Augmented Reality and Project Glass

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COSC 480

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
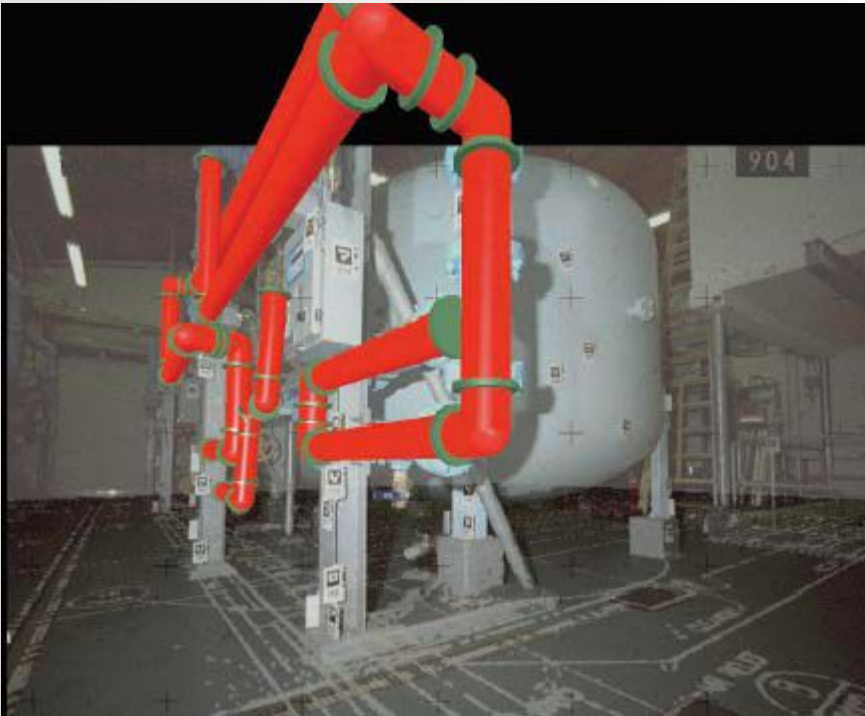
- Augmented Reality (AR)

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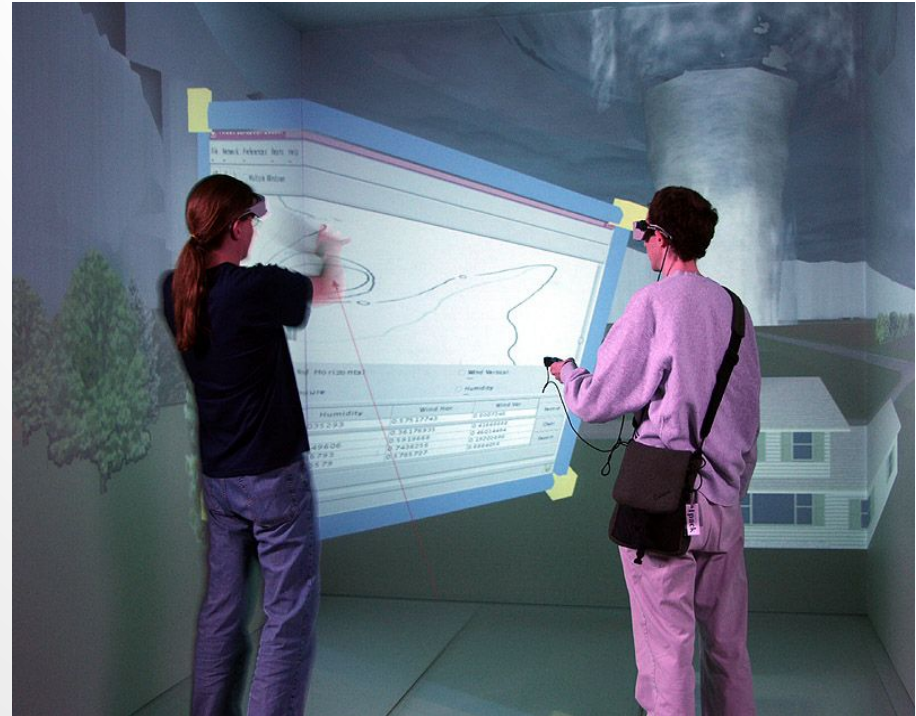
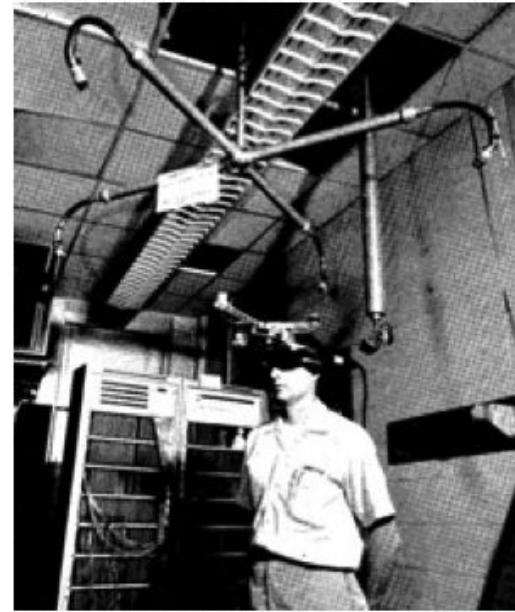# Augmented Reality vs. Virtual Reality

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.
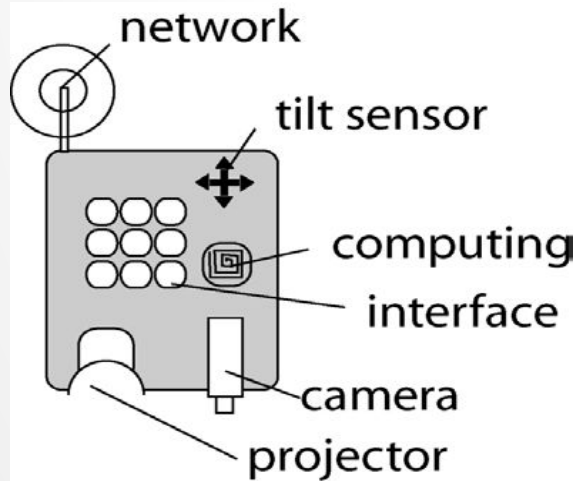
History of AR Cont

The Invisible 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
- UI Problem
  - Interaction through a wristbands with haptic feedback

MY GLASSES!

I CAN'T UPDATE MY STATUS WITHOUT MY GLASSES!

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

References

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Questions