## Augmented Reality and Project Glass

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# **Augmented Reality**

- Define Augmented Reality
- Augmented Reality vs. Reality
- History of AR and its Applications
- Augmented Tracking
- Future of AR
  - Google's Project Glass
- Conclusion



# **Augmented Reality**

- Augmented Reality
  - Def: An artificial environment created through the combination of real-world and computer generated data.
- Augmented Reality was initially designed for medicine, military and maintenance purposes.
- So companies interested in mobile development such as Nokia, Qualcomm, Google are willing to fund research on AR.



### Virtual Reality vs. Augmented Reality

#### Virtual Reality (VR)

a computer generated, interactive, 3D environment in which a person is immersed : virtual, interactive and immersive

#### Augmented Reality (AR)

Supplements the real world with the virtual(computer generated) objects that appear to coexist in the same space as the real world.



### **Augmented Reality vs. Virtual Reality**

#### Engineering

#### Education -Virtual Storm



# **History of AR**

- Head Mounted Display (HMD)
  - 1968 Ivan Sutherland
  - Idea behind 3D display
    - Perspective image which changes as the (kinetic depth effect)



- Change experience must be the same as the image of a real object.
- Must appear 3D without stereo dimension.



# History of AR cont..

Global Pointing System

- 1993 Military
- Wearable Wireless Webcam
  - 1994 Steve Mann
- Touring Machine
  - 1997 Steve Feiner
     (Columbia University , New York.)
- Battlefield Augmented
   Reality System (BARS) 2000







### History of AR cont..

- iLamps(2005) ~ An
  enhanced projector that
  can determine and
  respond to the
  geometry of the display
  surface to create a
  self-configuring display.
  - Shape adaptive display
  - Object-adaptive display
    - Projecting content onto a recognized object.







## **History of AR**

### The Ghvistble Train (2004)

- A multi-user AR application for handheld devices.
- Players control virtual trains on a real wooden miniature railroad track.
- Magic lens metaphor.
- Players can interact with the game environment by operating track switches and adjusting the speed of their virtual trains.
- common goal of the game is to prevent the virtual trains from colliding.





# **Augmented Tracking**

- "Tracking is the name given to an AR application's attempts to recognize and follow the physical objects of a scene"(Georg Klein).
- Three kinds of tracking for Augmented Reality
  - Marker-based
  - Known texture or pattern recognition
  - Parallel Tracking and Mapping (PTAM)



### **Future of AR: Google's Project Glass**

Blue-sky project by Google's mysterious research and development arm, Google X.

### Project Aim

- To augment your everyday experiences by superimposing a layer of visual indicators directly onto your field of vision.
- Natural language voice commands
- Google's Android Operating System
- If your smartphone could be a visor



## **Future of AR: Project Glass**

#### **Project Glass Video**





# **Future of AR: Project Glass**

- Provide 3G or 4G wireless connection
- More of a concept than an actual product
- Mounting the device onto prescription glasses
- Ul Problem
  - Interaction through a wristbands with haptic feedback





## Conclusion

- Augmented Reality to overlay computer-presented material on top of the real world
- History of AR ~ the Head Mounted Display (HMD)
- Augmented Tracking
- Future of AR
  - Google's Project Glass



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### Questions

