

CS560-Implementation Assignment II

3D Filesystem Visualizer



Presenter:
Ateş Akaydın

Outline

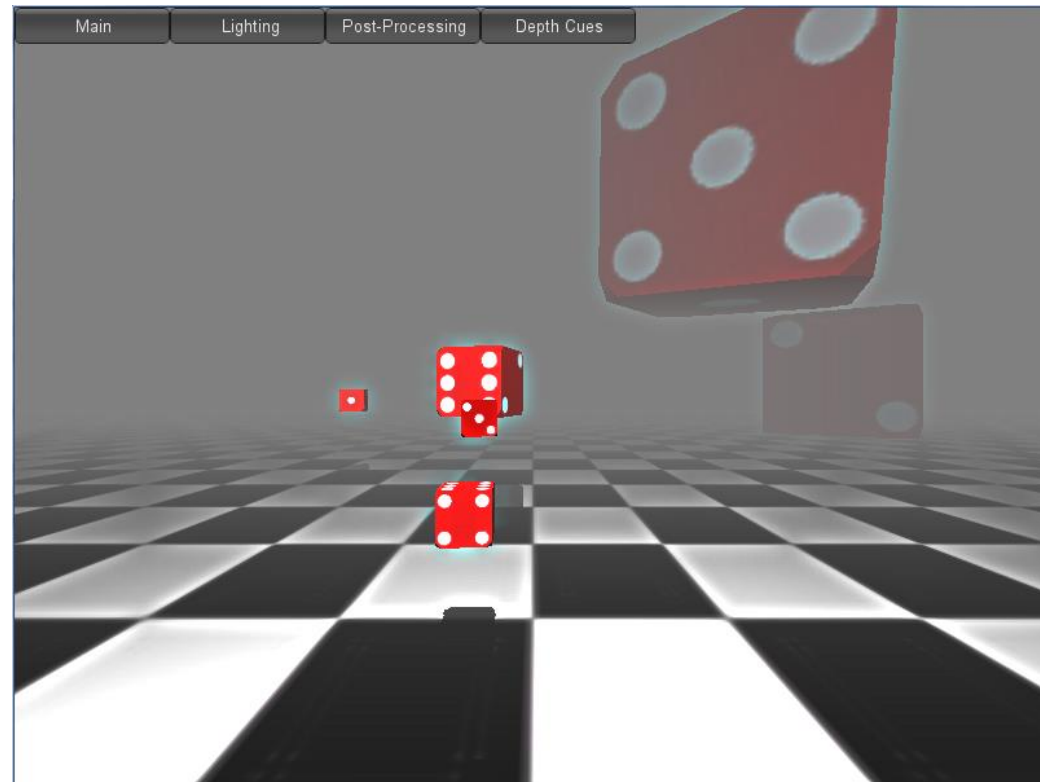
- Supported Depth Cues
- User Evaluation
- Application Details
- Demo

Supported Depth Cues

- Monocular
 - Horizon
 - Perspective
 - Relative size
 - Familiar size
 - Aerial Perspective
 - Atmospheric Fog
 - Occlusion
 - Texture Gradient
 - Blurring
 - Lightning & Shading
 - Motion Parallax
 - Depth from Motion
- Binocular
 - Stereopsis

User Evaluation

- **Test Scenario**
 - Images including combinations of depth cues
 - 6 Dice with numbers
 - Inprinted on front surface
 - **TASK:** Sort the dices from Near-to-Far



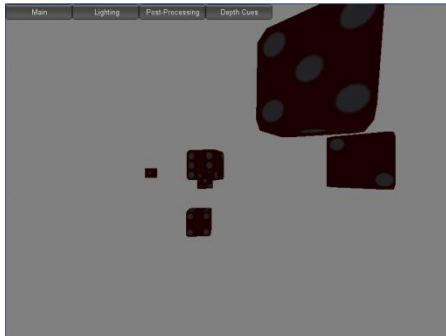
User Evaluation

▫ Test Options

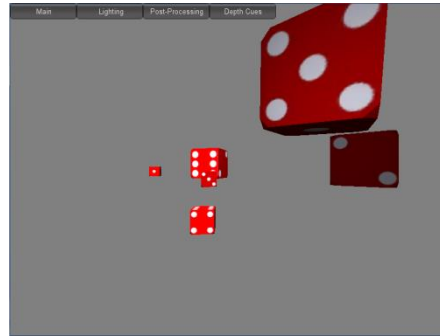
- Monocular:
 - Textured
 - Default
 - Lighting
 - Lighting & Shading Cues
 - Shadows
 - Requires Lighting and Ground Plane
 - Lighting & Shading Cues
 - Contrast Enhancement
 - Texture Gradient and Blurring Cues
 - Edge Detection
 - Texture Gradient, Perspective and Blurring Cues, Relative & Familiar size
 - Depth of Field
 - Blurring
- Monocular:
 - Atmospheric Fog
 - Aerial Perspective
 - Ground Plane
 - Horizon, Shadows,
 - Textured Ground Plane
 - Perspective
- Binocular
 - Stereopsis

