambiance for the creation of novel ideas, knowledge, and graduates who will be the leaders of tomorrow. The Institute is convinced that in order to achieve this objective, we will need to pursue a strategy that fosters creativity, supports interdisciplinary research and education. This will also provide the students with an understanding and appreciation not only of the process of knowledge creation, but also of the process by which technology and knowledge may be used to create wealth as well as achieve social economic goals.

I am delighted to note that the engineering graduates of this institute have been able to demonstrate their capable identities in different spheres of life and occupied prestigious positions within the country and abroad. The excellence of any institute is a measure of achievements made by the students and faculty.

All the Best.

Dr. Archana Keerti Chowdhary
Principal

HOD MESSAGE



Today we find that information technology has become overwhelmingly pervasive, while its parent, computing science, has become correspondingly hard to find. While many CS educational institutions have shifted focus from core CS. This is the single most important attribute of the education offered here. Our department has remained true to the vision on which it was founded. There are several ways to present the canonical core of computer science. Over the years we have developed a distinct style and method that bridges the theory - practice divide while remaining grounded in the core. Technology changes rapidly, especially in the field of computing, whereas the science, if it changes at all, does so much more gradually. Our understanding is that persons who are clear and thorough about the fundamentals can adapt to rapid changes in technology relatively easily. We want the education imparted to our students to be the basis of a life time of learning. Our Department has produced hundreds of professionals and has established a name for itself in the country and abroad. They have consistently excelled in the highly competitive industrial environment, Best Employer/ awards in top-ranking companies. I attribute this success to the winning combination of a dedicated faculty that works hard at imparting quality education, a well-planned syllabus and last but not the least, our students. Learning is a continuous process and does not end with the acquisition of a degree, especially because steady and rapid advances in computing technologies shorten the life of tools and techniques prevalent today. Therefore we do not aim to make our students walking manuals of any language or package. Instead, they are given a strong foundation in computer science and problem-solving techniques and are made adaptable to changes. We believe that this approach to teaching-learning, coupled with practical experience gained during Industrial Training in reputed organizations, equips our students to handle the challenges posed by the software industry.

Dr. Neeraj Shrivastava

HOD, Computer Science Engineering

IPS Academy, Institute of Engineering & Science

Vision & Mission of the Department

Vision

Attaining global recognition in computer science and engineering education, research and training to meet the growing needs of the industry and society.

Mission

M1: Provide quality education, in both the theoretical and applied foundations of computer

science and train students to effectively apply this education to solve real-world problems.

M2: Amplifying their potential for lifelong high-quality careers.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1:

To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies.

PEO 2:

To provide students with solid foundation in mathematical, scientific and engineering fundamentals to solve engineering problems and required also to pursue higher studies.

PEO 3:

To develop the ability to work with the core competence of computer science & engineering i.e. software engineering, hardware structure & networking concepts so that one can find feasible solution to real world problems.

PEO 4:

To inculcate in students effective communication skills, team work, multidisciplinary approach, and an ability to relate engineering issues to broader social context.

PEO 5:

To motivate students perseverance for lifelong learning and to introduce them to professional ethics and codes of professional practice.

PROGRAM OUTCOMES

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Apply concepts in core areas of Computer Science –Data Structures, Database Management

Systems, Operating Systems, Compiler Design, Computer Network and Software Engineering to solve

technical issue.

PSO 2: Apply Software Engineering Principles and Practices to provide software solutions.

PSO 3: Ability to work in team and apply the knowledge acquired to develop new real life systems and

able to adapt to societal needs of future.

History Of Department

The Department of Computer Science & Engineering was established in the year 1999 offering Bachelor of Engineering (BE) with intake 60, it was increased to 120 in year 2012 and again intake was increased to 180 in year 2014. The programme is intended to educate students on the applications of scientific knowledge for practical purposes involving activities like modeling, analysis, design and other associated fields of core courses in Computer Science & Engineering education. It intends to equip graduates with profound theoretical knowledge and rich hands on experience.

Department Faculty Details

			
Dr. Neeraj Shrivastava Associate Professor & HOD	Dr. Nitin Jain Associate Professor	Dr. Vaishali Gupta Associate Professor	Dr. Dharmendra Yadav Associate Professor
			
Dr. Prateek Nahar Associate Professor	Dr. Barkha Sahu Assistant Professor	Dr. Indra Kumar Shah Assistant Professor	Mr. Arvind Upadhyay Assistant Professor
			
Ms. Nisha Bhalse Assistant Professor	Mr. Deepak Shukla Assistant Professor	Ms. Angita Hirwe Assistant Professor	Mr. Ved Kumar Gupta Assistant Professor

			
<p>Mr. Pratik Jain Assistant Professor</p>	<p>Ms. Anjali Verma Assistant Professor</p>	<p>Mr. Yagyapal Yadav Assistant Professor</p>	<p>Mr. Vijay Choudhary Assistant Professor</p>
			
<p>Mr. Sunil Nimawat Assistant Professor</p>	<p>Ms. Nitu Mathiriya Assistant Professor</p>	<p>Mr. Pankaj Pateriya Assistant Professor</p>	<p>Ms. Priyanka Vijayvergiya Assistant Professor</p>
			
<p>Mr. Sumit Devray Assistant Professor</p>	<p>Ms. Neha Yadav Assistant Professor</p>	<p>Mr. Vishal Chhabra Assistant Professor</p>	<p>Mr. Ashish Sharma Assistant Professor</p>

			
Ms. Shefali Aggrwal Assistant Professor	Mr. Somil Neema Assistant Professor	Ms. Arpita Bhatia Assistant Professor	Ms. Poonam Mishra Assistant Professor
			
Ms. Vasudha Sharma Assistant Professor	Ms. Ritumbara Chauhan Assistant Professor	Mr. Yash Parashar Assistant Professor	Ms. Pooja Kothari Assistant Professor

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UPI: THE DAWN OF DIGITAL FINTECH NIRVANA

In March 2022, the Reserve Bank of India took a revolutionary leap in the Indian payments ecosystem by launching a version of UPI that can be used on feature phones. This move will be a significant way forward to boost financial inclusion and bring more than 40 million feature phone users into the digital payments fold. With innovation and committed focus, India has achieved remarkable feats in a digital payments ecosystem that is unmatched globally. In 2020, India surpassed all other countries in the world with the highest number of real-time online transactions, and the latest market studies now estimate that by 2023, digital wallet transactions are expected to overtake cash as the leading point of sale in India.

At the macro level, these are the dividends of the Digital India mission, which has led to a wave of transformation in the country. UPI FACTORS Precisely in the case of digital payments, a key driver of our growth was the launch of the United Payments Interface (UPI) in 2017 and its expansion since then. Since the launch of UPI in 2017, India has improved financial inclusion at a CAGR of 5% and more, and since 2018, the country has more than doubled the extent of digitization of payments, as shown by the extensive Digital Payments Index and Financial Inclusion Index. by RBI. One of the major issues in tech markets and UPI in particular was the fear of market concentration early on, with few digital payment platforms gaining dominance over UPI transactions due to network effects and first mover advantages. Around the time NPCI issued the regulation, only a few digital payments players had a market share of more than 75% in UPI payments.

THE NEED FOR UPI PROTECTION

Payment clearing is a critical area of economic activity with enormous global, societal and domestic impact. The impact of such dependence has been strongly felt, including accusations against leading app stores for allegedly using their dominant position to extract high commissions from app developers for payment settlements.

These concerns need to be isolated in the context of UPI and prevent a few players from gaining dominance over a country's highpotential proprietary technology. Analysis of the market trajectories of technology platforms across geographies strongly reflected that the advantages of network effects and early transition advantages make it challenging for new entrants to achieve a healthy market share. This can also be realized in the context of UPI payments, where even though there are about 60 UPI payment enablers in the country, exceeding 78% in volume and more than 80% in value as on February 2022, it is still going on. be held by several digital payment applications. At present, this appears to be a far-fetched scenario considering that between April 2021 and February 2022, leading payment app UPI's share roughly increased from 45% to 48% (value) and from 44% to 45% in volume, rather than gradually decreasing.

