DGITechChronicle

DGI TECH CHRONICLE

IT EDITION

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EDITORIAL BOARD

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(Assistant Professor)

Editor in Chief

In this issue, we delve into a captivating array of topics and developments, all tailored to the inquisitive minds of the future engineers. As an engineering college community, we stand at the forefront of technological breakthroughs, and it is our mission to empower you with the knowledge and insights to not only keep pace but to lead in this ever-accelerating race of innovation.

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DGITechChronicle

CSIT EDITION

Department Vision and Mission

Department PEO, PSO and PO's

My Pen and Me: Students Articles

Department Achievers

VISION

Promoting technologists by imparting profound knowledge in information technology, all while instilling ethics through specialized technical education.

MISSION

Delivering comprehensive knowledge in information technology, preparing technologists to excel in a rapidly evolving digital landscape.

Building a culture of honesty and responsibility in tech, promoting smart and ethical leadership.

Empowering individuals with specialized technical skills and ethical values to drive positive change and innovation in the tech industry.

Program Educational Objectives (PEO)

To enable graduates to think logically, pursue lifelong learning and will have the capacity to understand technical issues related to computing systems and to design optimal solutions.

To enable graduates to develop hardware and software systems by understanding the importance of social, business and environmental needs in the human context.

To enable graduates to gain employment in organizations and establish themselves as professionals by applying their technical skills to solve real world problems and meet the diversified needs of industry, academia and research.

Program Specific Outcome (PSO)

To adapt to emerging technologies and develop innovative solutions for existing and newer problems.

To create and apply appropriate techniques IT tools to complex engineering activities with an understanding of the limitations.

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Program Outcome (PO)

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

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.

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.

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.

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

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.

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.

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

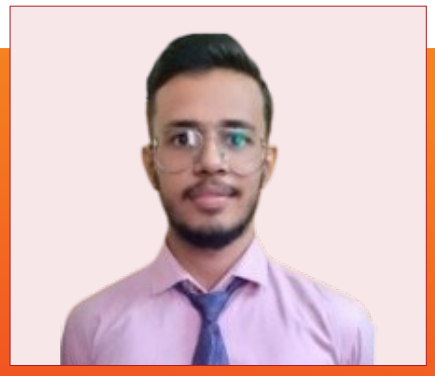
Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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.

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.

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.

Universal Serial Bus (USB)



Kartik Goswami
(13514; CSIT)

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USB was designed to standardize the connection of peripherals like pointing devices, keyboards, digital images and video cameras. But some devices such as printers, portable media players, disk drives, and network adaptors to personal computers used USB to communicate and to supply electric power. It is commonplace to many devices and has largely replaced interfaces such as serial ports and parallel ports. USB connectors have replaced other types of battery chargers for portable devices with themselves.

