UNIT – I

Introduction to Virtual Reality and Augmented Reality – Definition – Introduction to Trajectories and Hybrid Space-Three I's of Virtual Reality – Virtual Reality Vs 3D Computer Graphics – Benefits of Virtual Reality – Components of VR System – Introduction to AR-AR Technologies-Input Devices – 3D Position Trackers – Types of Trackers – Navigation and Manipulation Interfaces – Gesture Interfaces – Types of Gesture Input Devices – Output Devices – Graphics Display – Human Visual System – Personal Graphics Displays – Large Volume Displays – Sound Displays – Human Auditory System.

1.4) COMPONENTS OF VR SYSTEM:

A Virtual Reality (VR) system is composed of various hardware and software components that work together to create an immersive and interactive virtual environment. The key components of a VR system include:

1. Head-Mounted Display (HMD):

- The HMD is a wearable device that is worn on the head, covering the eyes and sometimes the ears. It typically consists of a display screen for each eye, lenses, and sensors to track head movements. Examples include Oculus Rift, HTC Vive, and PlayStation VR.

2. Motion Tracking Sensors:

- Sensors, such as accelerometers, gyroscopes, and magnetometers, are used to track the user's head movements and, in some systems, hand movements. This tracking information is crucial for updating the virtual scene in real-time based on the user's perspective.

3. Input Devices:

- Controllers or input devices allow users to interact with the virtual environment. These may include handheld controllers with buttons, triggers, and joysticks. Some systems also incorporate gloves or haptic devices for more immersive interactions.

4. Base Stations or External Cameras:

- Base stations or external cameras are used to track the position of the VR headset and controllers in a defined physical space. They help create a boundary for the user to move within and contribute to accurate positional tracking.

5. VR-Ready Computer or Console:

- A powerful computer or gaming console is required to run VR applications and simulations. It needs to meet specific hardware and performance requirements to ensure a smooth and lag-free VR experience.

6. Graphics Processing Unit (GPU):

- A high-performance GPU is essential for rendering complex 3D graphics in real-time. VR applications demand substantial graphical processing power to create realistic and immersive visuals.

7. Audio System:

- Integrated or external audio systems provide spatial audio to enhance the immersive

experience. Positional audio cues contribute to the sense of presence in the virtual environment.

8. Software Platform:

- The VR system relies on software platforms and applications designed for virtual reality. This includes VR games, simulations, training programs, and other interactive experiences.

9. Interconnectivity:

- VR systems may have the capability to connect to the internet or other external devices for additional content, updates, or multiplayer interactions.

10. Power Supply:

VR devices are typically powered by batteries or connected to a power source. The duration of battery life can affect the usability of portable VR devices.

11. Comfort Features:

- Comfort features such as adjustable head straps, padding, and ergonomic design contribute to user comfort during extended VR sessions.

12. Safety Measures:

- Some VR systems incorporate safety features, such as chaperone systems or guardian systems, to alert users when they are nearing physical boundaries or obstacles in the real-world space.

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