0808CS211004
Aarifa Qureshi

ESCALATION IN TELECOMMUNICATIONS

India is now the world's second largest telecommunications market with 1.16 billion subscribers and has experienced strong growth over the past decade. According to a report produced by the GSM Association (GSMA) in partnership with the Boston Consulting Group (BCG), India's mobile economy is growing rapidly and will contribute significantly to India's Gross Domestic Product (GDP). In 2019, India overtook the United States to become second largest market in terms of app downloads. The Indian government's liberal and reform policies, along with strong consumer demand, have contributed to the rapid growth of the Indian telecommunications sector. The government provided easy access to markets for telecommunications equipment and a fair and proactive regulatory framework that enabled consumers to access affordable telecommunications services. Deregulation of foreign direct investment (FDI) norms has made the sector one of the fastest growing in the country and one of the top five job creators.

INVESTMENTS /MAJOR DEVELOPMENT: As our subscriber base grows every day, there is a lot of investment and development going on in this area. His FDI inflow into the telecom sector from April 2000 to March 2022 was US\$38.33 billion. Here are some of the recent events. • In January 2022, Google invested his US\$1 billion in Airtel through the India Digitalization Fund. 11 | P a g e • In October 2021, Vodafone Idea to sell its minority stake to global private equity investors including Apollo Global Management and Carlyle for up to Rs 7.54 crore (USD 1 billion) over the next 2-3 months said it was under consideration. • In October 2021, British satellite operator Inmarsat Holdings Ltd. announced that it had become the first foreign operator to receive India's approval to sell high-speed broadband to aircraft and ships. Inmarsat operates through Bharat Sanchar Nigam Ltd. (BSNL) will enter the market after BSNL obtains a license from the Ministry of Telecommunications. • In October 2021, Dixon Technologies announced plans to invest his Rs 200 million (US\$26.69 million) under his PLI telecom scheme. This investment includes the acquisition of the Bharti Group production unit. In September 2021, Bharti Airtel announced his Rs 500 crore (US\$ 673 million) investment to expand its data center business to meet the demand of its customers in and around India. In August 2021, Narkotata Group announced it was in talks with Canadian company Telesat to launch his high-speed satellite broadband service in India under the Lightspeed brand. Did. . We work with One Web, Elon Musk's SpaceX, and Amazon. March 2021, Vodafone Idea Ltd. (VIL) said spectrum acquired in five circles will improve his 4G coverage and bandwidth, helping to provide customers with a 'better digital experience' announced.

ACHIEVEMENTS: Below are government achievements over the past four years. • The Ministry of Telecommunications has launched 'Tarang Sanchar', a web portal for sharing information on mobile phone base stations and their EMF compliance. • Unified Payments Interface (UPI) payouts hit an all-time high of 3.65 billion (volume based), worth ~Rs. 6.54 trillion (\$87.1 billion) as of September 2021.

5'G IS THE FUTURE: 5G is the fifth-generation mobile network technology. It is designed to improve network connectivity by solving age-old problems of speed, latency, and usability that previous and current generation cellular networks have failed to address. 5G is said to offer

data speeds 100 times faster than 4G networks. The key features are dramatically reduced latency from the current 50 milliseconds to less than 1 millisecond, throughput of up to 10 gigabytes per second, and an exponential increase in the number of connections.

5G LAUNCH IN INDIA: 5G launch in India soon. But when is the million-dollar question? There is no definitive answer to this question, but we are definitely getting closer to the launch of 5G in India. The global deployment of 5G networks is rapidly moving from pilot phases to early commercialization. In India, major network operators are working to roll out next-generation mobile networks. Bharti Airtel is one step closer to the 5G dream in India, announcing earlier this week that it will roll out his 5G service in India by the end of this month. Reliance Jio has to announced his 5G network on August 15th.

0808CS211027
Anmol Kushwah

THE WORLD'S DEPENDENCY ON GOOGLE

The world always assumes that Google services will be there, from Gmail and YouTube to online storage and smart homes. We take it for granted. Each hour YouTube has 30,000 hours of video uploaded, Google has almost 230 million searches and an enormous number of emails are sent. In terms of connections, Google controls about a third of the surface internet. But on Monday, the 14th of December 2020 all of the Google services suddenly disappeared. Across the world, users were unable to access emails and kicked out of ongoing Google meet sessions, one Twitter user even said that he was left sitting in the dark with his toddler as his Google home system had failed. The crash had become one of the biggest social media trends and it sent waves of panic across businesses in many parts of the world. How could one of the largest companies suddenly go dark on all of its services at once? In total, the outage only lasted one hour but had already caused a lot of chaos. Some interesting things emerge from this event, not only are consumers dependent on Google but many businesses that you may not think are also dependent. The Google outage caused pandemonium across the world. Some of the biggest companies that use Google services include Uber, Airbnb, Pinterest, Netflix, Spotify, Twitter, and the list goes on.

The employees were not able to reach not just these services in terms of Gmail but, in some cases, get into the system. Lots of companies use Gmail to authenticate as we try to get into different websites and web services like Salesforce, Dropbox and so many others that use Google simply to get online. In certain cases, the nest heaters, that control heat air conditioning appeared to be down all across the globe. There were companies literally at a standstill. Gmail, Google Search, YouTube, Google Docs, Google Drive, Nest Home Systems, Google Play, and even Stadia, 14 | P a g e all went down. The Wall Street Journal newsroom was dependent on Google services, so during the outage, some reporters had to resort to using telephones to collaborate in writing stories some schools in the USA had to close for the day. Wayne Westland community schools in Michigan gave its combined 10,000 students the day off after Google crashed. The school relied on Google meet for classes many other educational institutions would have been affected due to the prevalence of online classes because of the pandemic. There were also cases of the management of medical companies not being able to check on the schedules of physicians and other medical staff nor being able to contact customers. Remote work and learning had made individuals and businesses more dependent on online services than ever and in this domain, Google is the most widely used. All in all, the outages affected billions of people worldwide. A Google spokeswoman told the wall street journal that there was a problem with the company system that authenticates login credentials. She stated that the problem was due to internal servers and that the issues weren't the result of a cyber-attack. This explanation doesn't give us much but that's just about all that Google said about the issue. It's rare for Google to have such a global outage like this because even a single physical geography is served by multiple servers across the world and even on these servers there are multiple backups that rapidly come online if there's a problem. As we've seen so much commerce and people's livelihoods rely on Google, which raises some serious questions what if next time Google was down not just for an hour but for days? Billions of dollars in revenue could be lost by companies around the world.

How does Google prevent this? Google calls their plan to keep their services up and running, Site Reliability Engineering or SRE coined all the way back in 2006. SRE is a digital design philosophy basically for Google, the idea is to get software coders to run software management

instead of getting IT managers to run it people call this kind of philosophy DevOps. DevOps is basically development software coding that provides the outcomes of a system administrator. The thinking goes as follows; software coders will get bored by performing tasks by hand and naturally, build tools to help automate the process without the involvement of actual people. Google e states that SRE is its most fundamental feature. Todd Underwood of Google, in 2016 told Wide magazine, “We long for the day when nobody runs anything!” Traditionally, development and operations were opposing forces. The Devs always wanted to build new software and get the changes out to the public as fast as possible but the operations staff wanted to ensure that nothing went wrong and the best way to do this is to keep the changes to a minimum. The trick that Google found is that if you combine development and operations, you can get a powerful synergy for a reliable system.

anyone could have ever done. Google had to face off against the US department of justice for violating anti-trust laws. Google's lawsuit is one of the biggest antitrust cases since Microsoft in 1998. So, what can be done? The solution is that there are alternatives to Google for every service they provide, what it all comes down to is trading the convenience that we've all gotten used to. From this, we can understand that, indeed, the world is dependent on Google.

