Visualization Techniques

- Visualization is important for creating of good visual sensory information

- Surface rendering
  - ◆ advantage: hardware acceleration available on general purpose workstations, faster
  - ◆ disadvantage: cannot represent volume interior

- Volume rendering
  - ◆ advantage: can represent volume interior
  - ◆ disadvantage: special hardware required for acceleration. slower

Application of VR

- VR may offer enormous benefits to many different applications areas.

- One main reason why it has attracted so much interest.

- VR currently used to explore and manipulate experimental data in ways that were not possible before.

Vehicle Simulation for Ergonomics

University of the Ryukyus

11/12/09

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Application of VR

Virtual Cities

- **Virtual cities in VR are computer based spaces that give the users the sense (mostly visual, and sometimes auditive) of being part of them, usually by moving inside them in real-time.**

- **VR can be expressed with two techniques: panoramic views and 3D-models.**

- **3D-models cities can be re-creation of real cities or imagined cities.**

- **Cities can be interactive, single-user or multi-user interfaces.**

Panoramic Views

• **Users have a 360° (panoramic) view of the city, which gives them a good impression of being there.**
• **The plug in QuickTime VR is usually needed.**
• **Generally uses real images.**
• **Inconvenient: the users cannot change their view point. They are not able to move but turn their** head

Example: Helsinki

Movies as example!

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Application of VR

- Very popular and correspond the most closely to the definition of VR.

- Real immersion in a virtual environment, sometimes with sound. Can be used for entertainment, business, virtual reality immersive training (fire, police, emergencies etc.),

urbanistic or architectural planification, etc.

- Visitors can walk virtually in the city, as if they were

walking in a real place. They can freely explore streets

and buildings from any angles. It is even possible to fly

above the city.

# Examples of 3D Cities

Philadelphia

Geneva

Helsinki

Venezia

Berlin

San Francisco

Fear of heights (acrophobia)

- One of the very common phobias is the fear of heights.
- People are having extreme reactions on the very notion of heights.
- Psychological treatments for this, as well as for other phobias includes exposure to real anxiety.
- Whereas in the real world it is difficult to control the surrounding and the height the patient is exposed to, VR enables a therapist and a patient to achieve the complete control of the virtual world.
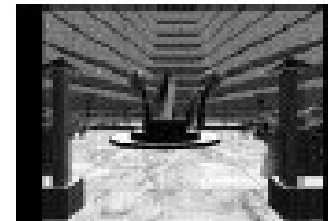
Real pain dulled in virtual worlds

Fantasy worlds created by virtual reality have been shown to provide a novel form of relief to patients suffering from intractable pain.

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I mean, at some level I knew she was working on me, but I wasn't thinking about it because I was inside that **Snow World !** "

• **With advent of realistic virtual humans, possible to recreate situations in VE, immersing real patient into virtual scenes,**
• **e.g., to re-unite patient with deceased parent, or to simulate patient as child allowing him/her to re-live situations with familiar surroundings and people.**