Augmented Reality Innovations

Changing the learning environment for the deaf.

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Project Overview

To improve the learning environment for the deaf:

- Develop a prototype that projects an ASL interpreters on a HUD
- Build a server to communicate video to the displays
- Create a user interface for testing
- Projected three year BYU Planetarium deployment plan

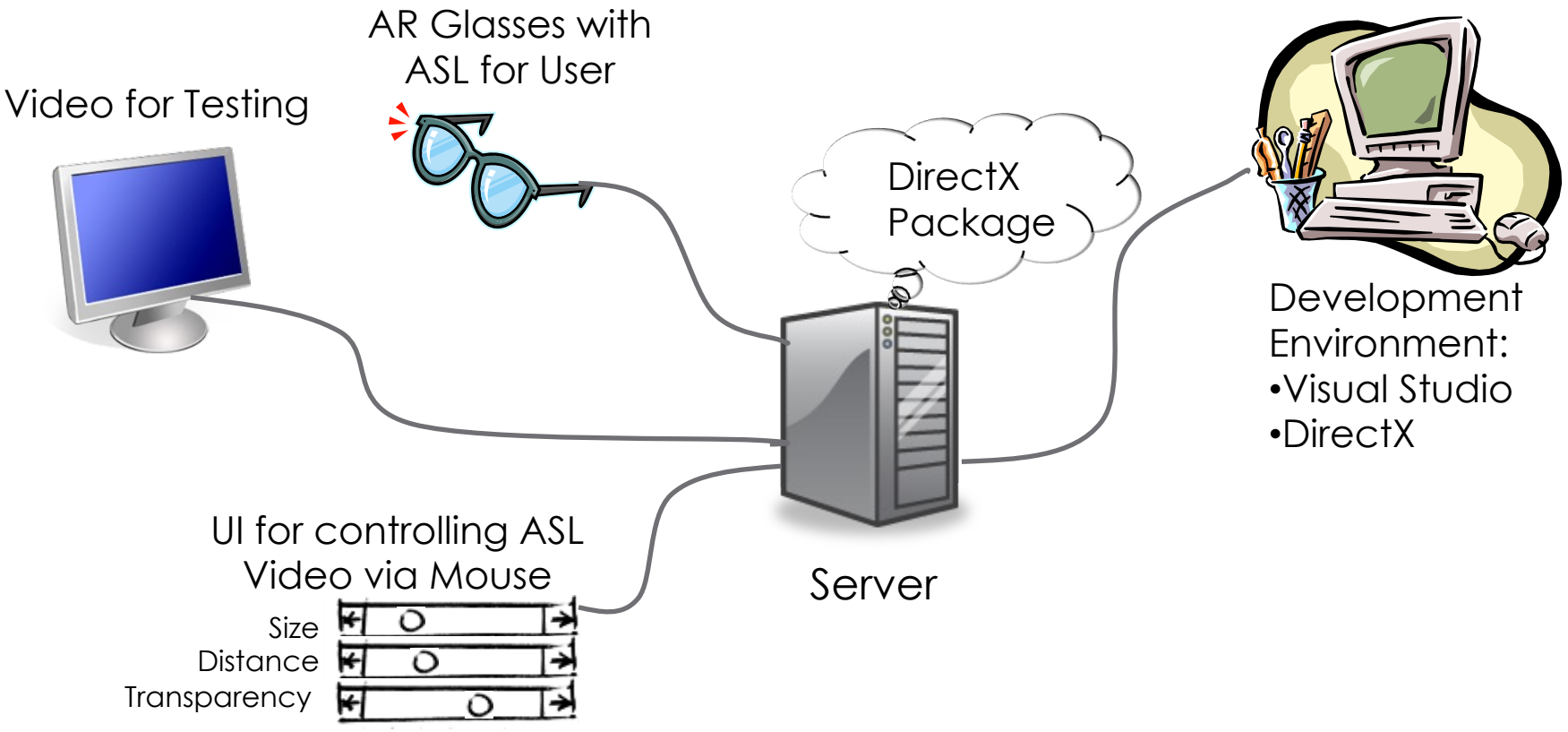
Our Scope

- Development environment
  - Obtain AR set
  - Setup a dedicated server
  - Create an API for real-time tracking of controls
- Create a working prototype
- Build a usability testing environment