0808CS211071
Harsh Sugandhi

QUANTUM COMPUTING & IT'S APPLICATION

The quantum in "quantum computing" refers to the quantum mechanics that the system uses to calculate outputs. In physics, a quantum is the smallest possible discrete unit of any physical property. It usually refers to properties of atomic or subatomic particles, such as electrons, neutrinos and photons. A qubit is the basic unit of information in quantum computing. Qubits play a similar role in quantum computing as bits play in classical computing, but they behave very differently. Classical bits are binary and can hold only a position of 0 or 1, but qubits can hold a superposition of all possible states. Quantum computers harness the unique behavior of quantum physics—such as superposition, entanglement and quantum interference—and apply it to computing. This introduces new concepts to traditional programming methods. A quantum computer has three primary parts: • An area that houses the qubits • A method for transferring signals to the qubits • A classical computer to run a program and send instructions For some methods of qubit storage, the unit that houses the qubits is kept at a temperature just above absolute zero to maximize their coherence and reduce interference. Other types of qubit housing use a vacuum chamber to help minimize vibrations and stabilize the qubits. Signals can be sent to the qubits using a variety of methods, including microwaves, laser and voltage.

APPLICATIONS OF QUANTUM COMPUTING

Cryptography: Classical cryptography—such as the Rivest–Shamir–Adleman (RSA) algorithm that is widely used to secure data transmission—relies on the intractability of problems such as integer factorization or discrete logarithms. Many of these problems can be solved more efficiently using quantum computers. **Quantum machine learning:** Machine learning on classical computers is revolutionizing the world of science and business. However, training machine learning models comes with a high computational cost and that has hindered the scope and development of the field. To speed up progress in this area, we are exploring ways to devise and implement quantum software that enables faster machine learning.

Optimization: Optimization is the process of finding the best solution to a problem given its desired outcome and constraints. In science and industry, critical decisions are made based on factors such as cost, quality and production time—all of which can be optimized. By running quantum-inspired optimization algorithms on classical computers, we can find solutions that were previously impossible. This helps us find better ways to manage complex systems such as traffic flows, airplane gate assignments, package deliveries and energy storage.

**0808CS211062
Divya Tadge**

JOURNEY OF SCIENCE & TECHNOLOGY IN PAST 75 YEARS.

Modern India is an epitome of Scientific and Technological Development and is one of the key elements for economic growth. Post 15th August 1947, India's journey has become a great example of an impressive growth story. As claimed by the Indian Brand Equity Foundation, India is among the topmost countries in the world in the field of science and technology. India ranks third among the most attractive investment destinations for technology transactions in the world. Modern India has a strong focus on science and technology, realizing that it is a key element for economic growth. India is among the top five nations in the world in the field for space exploration. The country has regularly undertaken space missions, including missions to the moon and the famed Polar Satellite Launch Vehicle (PSLV).

India is likely to take a leading role in launching satellites for the SAARC nations, generating revenue by offering its space facilities for use to other countries. Our First Prime Minister, Pandit Jawahar Lal Nehru said "Science is not merely an individual's search for truth; it is something infinitely more than that if it works for the community". He made efforts to convert India's economy into that of a modern state of art. By 2022, R&D expenditure is targeted to reach about 2% of the country's GDP. The engineering R&D and product development market in India is forecast to post a CAGR of 12% to reach US\$ 63 billion by 2025, from US\$ 31 billion in 2019. As per the Economic Survey 2022, India's gross domestic expenditure on R&D (GERD) as a percentage of GDP stood at 0.66%. IT spending in India will grow 7% YoY to reach US\$ 101.8 billion in 2022, compared to US\$ 81.89 billion in 2021. In FY21, the science and technology sector added 497,501 employees, becoming India's top employment generator. Over the last 75 years, India has become a bedrock for innovation in the technology sector. We are currently a major drive of the software-as-a-service revolution, a startup innovation hotbed with over 100 unicorns, a quick adopter of services centered on cutting-edge technologies like AI and ML, and above all a world leader in IT Services.

India's National Artificial Intelligence Strategy prepared by NITI Aayog outlined a way forward to harness the potential of Artificial Intelligence (AI) in different fields. Accenture offers a framework for assessing the economic effect of AI for selected G20 countries in its latest AI research studies and forecasts that AI will raise India's annual growth rate by 1.3% by 2035. Some of the recent developments in the field of science and technology in India are as follows:

- Actis, a global investor in sustainable infrastructure, is planning to invest over US\$ 700 million in order to acquire and expand assets for its platform aimed at offering real estate to tenants in the life sciences and allied sectors in India.

- In March 2022, Toyota launched its Mirai hydrogen fuel cell car in India. The Indian Oil Corporation would be supplying hydrogen to power the car. 20 | Page
- India's Top 5 IT firms (TCS, Infosys, Wipro, HCL and Tech Mahindra) added more than 122,000 employees in the first six months of FY22, nearly matching the 138,000 employees hired in the entirety of FY21.
- In October 2021, Biz2Credit, a fintech company, announced plan to invest US\$ 100 million in India over the next five years on research and development activities and expansions.
- From 2014 to 2021, India recorded a 572% growth in patent approvals.

- To accelerate digital innovation in India, NITI Aayog, Amazon Web Services and Intel have come together to develop a new experience studio to boost problem-solving and innovation between government stakeholders, start-ups, enterprises and industry experts. The new experience studio will use technologies such as artificial intelligence, machine learning, Internet of Things, augmented reality, virtual reality, blockchain and robotics to accelerate their use in the public sector.
- TechnoPro, a Japanese tech firm, plans to hire 10,000 engineers and researchers in India by 2022-23.
- Qualcomm plans to invest US\$ 8.5 million on design initiatives in India, which would include funding its innovation labs at Hyderabad and Bangalore for R&D. India is aggressively working towards establishing itself as a leader in industrialization and technological development. Significant developments in the nuclear energy sector are likely as India looks to expand its nuclear capacity. Moreover, nanotechnology is expected to transform India's pharmaceutical industry. The agriculture sector is also likely to undergo a major revamp with the government investing heavily for a technology-driven Green Revolution. Government of India, through the Science, Technology and Innovation (STI) Policy-2013, among other things, aspires to position India among the world's top five scientific powers.

0808CS211143
Saloni Gupta

INDIAN SPACE PROGRAM

The beginnings of the Indian Space Program began in 1962 when INCOSPAR (Indian National Committee for Space Research) was established. In 1972, the Space program was formalized with the creation of the DOS (Department of Space) and the Space Committee. This was done to formulate and implement roles related to research and technology in the country. The scientific committee is the focal point for coordinating research and development activities related to science and technology. And DOS is the executive branch of this Russian Commission, which operates through major national bodies such as ISRO, NRSA, RRL, NMRF and NE-SAS. DOS also supports educational institutions by sponsoring research-related projects. In 1969, the Government of India established his ISRO for the purpose of rapid development and development of the science and technology sector.