User Evaluation

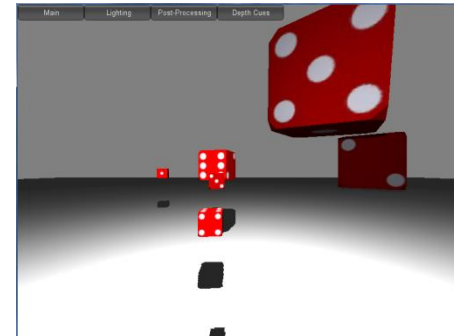
▫ Test Options



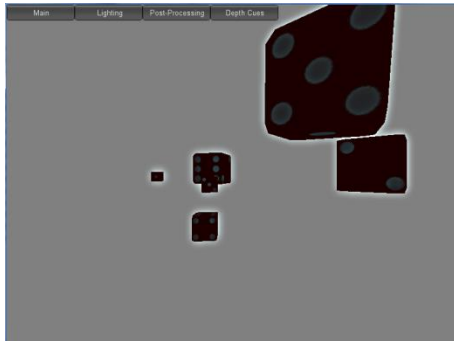
Textured(Default)



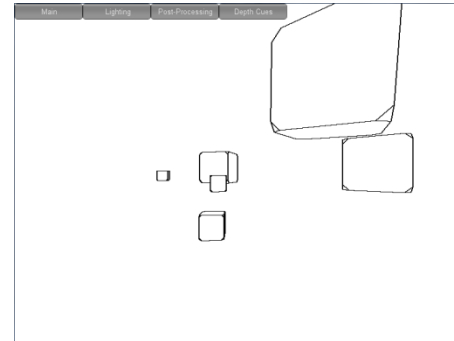
Lighting



Shadows



Contrast Enhancement



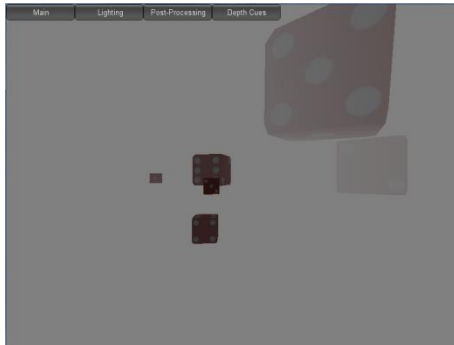
Edge Detection



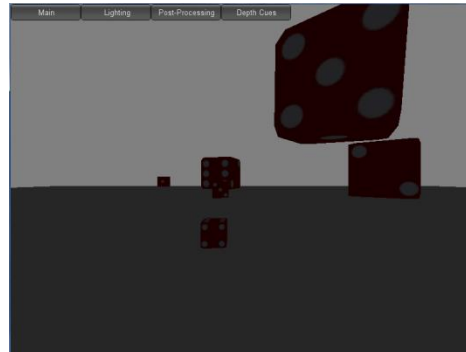
Depth Of Field

User Evaluation

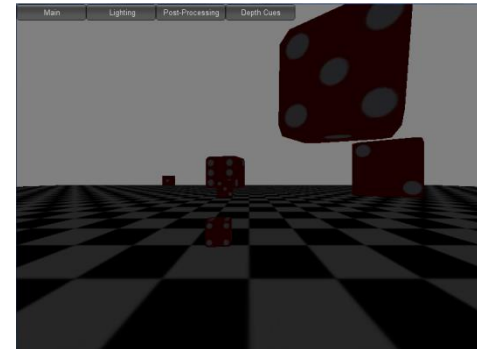
▫ Test Options



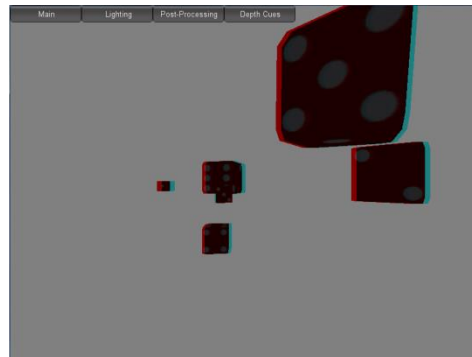
Atmospheric Fog



Ground Plane



Textured Ground Plane



Stereopsis

User Evaluation

▫ Evaluation

- 22 Test Subjects
- 19 Combinations of Options(Configurations)
- Each subject is given 3 independant configurations to evaluate
 - Should be independent and few...
 - As subjects may memorize