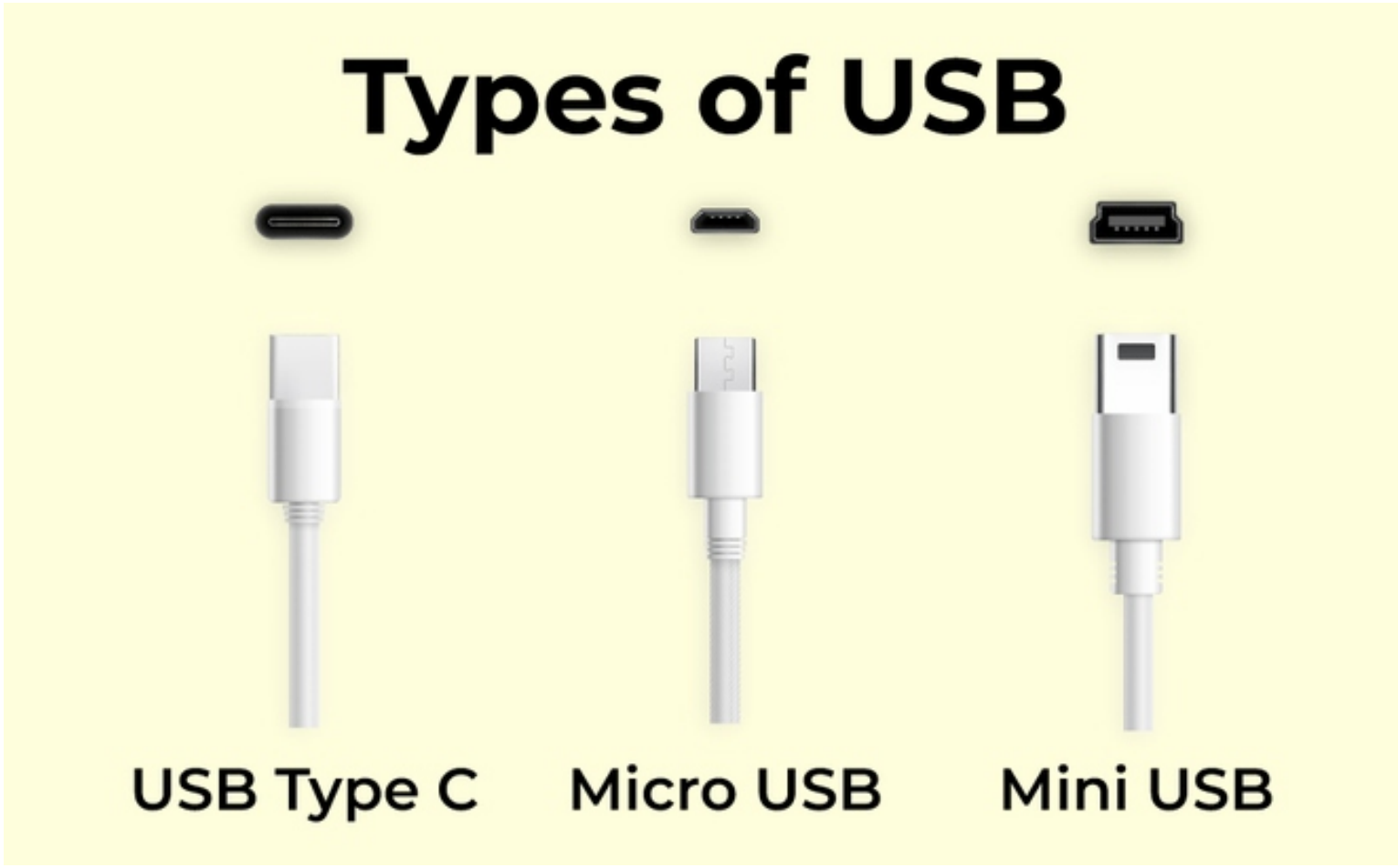
Universal Serial Bus (USB) is an industry standard that establishes specifications for connectors, cables, and protocols for communication, connection, and power supply between personal computers and their peripheral devices. There have been 3 generations of USB specifications:

- USB 1.x
- USB 2.0
- USB 3.x

The first USB was formulated in the mid-1990s. USB 1.1 was announced in 1995 and released in 1996. It was too popular and grab the market till about the year 2000. In the duration of USB 1.1 Intel announced a USB host controller and Philips announced USB audio for isochronous communication with consumer electronics devices.

USB Connector Types

USB connectors have different shapes and sizes. Most of the USB connectors are the standard USB, Mini-USB, and Micro-USB, which have two or more variations of connectors. Information on each type are shown below.



Mini USB

Mini USB is available in three different types A type, B type, and AB type. It is used with computer peripherals and digital cameras. The most common kind of interface is this one, that is referred to as mini B. Micro USB and USB-C cables basically take the place of mini USB on the latest devices. It uses coaxial cable to transmit data and power between two devices. it applies to mobile hard drives, digital cameras, and MP3 players. One end of a micro USB cable has a much smaller quadrilateral hub, and the other end has a regular USB hub with a flat head. It can be easily plugged into mobile devices. Although the tiny USB is mainly designed for, it can also be used to transfer data between computers having at least one USB port for charging device.

Micro USB

A reduced version of the USB (Universal Serial Bus), the micro-USB. It was created for connecting small and mobile devices including digital cameras, smartphones, GPS components, MP3 players, and photo printers and was first announced in 2007 as a replacement for mini USB.

The three different types of Micro-USB are Micro A, Micro B, and Micro USB 3. The connector size for the type Micro-A and Micro-B is 6.85 x 1.8 mm, while the Micro-A connector has a larger maximum overmild size. Because it has more pins on the side for twice as many wires than micro B, USB 3 micro is more comparable to micro B yet has faster speed. Micro USB and normal USB versions are both plug-and-play and hot-swappable is still widely used with electronic devices.