The Indian Space Research Organization (ISRO) was founded by Dr. Chaired by Vikram Sarabhai of Ahmedabad, the organization was headquartered in Bangalore. Dr. Vikram Sarabhai, as Chairman of the Executive Board, assisted in policy drafting, policy development and oversaw the implementation of all national policies. ISRO has objectives aimed at empowering technology and data for India's development. ISRO has assisted the country with media and education after successfully launching a satellite. ISRO also aims to oversee the collection and management of the country's natural resources using remote sensing technology, weather forecasting and environmental monitoring. India's racing program included the development and launch of several indigenous satellites, rockets, racing orbiters and rockets. Besides ISRO, there are other research organizations in India such as:

1. Space Applications Centre: SAC is the organization located in Ahmedabad that engages in the development of payloads for satellite communication, remote sensing, and meteorology. 2.
2. Vikram Sarabhai Space Center: VSSC is the leading organization for the development and launch of various satellites and satellite vehicles and similar related space technologies. VSSC was lost at Thiruvanantharam, India.
3. Liquid Propulsion Systems Center: India's leading organization for the development of liquid and cryogenic propulsion systems for satellites and rockets is LRSS. The company involved in the commercial marketing of racing-related products and services, in addition to research and development services for the Indian Space Program, is called Antarix Corporation. The Antarix Corporation is an entirely government owned company that was established in 1992. Some of the major achievements of Indian Space Programs are the successful launch and operation of several satellites and satellite vehicles, like the AstroSat, Mangalyaan, Chandrayaan 1 & 2 , RSLV, GSLV, etc. We are pleased that the government has invested heavily in India's Space Programs over the last 20 years. Indian science programs have a long way to go before India realizes its dream of establishing the world's best science and technology.

0808CS211021
Amey Jog

AI AND LANGUAGE

Facebook abandoned the experiment after two artificially intelligent programs appeared to be chatting in a foreign language that only they understood. Two chatbots have come up with their own changes to English that have made their jobs easier but that have remained mysterious to the people who supposedly care about them. The bizarre discussions came when Facebook invited its chatbots to try to negotiate a trade with each other, trying to exchange hats, balls and books, each of which had a certain value. But they quickly broke down when the robots appeared to be chanting at each other in a language they each understood, but which seemed mostly unintelligible to humans.

The bots were instructed to figure out how to negotiate with each other and improve their bartering as they went. But they weren't told to use plain English, which the researchers say allowed them to create their own "shorthand." In early 2017, Google revealed that the AI it uses for its Translator tool has created its own language to translate things into and then translate from. But the company was happy with this development and allowed it to continue. Another study at Open AI found that artificial intelligence can be encouraged to create language, making it more efficient and better at communicating. The main difference between artificial intelligence and human intelligence is that artificial intelligence systems can absorb vast amounts of information quickly and efficiently. This makes the software much better at grammar and vocabulary than the human brain, especially in unfamiliar languages. The rise of artificial intelligence may eventually lead to fewer people trying to learn a new language. Instead, they can only rely on language models of machine translation and natural language processing. Our ability to learn new languages declines significantly after the age of 17.

However, the technology is far from perfect. Unlike the human brain, artificial intelligence cannot understand humor, subtext, and especially context. In other words, when an AI speaks or writes, it has no idea what it's saying. Although it can provide us with the translation of thousands of words from other languages, it cannot understand where the translation falls short. Machine translation, on the other hand, creates understandable language that lacks expressions simply because it cannot understand the nuances of different languages. This could potentially make us abandon the complex idioms of our speech. However, not all the effects of artificial intelligence on our language are negative.

For example, AI in communications and brand compliance can respond to messages in a similar way to company guidelines. And it also eliminates negative tone and emotions. In fact, one study analyzed Gmail's tool that suggests possible responses to received email. The challenges it offers have been found to have a much more positive tone than what people usually use.

OUR BRAVE NEW HOMELAND

At the stroke of the midnight hour, in a world that never sleeps, all my compatriots rise to celebrate the 75th year of Independence on 15th August 2022. Little did we know that the tryst with destiny was not just an aspiration but a moral taken up by Citizens from all walks of life to make India a BRAVE NEW INDIA.

India has always been an epitome of scientific technology. From inventing zero to testing nuclear bombs it has led a journey of growth story. In words of Pandit Jawaharlal Nehru, “ Science is not merely an individual’s search for the truth, it’s something infinitely more than that of it works for the community.” In areas of research India has been positioned as one of the top 5 nations in the field of space exploration. India has continuously taken space missions to the moon and the famed PSLV. India also ranks third among the most attractive investment destinations for technology transaction in the world. India being an agrarian nation , 65% of total workforce is still concentrated to primary sector. We can’t have a paradigm shift to capitalistic labor as according to Mahatma Gandhi,” The soul of India lives in her villages.” Also, the partition period left the country in pieces leaving back it’s poverty and zero food security. 8 out of 10 people were estimated to be BPL (Below Poverty Line).

Wheat was being imported from USA in ships. Then came a ray of silver light named THE GREEN REVOLUTION, an endeavor by Norman Borlaug in 1960s. Use of fertilizers, pesticides, etc. has made India self-sufficient in food security despite certain criticisms to Green Revolution. India has a complicated history of relations with its neighbors which grew evermore after 1947.

Dr. Homi Bhabha played a major role in the Development of Defence Technology in India after independence. A PEEK TO OUR DEFENCE AND SCIENCE HISTORY:
1958-DRDO was set up 1989- Agni Missile successfully launched 1998- India conducted Pokhran 2 test 1963- India’s first ever rocket launch 1975- First satellite Aryabhata launched 1969- Formation of ISRO 2008- Chandrayaan 1 launch 2013- Mangalyaan launched Britishers ruled the nation but not the nationalists, for they always aspired to revolt. This sense of nationalism has kept the unity in diversity while not compromising with the development of the nation. We might not be a perfect democracy but we keep our eyes on the fundamental values we always strive for. This nation is our homeland standing on the edge and we are her abyss. It depends on us where we lead her from here!!!!!!

0808CS211142
Sakshi Dhakad

TECHNOLOGICAL ADVANCEMENTS IN IT INDUSTRY

Modern India is an epitome of Scientific and Technological Development and is one of the key elements for economic growth. Post 15th August 1947, India's journey has become a great example of an impressive growth story. As claimed by the Indian Brand Equity Foundation, India is among the topmost countries in the world in the field of scientific research and has been positioned as one of the top five nations in the field of space exploration. India also ranks third among the most attractive investment destinations for technology transactions in the world.

DEVELOPMENT IN THE IT INDUSTRY: The past few decades have seen staggering technological changes that have revolutionized the world. Technology has created hundreds of thousands of tools and resources, making it possible to access any information literally at our fingertips. Over 4.33 billion people actively use the internet today. That's a mind-boggling 56% of the global population, where India ranks second. And it's only going uphill from here.

IT technology in India is advancing at an astonishingly fast rate, and those who can't keep up are simply left behind. Technology has changed the way we communicate, how we pay our bills, and even how we watch TV. There's no doubt that the IT industry is growing like never before. In the past, India has often seemed to be a bit of a relative laggard among developing countries, especially in terms of economic growth. IT revolution in the country that led to the Indian software industry being recognized as one of the most successful in the world today. The late 1970s saw a boom in the IT industry with the outsourcing of software to specialized software firms. The early 1980s were all about "prepackaged" software because of the acute shortage of talented engineers who could build custom software. However, the 1990s saw a resurgence of project-driven software services that ignited the mushrooming high growth rates in the Indian software industry. Since the early 1990s, the Indian IT industry has been growing at a phenomenal rate with several phases of growth and development over the last three decades. Today, India stands tall as one of the largest digital hubs in the world.

Now it seems like an irony that how Before Independence, we were forced to work under the Abroad People from the East, and how we Indians are the Leaders of the biggest world companies from the East. some examples are Sundar Pichai running Google and Satya Nadella running Microsoft. In early 2000s , people were more focused in settling abroad but with upcoming generation , we have advanced enough to have our country its own IT hub Bangalore , known as Silicon Valley of Asia but I do feel in few years it will be more than that, rather than being known as 2nd Silicon Valley, it would be something of its own.