User Evaluation

□ Evaluation

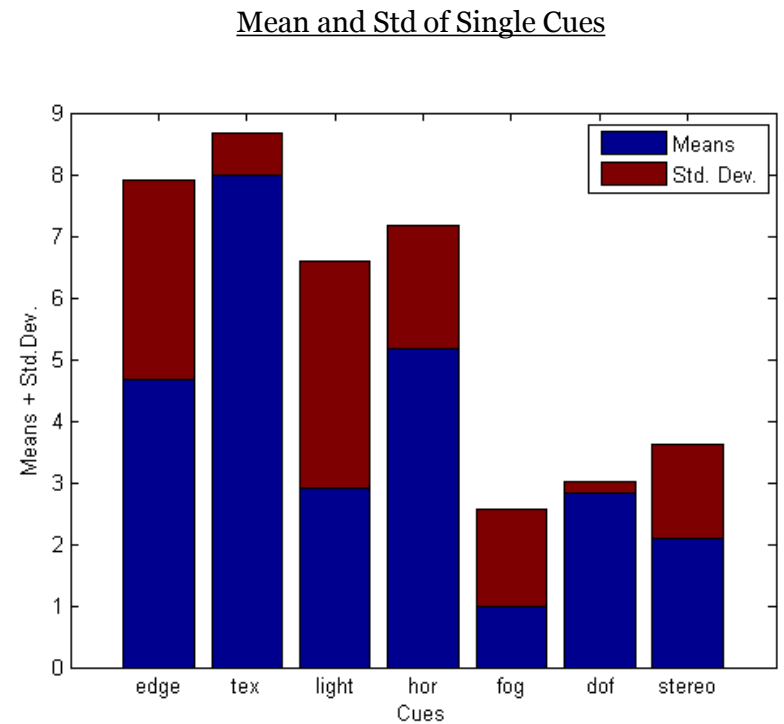
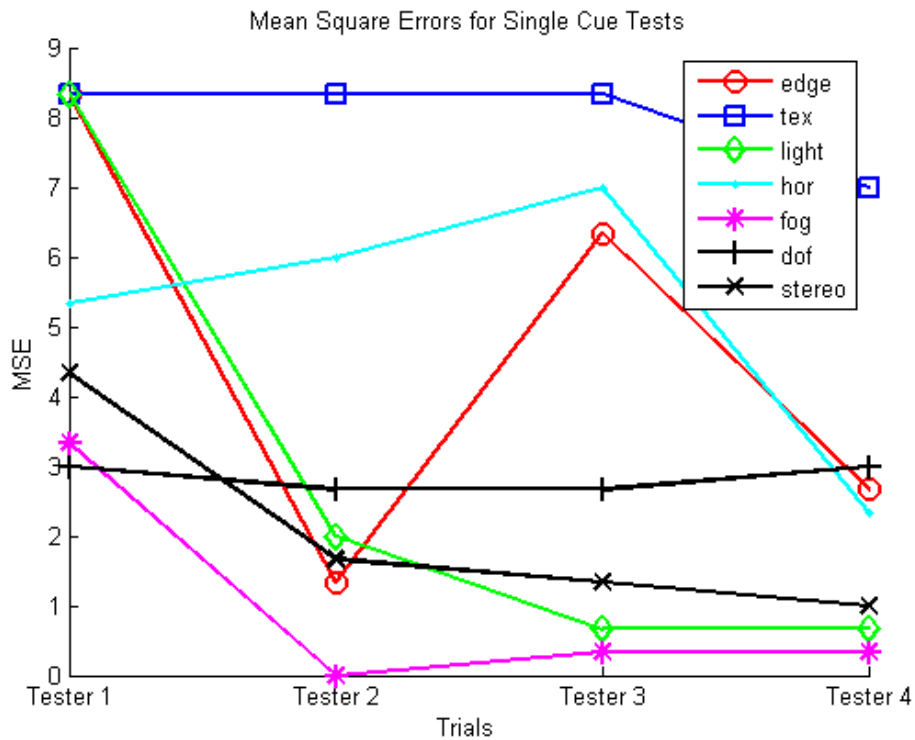
- For each configuration subject ordered results and correct order are compared
- Mean Square Error is computed as follows:

$$\frac{1}{6} \sum_{i=1}^6 (s_i - c_i)^2$$

- Where s_i and c_i are the indices of i.th dice in subject's ordering and correct ordering respectively
- Means and Standard Deviations of the MSEs are also computed for all trials on specific cues.