USB Type-C

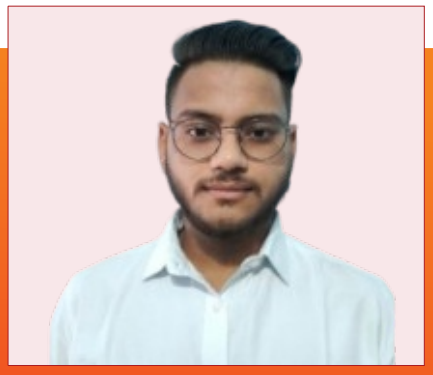
A USB Type-C port is a relatively new type of connector that may be found on the majority of contemporary newer Android smartphones and other USB-connected devices. Data and power are delivered to computing machines using it. In contrast to traditional USB connections, USB-C cables can be connected into devices in either direction, including upside down.

Advantages of USB

The Universal Serial Bus was designed to simplify and improve the interface between personal computers and peripheral devices when compared with previously existing standard or ad-hoc proprietary interfaces.

1. The USB interface is self-configuring. This means that the user need not adjust settings on the device and interface for speed or data format, or configure interrupts, input/output addresses, or direct memory access channels.
2. USB connectors are standardized at the host, so any peripheral can use any available receptacle. USB takes full advantage of the additional processing power that can be economically put into peripheral devices so that they can manage themselves. USB devices mostly do not have user-adjustable interface settings.
3. The USB interface is hot pluggable or plug and plays, meaning devices can be exchanged without rebooting the host computer. Small devices can be powered directly from the USB interface thus removing extra power supply cables.
4. The USB interface defines protocols for improving reliability over previous interfaces and recovery from common errors.
5. Installation of a device relying on the USB standard minimal operator action is required.

Cryptocurrency



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Cryptocurrency is a digital payment system that does not rely on banks to verify transactions. Cryptocurrency payments exist purely as digital entries to an online database. When cryptocurrency funds are transferred, the transactions are recorded in a public ledger.

- In cryptocurrency, “coins” (which are publicly agreed-on records of ownership) are generated or produced by “miners”.
- These miners are people who run programs on ASIC (Application Specific Integrated Circuit) devices made specifically to solve proof-of-work puzzles.
- The work behind mining coins gives them value, while the scarcity of coins and demand for them causes their value to fluctuate.
- Cryptocurrencies can be used for buying goods just like fiat currency.
- Cryptocurrencies use encryption to verify and protect transactions.
- It does not exist in physical form and is not typically issued by any central authority.
- They use decentralized control in contrast to central bank digital currency.

There are three steps involved in buying a cryptocurrency:

1. Choosing a platform: There are two platforms available to choose from:

- **Traditional Brokers:** There are online brokers who offer to buy and sell cryptocurrencies along with stocks, bonds, etc, but they offer lower trading costs and fewer crypto features.
- **Cryptocurrency exchanges:** Different types of cryptocurrency exchanges are available to choose from with different cryptocurrencies, wallet storage, etc.

2. Funding your account: After choosing the platform, the next step is to fund the account. Most crypto exchanges allow users to purchase cryptocurrencies using fiat currency like U.S. Dollar, or the Euro, or using Credit and Debit cards, but this varies from platform to platform. An important factor to consider here is the fees that include the potential deposit and withdrawal transaction fees plus the trading fees.

3. Placing an order: The order can be placed via exchanges or broker's web or mobile platform.

- Select the Buy option.
- Choose the order type.
- Enter the number of cryptocurrencies.
- Confirm the order.

A similar process needs to be followed for selling cryptocurrencies.

How To Store Cryptocurrency

Once the cryptocurrency is purchased, it needs to be stored safely to protect it from hackers. The usual place to store cryptocurrency is crypto wallets which can be physical devices or online software. Not all exchanges or brokers provide crypto wallet services. The cryptocurrencies can be stored in these four places:

1. **Custodial Wallet:** In this approach, a third party such as a crypto exchange stores the cryptocurrency either through cold storage or hot storage, or a combination of the two. This is the most simplest and convenient method for the users as it requires less work on the user's part.
2. **Cold Wallet:** These are also known as Hardware wallets. It is an offline wallet in which hardware connects to the computer and stores the cryptocurrency. The device connects to the internet at the time of sending and receiving cryptocurrency but other than that the cryptos are safely stored offline.
3. **Hot Wallet:** These are the applications that store cryptocurrencies online. These are available as desktop or mobile apps.
4. **Paper Wallet:** This is also known as a physical wallet. It is a printout of the public and private keys available as a string of characters or scannable QR codes. To send crypto scan the public and private keys and crypto will be received using the public keys.

Features of cryptocurrencies:

Decentralization: Cryptocurrencies are decentralized, meaning they operate on a peer-to-peer network and are not controlled by a central authority or government.

