



# ECHELON MAGAZINE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SRI VENKATESWARA COLLEGE OF ENGINEERING , TIRUPATI

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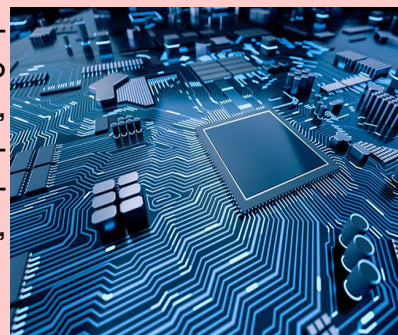
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## QUANTUM COMPUTING

Quantum computers shine when solving problems involving numbers or data crunching with huge amounts of inputs. They are designed to tackle complex problems that would take supercomputers from days to being unable to solve. Quantum computers can simulate the universe's subatomic particles by speaking the same language as an electron or proton. We're at the beginning of the quantum computing paradigm that is expected to have a major impact on our grasp of chemistry, biology, and physics. While

processors using transistors to perform calculations. On, off, one, zero...pretty predictable. The game changes completely however, with quantum computers. In this realm, the processing and storage of 1's and 0's of classical systems give way to qubits or quantum bits as the fundamental building block of quantum information, experienced as a two-state quantum-mechanical system. The power of these qubits is their inherent ability to scale exponentially so that a two-qubit machine allows for four calculations simultaneously, a three-qubit machine allows for eight calculations, and a four-qubit machine performs 16 simultaneous calculations.



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**How it works**—The basics We're all used to binary

simultaneously, a three-qubit machine allows for eight calculations, and a four-qubit machine performs 16 simultaneous calculations.

The basic properties of quantum computing are

superposition, entanglement, and interference.

**Superposition** is the ability of a quantum system to be in multiple states simultaneously. The go-to

example of superposition is the flip of a coin, which consistently lands as heads or tails—a very binary concept. However, when that coin is in **mid-**

air, it is both heads and tails and until it lands, heads and tails simultaneously. Before measurement, the electron exists in quantum superposition.

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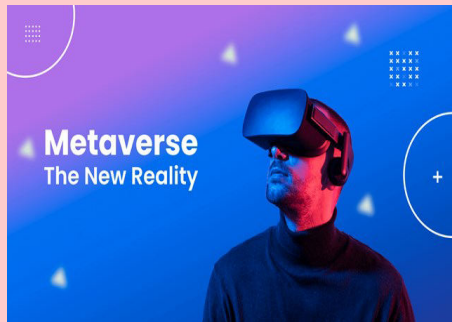


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# METAVVERSE

A metaverse is a network of 3D virtual worlds focused on social connection. In futurism and science fiction, it is often described as a hypothetical iteration of the Internet as a single, universal virtual world that is facilitated by the use of virtual and augmented reality headsets.



The term "metaverse" has its origins in the 1992 science fiction novel *Snow Crash* as a portmanteau of "meta" and "universe." Various metaverses have been developed for popular use such as virtual world platforms like *Second Life*. Some metaverse iterations involve integration between virtual and physical spaces and virtual economies. Demand for increased immersion means metaverse development is often linked to advancing virtual reality technology. The term has been used as a buzzword to exaggerate development progress of various related technologies and projects for public relations purposes. Information privacy, user addiction, and user safety are concerns within metaverses, stemming from challenges facing the social media and video game industries as a whole.

## Virtual reality

In 2019, the social network company Facebook launched a social VR world called Facebook Horizon.

In 2021, Facebook was renamed "Meta Platforms" and its chairman Mark Zuckerberg declared a company commitment to developing a metaverse. Many of the virtual reality technologies advertised by Meta Platforms remain to be developed. Facebook whistleblower Frances Haugen criticized the move, adding that Meta Platforms' continued focus on growth-oriented projects is largely done to the detriment of ensuring safety on their platforms. Meta Platforms has also faced user safety criticism regarding Horizon Worlds due to the occurrence of sexual harassment on the platform.

Microsoft acquired the VR company AltspaceVR in 2017, and has since implemented metaverse features such as virtual avatars and meetings held in virtual reality into

**Microsoft Teams.** In 2022, HTC announced its launch of a cross-



platform metaverse ecosystem called VIVERSE, which would allow connections between virtual

worlds accessible by both VR



and non-VR devices. and supports parental controls for children.

Proposed applications for metaverse technology include

improving work productivity, interactive learning environments, e-commerce, real estate and fashion. Other, smaller companies have worked towards creating the metaverse through virtual worlds in the past, such as the video-game VRChat.

## Video games

Components of metaverse technology have already been developed within online video games. The 2003 virtual world platform *Second Life* is often described as the first metaverse, as it incorporated many aspects of social media into a three-dimensional world with the user represented as an avatar. Social interaction and 3D virtual worlds are often an integral feature in many massively multiplayer online games.

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# 5G Technology

## What is 5G?



5G is the fifth generation of cellular network technology. It runs on radio frequencies the same as in our smartphones. However, this ground-breaking technology has significantly improved network connection and is providing new opportunities for more innovative solutions. From connected sensors to autonomous production lines that react to supply and demand, 5G is powering rapid advancement and elevating user experiences. But as with any new technology, many are wondering,

## what are the 5G network pros and cons?

### The evolution of 5G

Gone are the days of playing Snake on our Nokia and being happy with 1GB of data for the entire month. As technology has evolved over the years we have seen multiple generations of data technology emerge. From the basic internet services of 2G to the video and streaming capabilities of 3G, and more recently the faster speeds and online gaming abilities of 4G LTE and now 5G

which is hotly anticipated to change the way we work, live and play.