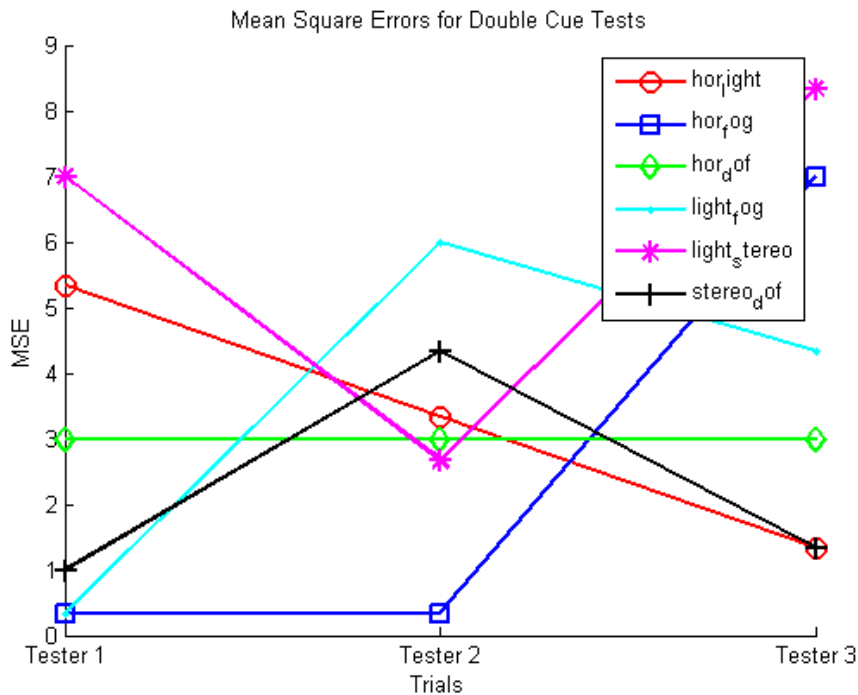
User Evaluation

Results(Single Option)

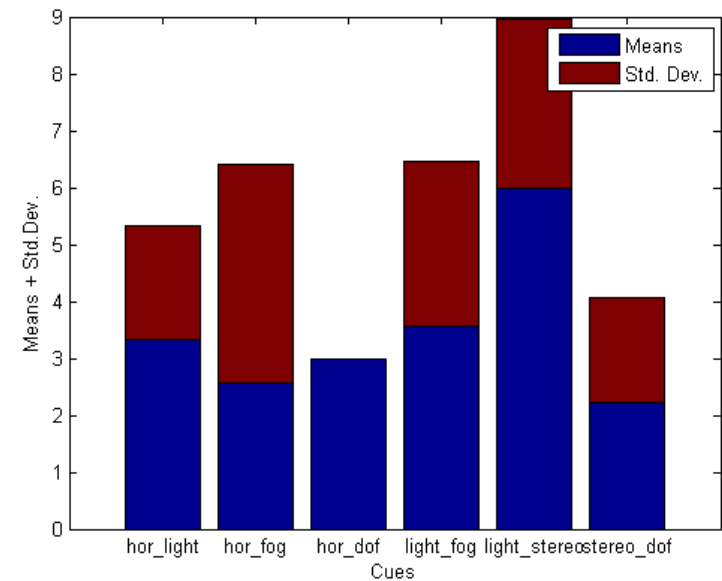


User Evaluation

Results(Dual Options)

