

# *Virtual Reality*



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# Virtual Reality

- Technology that provides one with the sensations & Control of perspective
- One experiences illusion of being in presence of an object or within a situation.
- Computer based application provides a Human-Computer interface such that computer & its devices
- Creates a sensory environment control by the actions of the individual.



# Forms Of Virtual Reality

## 1) Through the- window

- Also known as “Desktop VR”.
- Looks into the Virtual World through the window of the computer screen
- Navigates through Mouse, Joystick, Keyboard etc.
- These are non-immersive systems.
- eg: video games



## 2) Immersive VR

- Completely immerse the user's personal viewpoint inside the virtual 3D world.
- The scene is entirely synthetic & created by software, not filmed.
- The user has no visual contact with the physical world

e.g. Head Mounted Display (HMD), data gloves.



## 3) Second Person VR

- It uses camera to capture the image of a user & insert it into the virtual world.
- Users watch their images on a monitor interacting with objects in the virtual world.



# Head Mounted Display

- ❑ A Helmet or HMD providing the visual and auditory displays.
- ❑ Use LCD or CRT to display stereo images.
- ❑ May include built-in head-tracker & stereo Headphones
- ❑ Head Mounted Camera (HMC)



*Since display is synthetic :-*

*i.e. generated by a computer, it is easy to present different 2-D views to the eyes of the viewer.*

# Data Glove

- ✓ Outfitted with sensors on the fingers as well as an overall position/orientation tracking equipment.
- ✓ Enables natural interaction with virtual objects by hand gesture recognition.

## ADV:-

Read data directly from user's hands

Cyber glove is a high-end data glove with 18 sensors to track accurately every move our hand would make.



# FLIGHT SIMULATION

*Why Flight Simulation:-*

- ✓ *Production Cost*
- ✓ *Real-Time Computer Generated Images*
- ✓ *Force Feedback*
- ✓ *Immersion*

**Adv :-**

- **Safe to practice skills**
- **NO cost of Human life**

**In 1950s, First flight simulators were built by US Air Force**



# Training

## United States:

The military used it for Shooting practice to trained soldiers



Example of Immersive VR

# Entertainment



The most effective way to calm patients is to entertain them.

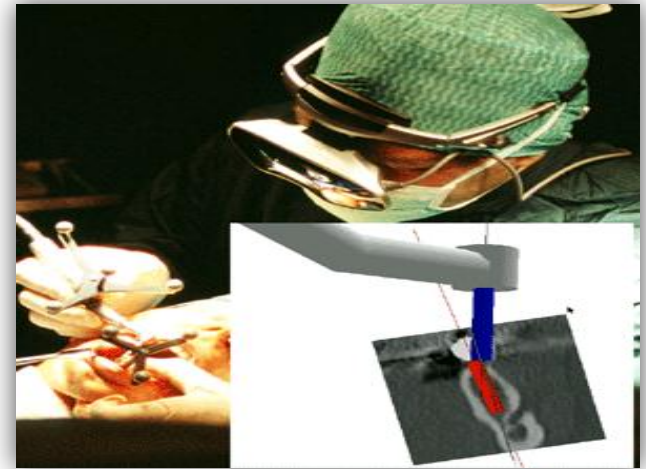
**NO need to go in some  
Adventure Park**

**- Feel the zeal of  
Roller Coaster at home**



# Medical Science

- Practice performing surgery.
- Perform surgery on a remote patient
- Teach new skills in a safe, controlled environment.



# Software Requirements

## ❑ Development tools :-

- ✓ Electronic Design Automation,
- ✓ CAD,
- ✓ Computer Aided Manufacturing (CAM)
- ✓ Finite Element Analysis

## ❑ Programming language,

- ✓ such as C++, Perl, Java or Python , etc.

## ❑ Software packages available in market

- ✓ Multi-Verse (Freeware)
- ✓ Virtual Reality Studio (Cost \$100)
- ✓ Sense8 World Tool Kit (WTK) (Cost over \$1000)
- ✓ Autodesk Cyberspace Development kit (over \$1000)

## ❑ VRML (Virtual Reality Modeling Language)



# Drawbacks ...!

- ✿ Initial Cost is High



- ✿ Personal Isolation



- ✿ Increases Unemployment



- ✿ Prolonging periods may cause Psychological & Mental stress



# Summary

- ❑ Visualization of complicated, large data is helpful for understanding & analysis.
- ❑ VR offers us a new way to interact with computer.
- ❑ VR enables us to Experience the virtual world that is impossible in real world.
- ❑ VR is changing our life, eventually VR will increasingly become a part of our life.



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