Dangerous Idea: box
Safe Idea: cylinder
or
Wand = User Interface

Harry Potter’s digital wand
Larry Rudolph

Good use for Boxes

- A box is a good shape for storage
- people
- shoes
- circuit boards
Poor use for boxes

- hard to hold a box
- fingers like to curl

Mobile Device Form

- Wand, stick, staff, cylinder
- Gandalf’s Staff
- Harry Potter’s Wand
- James Bond’s Pen
The computer science of Harry’s wand

- Point it at something, then shout some Latin-like command
- Location, Object, Speech recognition
- Camera, microphone, ghost sensors
- Torch, Zapping, Images
- Lasers and electricity

XWand

Andrew Wilson (Microsoft Research)

UI for Intelligent Spaces
Critique of XWand

- Need to be in an immersive, instrumented space
- Does not work everywhere, e.g. on trains such as the “hogwarts express”
- Why not simply use a hand with better camera tracking algorithms?
Bring your own environment

- Environment should have lots of
  - input sensors
  - output actuators
- Cylinders are nice form factors for arrays of sensors & actuators

Camera Arrays
Camera Array

Camera’s are small, say 1 square inch

a dozen per foot

Processing: if we wait .. will be ok

We have (had) one too
Self-reconfigurable Camera Array

Array of projectors

- Need small ones
- Need ones with low power
- Lasers!
Display Holograms

- Blue-Optics (start up)
- laser, lens, hologram on chip
- key insight, reduce noise variation, not noise
- array output?

Scalable self-calibrating display technology for seamless large-scale displays

- MIT thesis by Rajeev Surati (under TK)
- Projector array
- Self-calibration via camera
Microphone Array

- Camera
- CSAIL & others
- Need fixed, large spacing
- Virtual microphone(s) placed anywhere
Speaker Array

- Virtual sound placed anywhere
- Many for personal use
- Home theater
- Yamaha (CES’05)
- 42 speakers

Laser Array

- LIDAR (laser array accurately detect objects in front of autonomous car)
- Laser’s within all pointing forward. Mirror defects then outward -- hologram
- Lens have them all forward focused
- Parallel communication
- My favorite: two ships passing at sea
Laser Array

LIDAR (laser array accurately detect objects in front of autonomous car)

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My favorite: two ships passing at sea

Detectors
Transmitters
Sonar Array

Multi-sensor travel aid for the blind (Borenstein)

Put it all together

Sally O’Lee’s visualization initial view
If I had a cylinder, I’d ...

- Talk long distances wirelessly
- Burn through walls with laser’s
- Shock my enemies with static elect.
- Wave it around in a field to recharge
- Play DDR by opening it up & lay flat for 2-d array
Dimensions

Size:
- Pen (is there enough spread?)
- Wand (will it get too hot?)
- Staff (my choice; interleaved spiral arrays)

Discussion

- Please attack my 1/2 baked proposal
- Would like to form study group
- Array sizes (optimal numbers)
- Processing needs
- Heat & power requirements
- Can we build a prototype?
- Maybe transform mice into mouses?
tk’s comments

- what about keyboard or buttons
- what about handwriting
- he wants a pen with ink, phone, buttons.