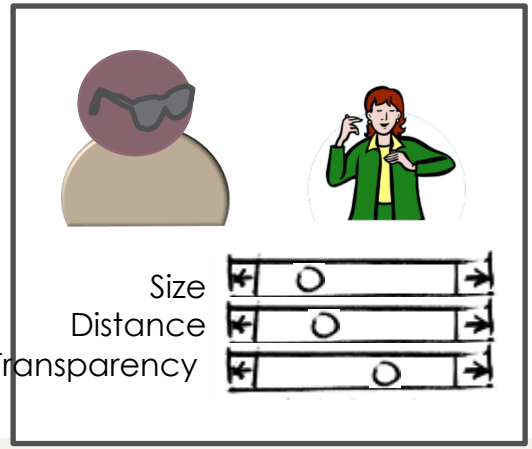
Beyond Our Scope

- The Final Implementation
- Integration with Planetarium System
- Provide Live ASL Interpretation
- In-depth User Testing

Development and Testing



Testing Environment



Deliverables?

- Demonstrable working prototype:
  - Video successfully streams between server and glasses
  - The API solution correctly and quickly modifies streaming video displayed on the glasses
- Working usability test environment
  - Sample test cases
- Technical and User Documentation
- Logging?

Choosen AR Display: Vuzix

Tac-Eye LT

- Child Suitable
- Durable
- Lightweight
- Attaches to prescription and non-prescription glasses

Binocular Glasses

- High-contrast Display
- ‘ordinary-looking sunglasses’
- Early summer

UI and Video Manipulation?

- Many Control Variables for the Interpreter Video
  - Brightness
  - Location
  - Size
  - Transparency
- Develop default settings for the Planetarium
- API to be used for further software development
  - Open Framework

MFPlayer?

DirectX/Microsoft Media Foundation selected

- Proven reliability and support
- Developed and maintained by Microsoft
- Capabilities for simple video transformations
- Easy implementation on Windows Platform

The Logging Script?

- Logging every settings modifications users make in testing phase.
- Save it to a file.
- Subject naming convention.
- CSV format.

MFPlayer Demo

Results?

- Logging
- Parent Program to start 2 MFPlayers
- User Controls

User Reactions to Prototype

- Focus Group

Schedule (From Gantt Chart)

- Accomplished
  1. Research Heads Up Displays – **Oct 9th**
  2. Order Headsets – **Oct 24th**
  3. Obtain Server - **Nov 4th**
  4. Prepare UI Video – **Nov 11th**
  5. Obtained ASL Test Film– **Nov 11th**
  6. Select Development Platform – **Nov 14th**
  7. Install test API software – **Nov 22nd**
  8. Headsets Expected – **Dec 5th**
  9. Design UI – **Jan 9th**
  10. Verify Designs with Customer – **Jan 13th**
  11. Test Compatibility of Glasses with Server – **Feb 17th**
  12. First Focus Group – **Feb 18th**
  13. Implement UI Changes – **Feb 24th**
  14. Finalize UI with customer – **March 17th**
  15. Code and Implement API image controls – **March 22th**
  16. Second Focus Group– **March 24th**
  17. Make adjustments to system – **April 5th**
  18. Train and create documentation for client – **April 11th**

Funding and Resources

- NSF Funding $14,693 + IAB $240 + Department Funding
  - Acquired Resources:
    - $3,500 – Headset Display for Testing
    - $1,699 – Backup Headset Display
    - Donated by Customer – Server Laptop
    - Time and Resources donated by KBYU - filming
    - Free for Microsoft Users – Microsoft Media Foundation
    - Free for IT students from MSDNAA – Visual Studio
    - $120 – Focus Group compensation
  - Future Expenditure:
    - $10,000 – interpreters
    - $2,500 – Project recruiting and compensation

Future Development

- 3 Year Project
  - Testing
    - Lab testing with targeted users
    - Planetarium testing
  - Planetarium Use
    - Implement prototype in planetarium


Questions?