0808CS211029
Anshika Sahu

METAVVERSE: THE FUTURE OF INTERNET

So, at the first let's see what is metaverse. Metaverse is beginning to create something new, The term metaverse was termed by of science fiction writer Neal Stephenson. It refers to "the concept of fully immersive virtual world where people gather to socialize, Play and Work.

The concept is recently published by Facebook's rebranding as meta. Facebook's CEO Mark Zuckerberg, stated that, " The next generation of Internet is Metaverse".

He describes metaverse as " A virtual environment where you can present yourself with people in digital spaces.

The metaverse can shape the future in which We spend more time in virtual world than reality. An avtar represents you in metaverse, comparable to avtar in Facebook . Many technology experts believe that it will eliminate the geographical issues. Beyond games, Roblox Views itself as future hub for metaverse experiences. They intend to introduce instructional video games in schools.

Roblox recently hosted a Marshmello concert in Fortnite,which gathered 60 million people indicating Metaverse success. To your surprise you can also buy property in this virtual world. To do so you must first register with Decentraland, The Sandbox or Axie infinity among others. Binance, Gemini and Coinbase are all popular platforms for purchasing metaverse cryptocurrency.

They will assist you in converting real cash to metaverse crypto, "If you have such cryptocurrencies, you can directly trade it with virtual property. Moving to the conclusion Metaverse can be the future of Internet". This is so because IT industry is particular about metaverse predicting that it will be around \$800 billion by 2024.Hence, " METAVERSE IS THE FUTURE OF THE INTERNE”

0808CS211150
Saumyata Tiwari

5G AND WI-FI 6 CONNECTIVITY 5G

deployment will be accelerated in the new age of infrastructure. However, one more communication technique comes to mind: Wi-Fi 6. Coexistence or competition? What type of future connection will these two have? Although the idea and implementation of 5G has been widely promoted, some individuals may not be familiar with Wifi6. This is actually a protocol, WiFi device protocol 6. Wifi6 was created for the era of the Internet of Everything with the capacity to allow more device connections and more consistent communication, similar to 5G.

5G and the technologies that support it Let's start with the fifth generation of mobile networks. 5G has advanced features that earlier generations lacked, such as ultra-fast communication due to reduced latency and wholesale 5G lines also available in the market. High performance, efficiency and reliability are all benefits of 5G. The core technologies of 5G are orthogonal frequency division multiplexing (OFDM) and the new radio (NR) interface of 5G.

OFDM is a technique for reducing interference by modulating digital signals over multiple channels. 5G also uses wide-bandwidth technologies such as Sub-6 GHz and mm Wave, which are very fast but have relatively limited range.

These sensors can also connect directly to each other, allowing for a very fast and efficient flow of data between devices. Hundreds or thousands of interconnected IoT sensors can be used for many reasons, such as monitoring blood pressure or heart rate, testing urine for kidney function, and even monitoring skin tissue oxygenation levels! Some examples of use cases related to 5G For various reasons, such as content creation and consumption, a faster mobile device connection is preferable.

For example, faster video traffic improves the experience of watching media and entertainment content. Video streaming, social networking, banking, food delivery, e-commerce and retail will all benefit from 5G's capacity to transfer speeds of up to 20 gigabits per second. 5G will be essential for mission-critical communications such as remote healthcare, security, autonomous cars and smart city infrastructure monitoring. It also connects IoT devices, sensors and equipment used in manufacturing, automotive security, aerospace, military and healthcare.

5G offers a wide range of applications thanks to its excellent performance, reliability and efficiency. It connects IoT devices and enables enterprises to build and deploy private 5G wireless networks. As a result of its long-term impact on manufacturers, operators, content providers, application developers and consumers, 5G is rapidly becoming a major driver of global economic development.

Conclusion This means that 5G and Wi-Fi 6 will be key technologies to support various IoT applications; for example, home automation systems will rely on high data speeds to enable features such as remote video chatting, smart locks and even the ability to turn on appliances with your voice.

WEB EVOLUTION

What Is Web 3.0? Many of you must had this question, right. Imagine a new type of internet that not only accurately interprets what you input, but actually understands everything you convey, whether through text, voice or other media, one where all content you consume is more tailored to you than ever before.

Let's be more specific, Web 3.0 is the upcoming third generation of the internet where websites and apps will be able to process information in a smart human-like way through technologies like machine learning (ML), Big Data, decentralized ledger technology (DLT), etc. But you know, how web evolved to this stage. Web 1.0 (1989-2005) Web 1.0, also called the Static Web, was the first and most reliable internet in the 1990s despite only offering access to limited information with little to no user interaction. Web 2.0 (2005-present) The Social Web, or Web 2.0, made the internet a lot more interactive thanks to advancements in web technologies like JavaScript, HTML5, CSS3, etc., which enabled startups to build interactive web platforms such as YouTube, Facebook, Wikipedia and many more. Web 3.0 (yet to come) Web 3.0 is the next stage of the web evolution that would make the internet more intelligent or process information with near-human-like intelligence through the power of AI systems that could run smart programs to assist users.

How Web3 works Much of the vision for Web3 is based on the blockchain technology. This blockchain is basically a decentralized network built on peer-to-peer connections. Each device on the network handles a small portion of the computing and communication that occurs on the network, creating an online network without the need for servers and therefore without the control of large platforms and / or governments. Web 3.0 brings the human aspect back by providing privacy and security to the users rather than making corporations more powerful than ever. The vision of Web 3.0 changed in the last 7-8 years. Initially, it was simple, but with the introduction of blockchain and bitcoin, the vision and approach have changed completely.

Now, Web 3 focuses more on the decentralized features that the blockchain has to offer. dApps and The Future The transition has already started with the Web 3.0 dApps. To get a better understanding, we will be divided into different categories and discuss the dApps that will replace traditional services and applications. Using the dApps, one can easily create decentralized organizations' business models as well. The transition is inevitable, and it is only time when mass adoption of these apps will take place.

To really get a clear picture of what is Web 3.0, you need to deeply understand dApps. -Sarthak Shah SE-IT UNMANNED AERIAL SYSTEMS (UAS) For planet exploration Currently, our industry has UAS and AI on Earth they have seen a phenomenal leap in specialized areas such as navigation (selfdriving cars), Human interaction, etc. With the decision-making form of intelligence, the future of India rovers like Lunar Pragyan or Mars rover, would be very they benefited from artificial intelligence incorporated into their "minds" module for safe control of these systems using detection obstacles and exercises in the best way. Unfortunately, lunar landing and recovery operations or Mars surface rover mother ship for their location back in another zone on the surface for

measurement can be a delicate operation. Such rovers are limited in their long-distance movement due to various limitations of the earth's surface and hostile Surroundings.

To overcome such limitations, Unmanned Aerial System (UAS) is the technology for such on-planetary type surveys. Science probes attached to UAS the body can take the required measurements after being launched from the Orbiter mother ship. They can fly over to a specific area and plot of land for measurement. Big areas on a celestial body can be covered because UAS have the ability to hop like a "housefly". When landing on the surface is not possible, then UAS can float close to the surface, take measurements or wind up dip the probe into the liquid surface and collect data.

This flexibility is achieved through a UAS on an external device the celestial body provides rich data collection. ISRO has already taken steps towards this spatial feasibility and established a UAS branch in North Eastern Space Applications Center (NE-SAC) where the UAS are designed and built for various applications, e.g., Remote land survey.

0808CS211124
Priyanshi Gupta

ADAPTATION OF CAMERA

Photography has come a long way in its relatively short history. The story of photography is fascinating and it is possible to go into its great detail. However, let's briefly look at the most important and the main development of this scientific art form. The first cameras The basic concept of photography has been around since 5th century BC As much as one Iraqi scientist developed something called a camera obscura in the 11th century art was born The first permanent paintings Photography as we know it today began in the late 1830s France.