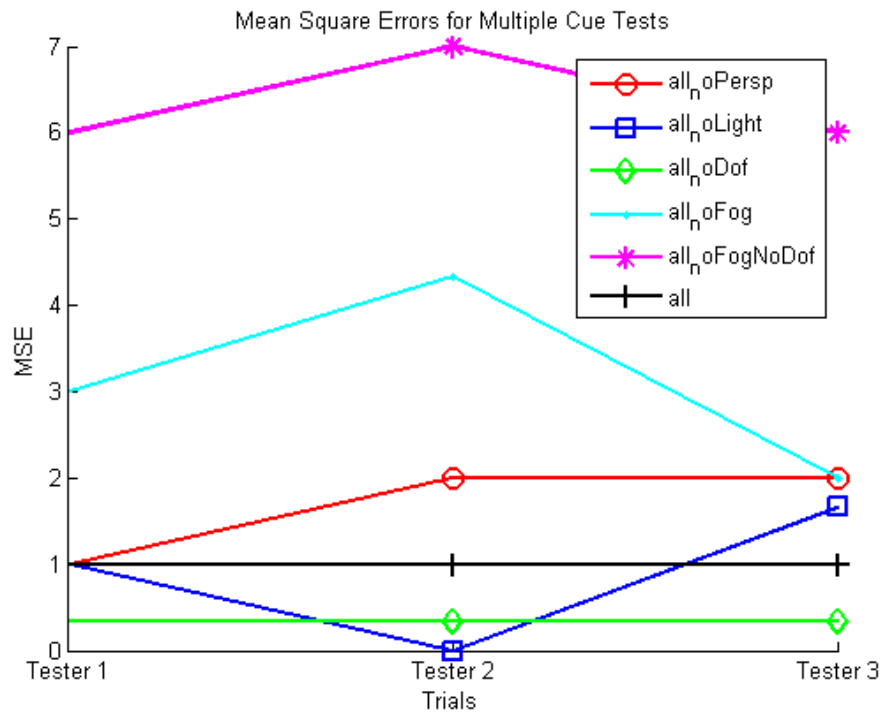


Mean and Std of Single Cues

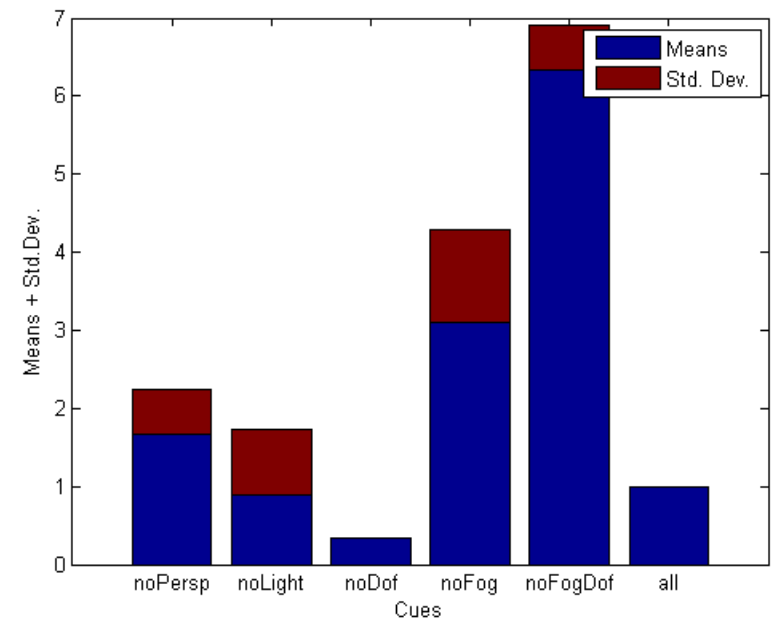


User Evaluation

Results(Multiple Options)



Mean and Std of Single Cues



User Evaluation

▫ Conclusion

• Most Dominant Cues:

- **Relative and Familiar Size**
 - Inherent in all options
- **Perspective**
 - Missclassification of Dice 1,3 and 4 due to perspective
- **Blurring**
 - Through Depth of Field
- **Stereoscopy**
- **Aerial Perspective**
 - Atmospheric Fog produced most accurate results with little deviation.
- **Occlusion**
 - Inherent in all options
 - Dice 3 is closer than Dice 6 in all results...

 Unreliable

 Reliable

Application Details

- 3D File System Visualizaer (Filemaster)
 - Includes Cues
 - Perspective, Relative Size, Occlusion, Texture Gradient, Blurring, Lighting, Shading, Motion Parallax, Depth From Motion, Stereopsis.
 - Configurable options
 - A 3D File System Browser
 - Similar to Robert Chin's approach
 - Indoor Environment
 - With interactable entities...
 - To increase feeling of immersion
 - Support for 3d mouse(space navigator)

Demo

