BCA
Fifth Semester
Computer Graphics & Animation
Unit: #5

Prepared by :Narayan Dhamala

Introduction to Virtual Reality (VR)

- Virtual reality is an artificial reality that makes users to feel in a virtual environment by using the computer hardware and software.

OR

- Virtual reality is a computer generated, immersive (or wide field), multisensory information program which tracks a user in real time.
- VR is used in application areas like aircraft pilot training, training for surgical procedures, engineering and scientific visualization, computer games etc.

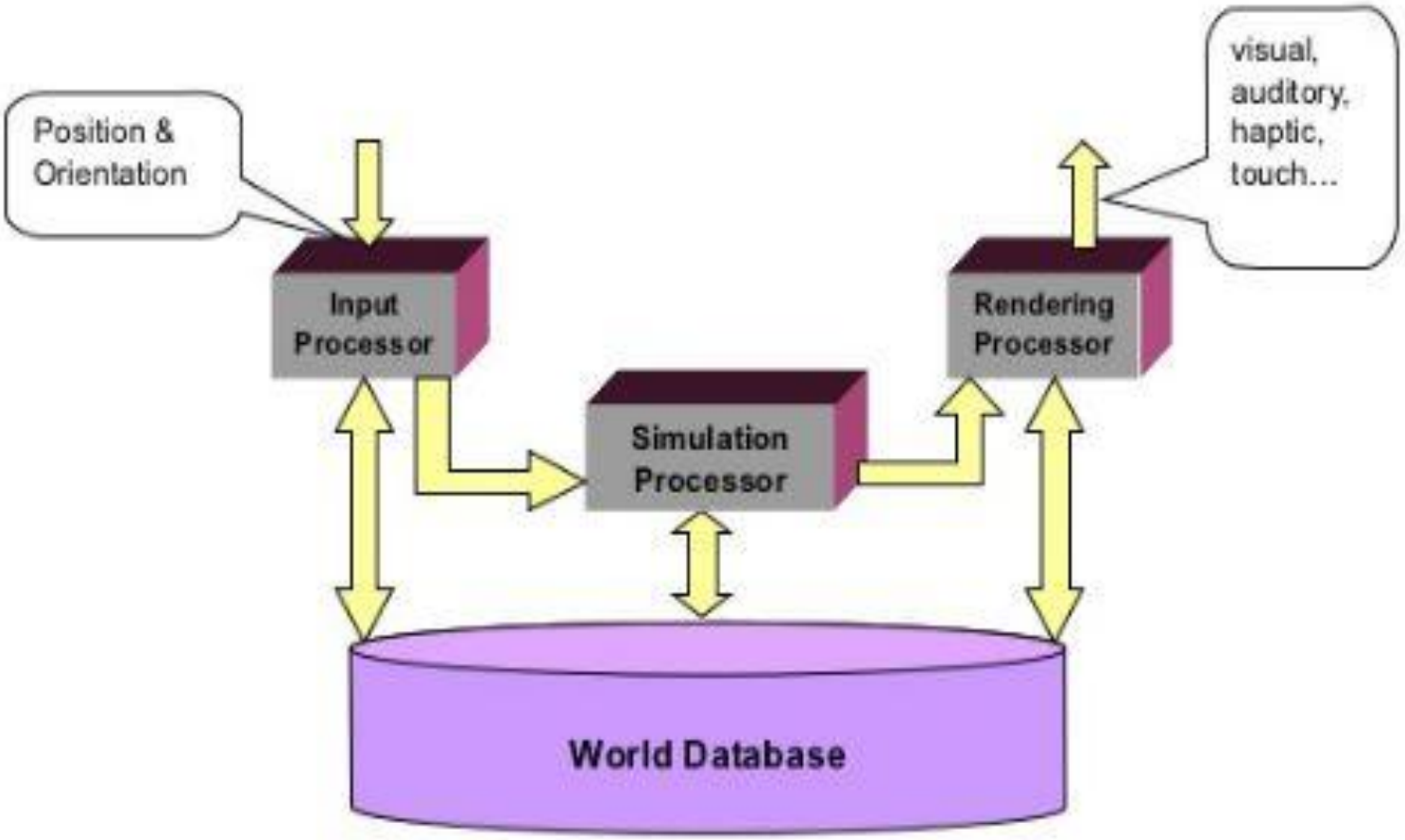
ADVANTAGES

- Interaction with the environment.
- User interface
- User can see and even feel the shaped surface under his/her fingertips.
- Flight simulators and games.
- CAD/CAE
- Biomedical Engineering the projects mentioned are use of virtual reality for viewing of X-RAY's and MRI‘s.
- Rendering and 3-D lighting, modeling for resource management.

DISADVANTAGES

- New technologies have also revealed new problems.
- VR in medical treatment is going through some growing pains.
- There are limitations with VR devices as well in regards to usability.
- Lack of standardization of hardware and protocols.
- Most troublesome are the side effects it can induce, like disorientation, dizziness and nausea.
- People often find navigating in 3-D spaces and performing actions in free space extremely difficult.
- Practical problems in spatial cognition research

Architecture of VR System



Components of VR System

- **Input Processor**
- Controls the devices used to input information to the computer.
- The objective of input processor is to get the coordinate data and provide to the rest of the system with minimum time.
- Example of input processor are: Mouse, Keyboard, 3D position trackers, a voice recognition system etc..

Components of VR System Contd..

- **Simulation Processor**
  - Simulation processor is the core component of VR system.
  - It takes the user input along with any task programmed into the world and determine the action that will take place in the virtual world.
- **Rendering Processor**
  - Rendering processor creates the sensations that are output to the user.
  - The separate rendering processor are used for visual, auditory, haptic and other sensory systems.
  - Each rendering processor take a description of the world from the simulation processor or derive it directly from the world database for each time step.

Components of VR System Contd..

- **World Database**
  - The world database store the objects that exist in the world and scripts that describes the actions of those objects.

Types of Virtual Reality

- VR system can be classified into 3 major categories based on the important feature of the VR, which is immersion or type of interfaces or components utilized in the system. Which are as follows:

1. **Non-Immersive**

- Non-immersive VR system is also called Desktop VR system, fish tank or window on world system.
- Non-immersive VR system is least immersive and least expensive of the VR systems, as it requires the least sophisticated components.
- It allows user to interact with a 3D environment through a stereo display monitor and glasses.

Types of Virtual Reality Contd..

2. Immersive

- Immersive VR system is most expensive and gives the highest level of immersion.
- It's component includes HMD(Head Mounted Display), tracking devices, data gloves and others, which encompasses the user with computer generated 3D animation that gives the user the feeling of the part of the virtual environment.

3. Semi-Immersive

- Semi-immersive VR system provides high level of immersion, while keeping the simplicity of the desktop VR system or utilizing some physical model.
- Example of such system includes: CAVE (Cave Automatic Virtual Environment) and an application is the driving simulator.

APPLICATIONS

END