Joseph Nicéphore Niépce used a portable camera obscura expose the tin plate coated with bitumen to light. It is the first image recorded that did not fade quickly. Daguerreotype Niépce's experiment led to a collaboration with Louis Daguerre. The result was the creation of the daguerreotype, a precursor modern movie. • The copper plate was coated with silver and exposed to iodine vapors before being exposed to light. • To create an image on an early daguerreotype plate had to be exposed to light for up to 15 minutes.

Emulsion plates Emulsion boards or wet boards were cheaper than daguerreotypes and required only two- or three-seconds exposure time. These wet plates used the emulsion process called collodion process rather than the simple coating pictured plate. Dry plates In the 1870s, photography took another giant leap forward. Richard Maddox improved the previous invention to be dry gelatin plates that were almost the same speed as wet plates quality. These dry slabs could be stored rather than manufactured as need. Cameras for everyone Photography was only for professionals and very rich until George Eastman founded a company called Kodak in the 1880s. Eastman created a flexible roll film that did not require continuous hard disk replacement.

The horrors of war Around 1930 Henri-Cartier Bresson and other photographers he began using small 35mm cameras to capture images of life as it is occurred rather than staged portraits. When World War II started by 1939, many photojournalists had adopted this style. This style capturing decisive moments shaped the face of photography forever. Advanced picture control While the French established a permanent image, the Japanese brought the photographer easier image control.

These were both SLR and Nikon F cameras counted interchangeable lenses and other accessories. Introducing smart cameras In the late 1970s and early 1980s, compact cameras that were able to make independent decisions about image control introduced These point-andshoot cameras calculate the shutter speed speed, aperture and focus, giving photographers freedom focus on composition. The digital age A number of manufacturers worked in the 1980s and 1990s cameras that stored imageselectronically.

The first of them were point-and-shoot cameras that used digital media instead of film. -Ankita Giri. TE- IT HAPTIC TECHNOLOGY Haptic technology, also known as kinesthetic communication or 3D touch, refers to any technology that can create a tactile experience by applying forces, vibrations, or movements to the user. These technologies can be used to create virtual objects in computer simulation, control virtualobjects and improve remote control of machines and equipment .

Haptic devices may include tactile sensors that measure the forces exerted by the user on the interface. The word haptic, from the means "tactile, pertaining to touch". Simple

haptic devices are common in the form of game controllers, joysticks and steering wheels. Haptic technology facilitates the exploration of how human touch works by enabling the creation of controlled haptic virtual objects. Most researchers distinguish three sensory systems related to touch in humans: cutaneous, kinesthetic, and haptic. All sensations mediated by skin and kinesthetic sensitivity are referred to as tactile perception. Touch can be classified as passive and active, and the term "haptic" is often associated with active touch to communicate or recognize objects.

Types of mechanical touch sensing Human perception of mechanical stress in the skin is controlled by mechanoreceptors. There are a number of types of mechanoreceptors, but those present in the finger pad are usually divided into two categories. Fast acting (FA) and slow acting (SA).

SA mechanoreceptors are sensitive to relatively large voltages and at low frequencies, while FA mechanoreceptors are sensitive to smaller voltages at higher frequencies. As a result, SA sensors can generally detect textures with amplitudes greater than 200 micrometers, and FA sensors can detect textures with amplitudes less than 200 micrometers down to about 1 micrometer, although some research suggests that FA can only detect textures smaller than a fingerprint. FA mechanoreceptors achieve this high sensing resolution by sensing the vibrations produced by the friction and interaction of the fingerprint texture moving over the fine surface structure.

.Application

1. Aviation Force-feedback can be used to increase adherence to the safe flight envelope and thereby reduce the risk of pilots entering dangerous flight conditions outside operational boundaries while maintaining the ultimate authority of pilots and increasing their situational awareness.

2. Robotics Haptic feedback is essential for performing complex tasks via telepresence. The Shadow Hand, an advanced robotic hand, has a total of 129 touch sensors embedded in each joint and finger pad that transmit information to the operator. This allows tasks such as typing to be done remotely. The first prototype can be seen in NASA's collection of humanoid robots or robonauts.

0808CS211204
Vivek Raj Gupta

CLOUD COMPUTING: PAST, CURRENT AND FUTURE

Abstract: With the augmentation of data, the organizations need to provide better and faster secured data access to customers. Cloud computing came as a godfather of the new generation of data warehousing and data access through the network. This new way of deploying and using data solved many of data problems. **Introduction:** When it rains, in few minutes we can see the streets full of water.

What gives clouds the ability to do such a seen in such a time can be easily expressed by the following. **Comparison:** The difference between a raining cloud and a hosepipe is that a cloud drops water in parallel. From this, comes the idea of cloud computing (CC), we don't have to have many servers to make parallel transactions. We can make them from the same site, which will ease the update time and do us big favor in many ways that we'll see in this article.

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Current Status of Clouds, the S-Curve Bandwidth, perception, loss of control, trust and feasibility were the challenges that confronted the presence of CC service in the past. Many of these challenges were overcome by our new technologies and others will be in the future. Which means that this service moved from virtual to real and will be advanced as our technologies advance.

The advantages and benefits of CC are categorized in three categories:

– Centralization:

- Competitive advantage in data access.
- Huge flexibility in data access.

– Cost: Few huge clouds cost less than thousands of large local servers. Less materials, less areas, fewer employers.

– Environmental effects:

- i) Less need for infrastructure,
- ii) Less need for hardware,
- iii) Huge reduction in energy consumption. Future and R&D *The ability to detect failures, adapt to the required scale of resources., ensuring continuous availability of such resources, and meeting client's expectations in terms of quality. *New security holes will appear with hackers advancing in their efforts. *Adaptability.
- iv) Example: If a CPU is added to a virtual machine that is already in use, the running code should be able to adapt and make use of the additional resource without having to be restarted or even adapted.
 1. New segmentation concepts and distributed programming models.
 2. Solution: Data should be simultaneously protected in a form that addresses legislative issues with respect to data location and be manageable by the system.
 3. Solution: Imposing clear legislation models regarding jurisdiction over the hosted data and its distribution in other countries.

4. Solution: Developing programming models to provide adaptability. In Conclusion Cloud computing (CC) offers an exciting opportunity to build data structures that promise to solve problems associated with economic modelling, terrorism, healthcare and epidemics, etc.... and to bring on-demand applications to customers in an environment of reduced risk and enhanced .

0808CS211071
Harsh Sugandhi

CRYPTOCURRENCY

Cryptocurrency is basically a decentralised digital and virtual currency which is not regulated, monitored or controlled by any supervising authority. The only thing that upholds our integrity is cryptography and blockchain technology. And this is exactly where crypto currency and technology comes together, through blockchain. Blockchain and cryptocurrency, being two very different technologies, are very deeply intertwined and the digital money is able to function because of blockchain.

Blockchain also developed further with the popularity of crypto even though it is used in many other areas. Blockchain is a collection of blocks, i.e., digital information that is stored across various computers to form a database. When transactions through crypto take place, they are added to these blocks which later on form a chain. These chains are protected and are difficult to manipulate. Many experts claim that blockchain technology has the power to change our lives in significant and multi-dimensional ways. It has potential for much more than just crypto and it is an innovative and miraculous way of storing data. It ensures then authenticity and protection of data and one of the most impactful uses we could attain out of it is as simple as storing sensitive yet personal data.

