Alpha Presentation

IMAGINE: IMAGe INtake Experience

The Capstone Experience

Team Auto-Owners

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Project Overview

• Auto-Owners wants a way to easily Evaluate Physical Environments

• Virtual Reality Application
  ▪ View 360° Images as if you are On Location using an Oculus Rift
  ▪ View Info and Make Notes on Objects using the Oculus Controllers

• Web Application
  ▪ Upload Images and Create Environments
  ▪ View and Edit Environment and Image Information
  ▪ View Inventory of Objects in an Environment
  ▪ Add or Edit Objects and their Information

• Object Detector/Classifier
  ▪ Identify Objects in an Image
  ▪ Classify General Types of Environments
System Architecture

**Server-Side Applications**
- Object Recognition System
  - Submits Environment Images for Object Identification
  - Manages User Data, Updates Data, Retrieves Data, Creates Data
  - Creates Object Listings in Object Database

**User System**
- Manages User Data, Updates Data, Retrieves Data, Creates Data

**Database**
- MariaDB

**Client-Side Applications**
- VR Application
- Web Application
  - Provides object data and image environments
  - Selects environment and edits object data
  - Provides object data and image environments

**External Hardware**
- Oculus Rift Headset
  - Displays panoramic view of uploaded environment and object info
- Oculus Rift Controllers
  - Provides user’s visual orientation and microphone input
- Omnidirectional Camera
  - Allows user to interact with UI and select available objects
  - User uploads omnidirectional images to web portal
Web: Environments List
Web: Inventory List

![Inventory List](webdev.cse.msu.edu/~larabel8/autoowners/inventory.php?id=1)

### Inventory View

**Smith Home**  
324 Maple Street

<table>
<thead>
<tr>
<th>Image</th>
<th>Object</th>
<th>Room</th>
<th>Characteristics</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sink</td>
<td>bathroom #1</td>
<td>Pedestal</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Shower/Tub</td>
<td>Bathroom #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mirror</td>
<td>Bathroom #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bed</td>
<td>Bedroom #1</td>
<td>Queen</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Drawer</td>
<td>Bedroom #1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Object Detection
VR: Selecting Object Nodes
What’s Left To Do?

• **Object Detection**
  - Implement Classification Abilities for Additional Objects
  - Implement Environment Classification Abilities
  - Overcome Effects of Warping in 360° Images

• **VR Application**
  - Complete UI Elements
  - Fix Image Distortion Issues

• **Web Application**
  - Add Image Gallery
  - Implement Exporting of Object Inventory to Other File Formats (i.e. csv, xml, json, etc.)

• **Integrate Web and VR Clients with Server Backend**
Questions?