Security: Cryptocurrencies use cryptographic techniques to ensure the security and integrity of transactions and to protect against fraud and hacking.

Transparency: Most cryptocurrencies operate on a public ledger called a blockchain, which allows anyone to see all transactions that have occurred on the network.

Anonymity: While most cryptocurrencies are not completely anonymous, they do offer a high degree of privacy and can allow users to transact without revealing their identity.

Introduction to Human Computer Interface (HCI)

Mayur
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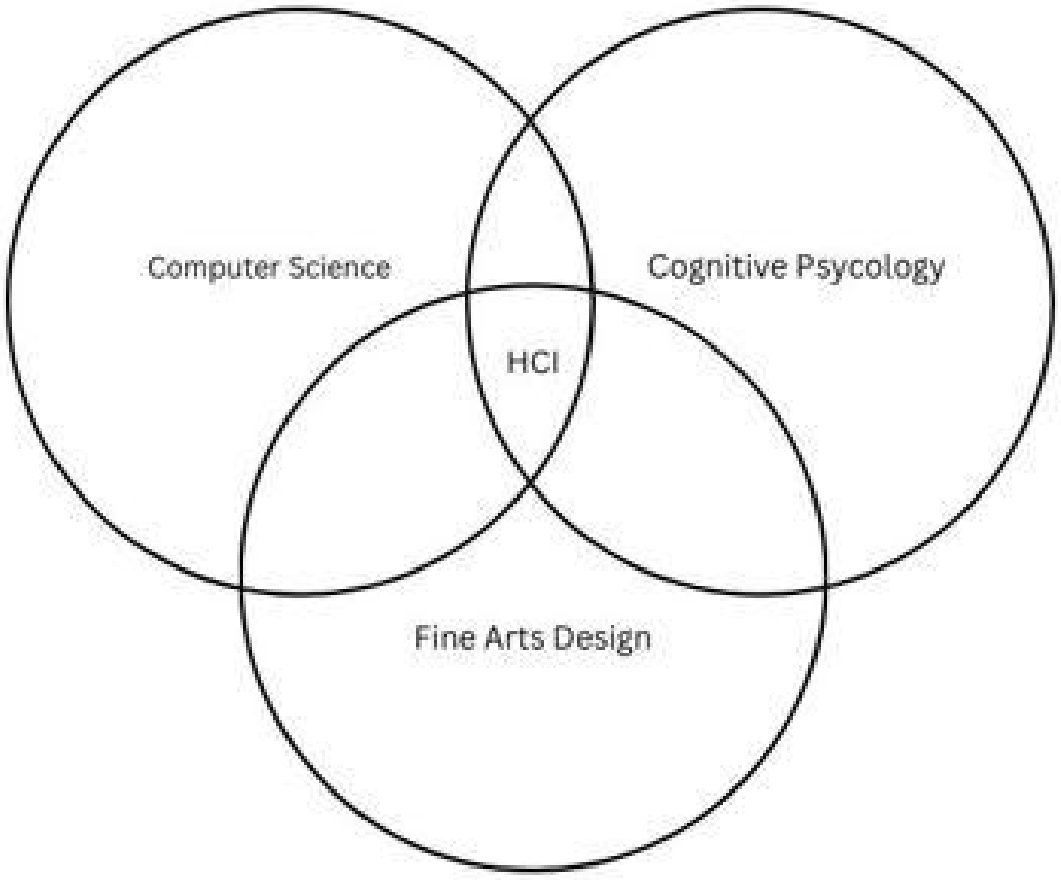
HCI (Human Computer Interface) is a field of study that refers to communication between the human user and a computer system. Here interface refers to a medium or interaction between the computer and the end user. It is also known as CHI (Computer Human Interface) or MMI (Man Machine Interaction). It is concerned with design, evaluation, and implementation. It is used to provide a user-friendly environment.

Objective

Human uses digital devices to perform various activities. HCI is to design a systems in such a way that make them efficient, stable, usable and attainable. Lack of communication can result in poor designed user interfaces. It provides a ways to reduce design time through various task models. There are some disciplines contributing to HCI.



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Computer Science

Computer science is a field of computation and information. Computer science plays a crucial role in modern development of HCI. Smart Television, Voice assistant, AR/VR technology and gaze detection are some of the technology exists in modern world, that are running our day to day life.

Cognitive Psychology

It is a field of HCI which identifies how human interact with systems. It includes Language based interaction, a set of rules are provided to the system. Based on that rules we create our model. It also includes Human motor skills, where we identifies physical characteristics of user and based on that characteristics we create our model.