CRYPTO CURRENCY

There are hardly a couple of things which attracted as much attention as the coronavirus and Cryptocurrency was surely one of them. With the first Cryptocurrency being introduced in 2009, the very famous Bitcoin, very few people knew or as much as cared about them. Then one day suddenly, the world was after these decentralised digital currencies and we could literally look at 800% surge in even satiric and ‘joke’ coins (read DOGE). A person who had invested in these as a part of some truth or dare game was now a millionaire and every newspaper had the same headline. A new trend was here and it was not some dance or meme, but a Laxmi chit fund-sure shotin a whip way of becoming rich, only difference being, this was actually legit. Does this not seem too good to be true? Why don’t people buy 20\$ worth of these coins, get rich and end poverty? Because these supposedly new age replacement for real, normal, everyday money were not really so. In Jan 2021, all these crypto currencies crashed leading to \$134B losses. How did this happen? The distrust of governments and unstable market were the main culprits to blame. However, this opened investor’s eyes and the bitter truth of investment was realised yet again, that loss and gain are the two sides of the same coin.

Yes, Cryptocurrency is an excellent investment opportunity and could be the boon for our generation or until the next quick money option emerges, but it comes with equally high-risk factors. With no regulatory body or no nodal authority, it is just a peer-to-peer network of transactions and the anonymity worries government and people alike. As of now, crypto can more easily be used for criminal activities rather than daily life transactions. With more developments, maybe a new age of virtual cash could come with crypto as safe

as rupee and dollar, but today with the ever-fluctuating rates and such vague nature, further huge advancements are required .This tug of war situation is a part of the journey and at the end either Cryptocurrency will be a revolutionary idea or just a primitive prototype of virtual currency which taught quite a few lessons.

0808CS211087
Khushi Sharma

CYBER SECURITY AND ITS SHORTCOMINGS IN PANDEMIC

Look around today's world, and you'll see that daily life is more dependent on technology than ever before. The benefits of this trend range from nearinstant access to information on the Internet to the modern conveniences provided by smart home automation technology and concepts like the Internet of Things. With so much good coming from technology, it can be hard to believe that potential threats lurk behind every device and platform. Yet, despite society's rosy perception of modern advances, cyber security threats presented by modern tech are a real danger.

According to Forbes, 2022 will present us with a pack of diverse and terrifying cyber security challenges, everything from supply chain disruption to increased smart device risks to a continued cyber security talent drought. According to Cybercrime Magazine, cybercrime will cost the world \$10.5 trillion annually by 2025. With advances in technology, cybersecurity is not an option it has become a necessity. Cyber security is a discipline that covers how to defend devices and services from electronic attacks by nefarious actors such as hackers, spammers, and cybercriminals. A strong cybersecurity strategy can provide a good security posture against malicious attacks designed to access, alter, delete, destroy or extort an organization's or user's systems and sensitive data. Cybersecurity is also instrumental in preventing attacks that aim to disable or disrupt a system's or device's operations.

CYBER SECURITY AND ITS SHORTCOMINGS IN PANDEMIC

Maintaining cybersecurity in a constantly evolving threat landscape is a challenge for all organizations. Traditional reactive approaches, in which resources were put toward protecting systems against the biggest known threats, while lesser-known threats were undefended, are no longer a sufficient tactic. To keep up with changing security risks, a more proactive and adaptive approach is necessary. Several key cybersecurity advisory organizations offer guidance. For example, the National Institute of Standards and Technology (NIST) recommends adopting continuous monitoring and real-time assessments as part of a risk assessment framework to defend against known and unknown threats. Cyberthreats take many forms, some of which are: Malware is a form of malicious software in which any file or program can be used to harm a computer user. This includes worms, viruses, Trojans, and spyware. Ransomware is another type of malware. It involves an attacker locking the victim's computer system files -- typically through encryption -- and demanding a payment to decrypt and unlock them. Social engineering is an attack that relies on human interaction to trick users into breaking security procedures to gain sensitive information that is typically protected. Phishing is a form of social engineering where fraudulent email or text messages that resemble those from reputable or known sources are sent. Often random

attacks, these messages intend to steal sensitive data, such as credit card or login information. Spear phishing is a type of phishing attack that has an intended target user, organization, or business. Insider threats are security breaches or losses caused by humans -- for example, employees, contractors, or customers. Insider threats can be malicious or negligent in nature. Cont'd. Distributed denial-of-service (DDoS) attacks are those in which multiple systems disrupt the traffic of a targeted system, such as a server, website, or other network resources. By flooding the target with messages, connection requests, or packets, the attackers can slow the system or crash it, preventing legitimate traffic from using it. Advanced persistent threats (APTs) are prolonged targeted attacks in which an attacker infiltrates a network and remains undetected for long periods of time with the aim to steal data. Man-in-the-middle (MitM) attacks are eavesdropping attacks that involve an attacker intercepting and relaying messages between two parties who believe they are communicating with each other.

Cybersecurity is continually challenged by hackers, data loss, privacy, risk management, and changing cybersecurity strategies. The number of cyberattacks is not expected to decrease in the future. Moreover, increased entry points for attacks, such as with the arrival of the internet of things (IoT), increase the need to secure networks and devices. One of the most problematic elements of cybersecurity is the evolving nature of security risks. As new technologies emerge, and as technology is used in new or different ways, new attack avenues are developed.

Due to the pandemic, millions have been forced into remote work all around the world. From education at schools and colleges to work at huge MNCs, everything shifted online, creating major opportunities for cybercriminals. The negative cybersecurity impacts of these online changes have led many experts to summarize the events as a growing “cyber pandemic.” Criminals quickly picked the ideal strategy to take advantage of the pandemic and the confused people: phishing, internet frauds, and spreading fake news. Already at the beginning of the pandemic, in May 2020 the number of coronavirus-related cyber-attacks increased from just a few hundred to over five thousand a day. Cont'd. Healthcare organizations and banks became the major target of cyber-attacks..

Leakage or theft of such confidential information could end in a tragedy for the victims. The business sector too experienced a significantly increased number of attacks with a shift to online mode.

Nevertheless, cyber-attacks have been prevalent regardless of the situation in the world. Hence, cybersecurity is a must. Some steps that can be taken towards a safe cyberspace include:

- 1 .Installing antivirus software on all devices connected to the internet
- 2 .Choosing strong and different passwords for your email and social media accounts
- 3 .Reviewing the privacy settings of your social media accounts

DATA PRIVACY

Data privacy, sometimes also referred to as information privacy, is an area of data protection that concerns the proper handling of sensitive data such as certain financial data and intellectual property data, to meet regulatory requirements as well as protecting the confidentiality and immutability of the data. Roughly speaking, data protection spans three broad categories, namely, traditional data protection (such as backup and restore copies), data security, and data privacy .

Ensuring the privacy of sensitive and personal data can be considered an outcome of best practice in data protection and security with the overall goal of achieving the continual availability and immutability of critical business data. What are some of the most important technologies for data privacy? Encryption is a way to conceal information by scrambling it so that it appears to be random data. Only parties with the encryption key can unscramble the information.

DATA PRIVACY :

With the increase in dependency on electronic devices, it becomes important to teach people the proper 'netiquettes'. Parents have an important role to play in monitoring their child's behaviour and activity on the internet. It is also important for Access control ensures that only authorized parties access systems and data. Access control can be combined with data loss prevention (DLP) to stop sensitive data from leaving the network. Two-factor authentication is one of the most important technologies for regular users, as it makes it far harder for attackers to gain unauthorized access to personal accounts. These are just some of the technologies available today that can protect user privacy and keep data more secure.

However, technology alone is not sufficient to protect data privacy. What are the laws that govern data privacy? As technological advances have improved data collection and surveillance capabilities, governments around the world have started passing laws regulating what kind of data can be collected about users, how that data can be used, and how data should be stored and protected. Some of the most important regulatory privacy frameworks to know include: General Data Protection Regulation (GDPR): Regulates how the personal data of European Union (EU) data subjects, meaning individuals, can be collected, stored, and processed, and gives data subjects rights to control their personal data (including a right to be forgotten). National data protection laws: Many countries, such as Canada, Japan, Australia, Singapore, and others, have comprehensive data protection laws in some form. Some, like Brazil's General Law for the Protection of Personal Data and the UK's Data Protection Act, are quite similar to the GDPR. Cont'd.