Currently, in its earliest phase of deployment, network carriers have been rolling out limited 5G

availability throughout 2020 and are planning wider availability by the end of 2021. Forecasts predict that there will be 1.9 million 5G subscriptions worldwide by 2024. As business leaders look ahead to the innovation opportunities that 5G will offer, they need to remember that the network is still in its infancy, and whilst there are many advantages, there are also some disadvantages. In this blog, we share the 5G pros and cons

### 5G PROS

There are numerous pros of the 5G network including

#### 1) Faster Speeds

5G is much faster than previous generation networks, with potential speeds of up to 20 Gbps, it is 100 times faster than that of 4G and 4G LTE. The enhancements 5G brings, means downloading movies in seconds as opposed to minutes. One comparison showed that 5G would save consumers 23 hours (almost one day) per month in loading time across social media, gaming and music/video streaming sites. 5G movie downloads, in particular, were decreased from 7 minutes to just 6 seconds. Once 5G is rolled out in its entirety many consumers and businesses may consider 5G

as a strong alternative to broadband connections.

#### 2) Low Latency

Latency refers to the time that passes an action and a response. For instance, the delay between when someone clicks a link to a webpage and when the browser displays that webpage. 5G networks will have far lower latency than 4G LTE. One trial showed that it could be less than 5 milliseconds. This reduced latency



will be able to support new applications, such as IoT (Internet of Things) and artificial intelligence, allowing for real-time connectivity.

#### 3) Increased Capacity

5G will deliver up to 1000x more capacity than 4G across a larger frequency spectrum. It will be able to cope with simultaneous high demand applications and will be able to connect thousands of internet-enabled devices, from phones to sensors and IoT (Internet of Things). It also means that field-based employees who

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# Cryptocurrency

A cryptocurrency is an encrypted data string that denotes a unit of currency. It is monitored and organized by a peer-to-peer network called a block chain, which also serves as a secure ledger of transactions, e.g., buying, selling, and transferring. Unlike physical money, cryptocurrencies are decentralized, which means they are not issued by governments or other financial institutions. A cryptocurrency is an encrypted data string that denotes a unit of currency. It is monitored and organized by a peer-to-peer network called a block chain, which also serves as a secure ledger of transactions, e.g., buying, selling, and transferring. Unlike physical money, cryptocurrencies are decentralized, which means they are not issued by

governments or other financial institutions.

Cryptocurrencies are created (and secured) through cryptographic algorithms that are maintained and confirmed in a process called mining, where a network of computers or specialized hardware such as



terminaries. "Crypto" refers to the various encryption algorithms and cryptographic techniques that safeguard these entries, such as elliptical curve encryption, public-private key pairs, and hashing functions. Cryptocurrencies can be mined or purchased from cryptocurrency exchanges

## Types of Cryptocurrency

Bitcoin is the most popular and valuable cryptocurrency. An anonymous person called Satoshi Nakamoto invented it and introduced it to the world via a white paper in 2008. There are thousands of cryptocurrencies present in the market today.

Each cryptocurrency claims to have a different function and specification. For example, Ethereum's ether markets itself as gas for the underlying smart contract platform. Ripple's XRP is used by banks to facilitate transfers between different geographies. existing financial infrastructure. The legal status of cryptocurrencies has implications for their use in daily transactions

application-specific integrated circuits (ASICs) process and validate the transactions. The process incentivizes the miners who run the network with the cryptocurrency. Bitcoin, Ether, Litecoin, and Monero are popular cryptocurrencies.

## Understanding Cryptocurrencies

Cryptocurrencies are digital or virtual currencies underpinned by cryptographic systems. They enable secure online payments without the use of third-party in-



VISWANADHAM RAJA

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## ABOUT DEPARTMENT

### Vision of the Department

To produce globally competent, dynamic and multi talented young leaders with skill & knowledge in Computer science and Engineering to cater the contemporary demands of the software industry, thereby making them industry ready while at the Institution and also to pursue higher education imbibing holistic approach.

### Mission of the Department

**M1:** To impart high quality technical education in Computer Science and Engineering by providing well equipped infrastructure, core values.

**M2:** Advanced research and technical consultancy services with qualified and senior faculty.

**M3:** To prepare the learners professionally deft and intellectually adept possessing excellent skill, knowledge and behavior.

**M4:** To inculcate the leadership capabilities in learners to face the dynamic and challenging global of the Computer Science and Engineering field.

### Programme Outcomes (POs)

**PO1 :** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering speciali-

zation to the solution of complex engineering problems.

**PO2:** Problem analysis: Identify, formulate, review 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 rele-



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### Programme Outcomes (POs)

**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 (PSOs)

**PSO1 : Problem Solving Skills:** Ability to design and develop computing tools with moderate complexity in the areas pertaining to database, data analytics, networking, web and app design, IoT and information security with integration.

**PSO2: Professional Skills:** Ability to apply standard practices and methods in software project management and software development using suitable programming environments to deliver quality product to the industry

### Programme Educational Objectives (PEOs)

**PEO1:** To impart foundations of applied science and engineering subjects in order to apply, analyze and solve problems in computational aspects.

**PEO2:** To inculcate ability in creativity and design of computer support systems and impart knowledge and skills to analyze, design, test and implement various software applications.

**PEO3:** To strengthen higher education, research, prepare for globally acclaimed competitions; imbibe in civic-leadership qualities and to trigger social, ethical, holistic and behavioral approach