California Consumer Privacy Act (CCPA): Requires that consumers be made aware of what personal data is collected and gives consumers control over their personal data, including a right to tell organizations not to sell their personal data. There are also industry-specific privacy guidelines in some countries: for instance, in the United States, the Health Insurance Portability and Accountability Act (HIPAA) governs how personal healthcare data should be handled. However, many privacy advocates argue that individuals still do not have sufficient control over what happens to their personal data.

Governments around the world may pass additional data privacy laws in the future. What are some of the challenges users face when protecting their online privacy? Online tracking: User behavior is regularly tracked online. Cookies often record a user's activities, and while most countries require websites to alert users of cookie usage, users may not be aware of to what degree cookies are recording their activities. Losing control of data: With so many online services in common use, individuals may not be aware of how their data is being shared beyond the websites with which they interact online, and they may not have a say over what happens to their data. Lack of transparency: To use web applications, users often have to provide personal data like their name, email, phone number, or location; meanwhile, the privacy policies associated with those applications may be dense and difficult to understand. Social media: Social media posts may reveal more personal information than users realize.

Cyber crime: Many attackers try to steal user data in order to commit fraud, compromise secure systems, or sell it on underground markets to parties who will use the data for malicious purposes. Some attackers use phishing attacks . What are some of the challenges businesses face when protecting user privacy? Communication: Organizations sometimes struggle to communicate clearly to their users what personal data they are collecting and how they use it.

Cyber crime: Attackers target both individual users and organizations that collect and store data about those users. In addition, as more aspects of a business become Internet-connected, the attack surface increases. Data breaches: A data breach can lead to a massive violation of user privacy if personal details are leaked, and attackers continue to refine the techniques they use to cause these breaches. Insider threats: Internal employees or contractors might inappropriately access data if it is not adequately protected. Why is Data Privacy important? In many jurisdictions, privacy is considered a fundamental human right, and data protection laws exist to guard that right. Data privacy is also important because in order for individuals to be willing to engage online, they have to trust that their personal data will be handled with care. Organizations use data protection practices to demonstrate to their customers and users that they can be trusted with their personal data.

Business Asset Management: Data is perhaps the most important asset a business owns. We live in a data economy where companies find enormous

value in collecting, sharing and using data about customers or users, especially from social media.

Regulatory Compliance: Managing data to ensure regulatory compliance is arguably even more important. A business may have to meet legal responsibilities about how they collect, store, and process personal data, and non-compliance could lead to a huge fine. If the business becomes the victim to a hack or ransomware, the consequences in terms of lost revenue and lost customer trust could be even worse.

Personal data can be misused in a number of ways if it is not kept private or if people don't have the ability to control how their information is used: Entities may sell personal data to advertisers or other outside parties without user consent, which can result in users receiving unwanted marketing or advertising. When a person's activities are tracked and monitored, this may restrict their ability to express themselves freely, especially under repressive governments. For individuals, any of these outcomes can be harmful.

For a business, these outcomes can irreparably harm their reputation, as well as resulting in fines, sanctions, and other legal consequences. In addition to the real-world implications of privacy infringements, many people and countries hold that privacy has intrinsic value: that privacy is a human right fundamental to a free society, like the right to free speech.

0808CS211028
Ansh Kumar Dwivedi

DATA VISUALIZATION AND POWER BUSINESS INTELLIGENCE

Every day a huge amount of data is generated. This data can even vary in nature and structure. A business, for example, can have data on sales revenue, marketing performance, customer interactions, inventory levels, production metrics, staffing levels, costs, etc. But with so much data to sift through, it can be difficult for people to see the story it tells.

Data visualization helps you turn all that granular data into easily understood, visually compelling—and useful—business information. Data visualization is the graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data. In the world of Big Data, data visualization tools and technologies are essential to analyse massive amounts of information and make data-driven decisions. Hidden within your data lie important insights that can help drive the business forward. But the challenge is that you can't always connect the dots by looking at raw numbers alone. When you look at your data presented in a visual format, patterns, connections, and other insights emerge that would otherwise remain out of sight.

Our eyes are drawn to colours and patterns. We can quickly identify red from blue, and a square from a circle. Our culture is visual, including everything from art and advertisements to TV and movies. Data visualization is another form of visual art that grabs our interest and keeps our eyes on the message. When we see a chart, we quickly see trends and outliers. If we can see something, we internalize it quickly. It's storytelling with a purpose. If you've ever stared at a massive spreadsheet of data and couldn't see a trend, you know how much more effective a visualization can be. It's hard to think of a professional industry that doesn't benefit from making data more understandable.

Every STEM field benefits from understanding data—and so do fields in government, finance, marketing, history, consumer goods, service industries, education, sports, and so on. While we always increasing talk about data visualization there are practical, real-life applications that are undeniable. And, since visualization is so prolific, it's also one of the most useful professional skills to develop. The better you can convey your points visually, whether in a dashboard or a slide deck, the better you can leverage that information. Skill sets are changing to accommodate a data-driven world. It is increasingly valuable for professionals to be able to use data to make decisions and use visuals to tell stories of when data informs the who, what, when, where, and how.

While traditional education typically draws a distinct line between creative storytelling and technical analysis, the modern professional world also values those who can cross between the two. Today, data visualization tools run the gamut from free versions you can access with a browser to feature-rich platforms that integrate with a wide variety of mainstream business

applications. One such tool is Power BI, an interactive data visualization software product developed by Microsoft with a primary focus on business intelligence (BI). Power BI offers cloud-based services for interactive visualizations with a simple interface for end-users to create their own reports and dashboards.

Power BI was first conceptualized by Ruler and Dhers Netz of the SQL server coverage services team at Microsoft. It was further designed by West Chadic George in the year 2010 and named Project Crescent. In 2011, It was bundled with SQL Server Codenamed Mount McKinley. Microsoft unveiled the first preview to Power BI in September 2014. And finally, the first version of Power BI was released on 24 July 2015. It was based on Excel Based Add-ins like Power Query, Pivot, view, and Map. Today Power BI comes across as one of the most powerful and efficient data visualization and analytical tool. Some of the many advantages it offers include pre-built dashboards, real-time updates, secure and reliable connection to your data sources in the cloud or on-premises, integration with both Python and R coding, etc. Moreover, it is backed by artificial intelligence and machine learning. This tool, however, currently has some disadvantages in terms of sharing the reports made and certain types not being compatible with it. These are likely to be overcome in the future as Power BI is further developed.

0808CS211068
Harpreet Singh Chhabra

TRAINING THE MODELS

In the last few years, classical machine learning models have made revolutionary strides in improving automated predictions. But when researchers tried using them to solve quantum problems, Preskill said, the models often got things right, but their accuracy was not guaranteed. Machine learning typically progresses via trial and error, so you'd need just the right kind of data — and a lot of it — to get useful information. A paper by Huang and collaborators at Google Quantum AI underscored that intuition: Classical machine learning algorithms trained with enough quantum data can be computationally powerful enough to model quantum systems. But there was still a problem. These machine learning models were still fundamentally classical, meaning that it's impossible for them to process truly quantum data and output quantum states. To get around this, Huang and colleagues showed in a science paper last year how to use classical shadows to convert quantum information into classical data. They could then train a machine learning model to predict properties of new quantum systems.

“The advantage they create is a quantum map between [quantum] inputs and [quantum] outputs, both of which are classical shadows — since you are never going to succeed if it blows up to the full quantum state,” said Jarrod McClean, a computer scientist at Google Quantum AI.

Laura Lewis showed how to improve existing machine learning algorithms to allow classical computers to learn how to process quantum information in practical, achievable terms.

0808CS211124
Priyanshi Gupta

Editorial

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