Team 1 - VR Texting & Driving

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Project Overview & Background

- Project sponsored by Erie Insurance
- Android App
  - Google Cardboard VR
- Purpose of the application has changed
- Used by agents with young drivers
  - Purpose is to connect with young drivers
  - Will help young drivers recall the conversation about distracted driving they had with their agent

Google Cardboard

Project Needs & Our Objective

- Meeting with business sponsors (2/6/17)
  - Interested in going in a different direction
  - Complement their SHIFT program
  - Use as a tool to help young drivers remember discussion with agent
- **We will not be destroying progress**
  - Slightly modified scenario system
  - Pathing through levels/scenes
  - Levels/scenes still needed designing
- We want to create an interesting system that suits our partner's needs

Source: https://www.jointheshift.org/themes/base/images/logo-shift.svg

Review of Requirements

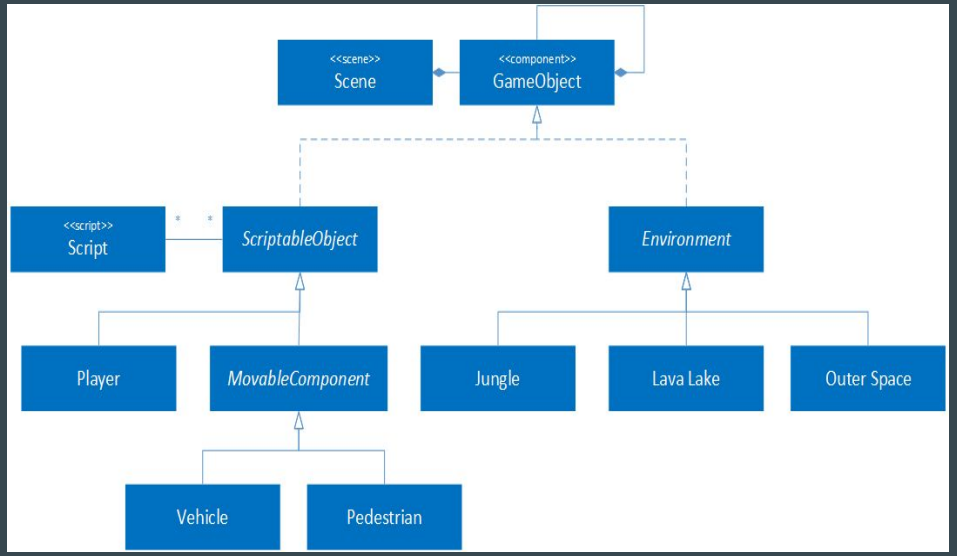
Project Name: Virtual Reality---Texting While Driving			
User Requirements		System Requirements	
Req ID	Description	Req ID	Description
UF-A	The application should present various scenarios that display a distracted driver, and give the user the ability to overcome the potential negative outcome.	SF-A-01	The system should provide two possible solutions for every decision presented.
		SF-A-02	When the car passes a trigger, a scenario should be presented.
UF-B	The user should control a passenger in a vehicle driven by a person engaging in dangerous activities.	SF-B-01	The user should have a first person perspective during the experience, and can use motion inputs to position the camera.
		SF-B-02	The user will use the button on the cardboard headset to interact with objects in the environment, and select choices during scenarios
		SF-B-03	Double clicking the input button will re-center the camera to the front of the car
UF-C	The system should feature multiple outcomes that can occur due to the driver being distracted.	SF-C-01	The system should include various types of outcomes that can occur within the environment, including avoiding falling objects, avoiding collisions with other objects, and dealing with going off the path.
UF-D	The user should be able to interact with their environment between scenarios presented to them	SF-D-01	The user should be able to grab a drink in the cup holder, open/close the window, and adjust the radio.
UF-E	There should be orbs around each level that the user can collect to gain additional points.	SF-E-01	There should be white, glowing orbs featuring the Erie Insurance logo placed around each level which the user can collect by focusing on them to gain an additional amount of points.
UF-F	The driver should be controlled by an AI and should engage in various tasks.	SF-F-01	The driver AI should text while driving, and should stop texting when the user looks in the direction of the driver.

UO-01	The application should be developed for modern Android devices.	SO-01-01	The system should be targeted for Android 5.1.1 "Lollipop" for phones with hardware specifications of the Samsung S5 and up
UO-02	The application should be developed for cardboard VR use.	SO-02-01	The system will utilize the Google VR SDK to display two images through the cardboard.
UO-03	The application must feature ERIE Insurance branded paraphernalia advertising the company throughout.	SO-03-01	Erie Insurance logos will be placed on buildings, billboards, bumper stickers, and air fresheners.

UP-01	The system should run at an acceptable frame rate suitable for virtual reality use.	SP-01-01	The application should run at a minimum of 30 frames per second.

Review of System Design

- Built in Unity game engine
- Component based
  - Own separate entities
- Composed as scenes
  - Targeting 3 scenes
  - Scenes are composed of game objects



Architectural Design

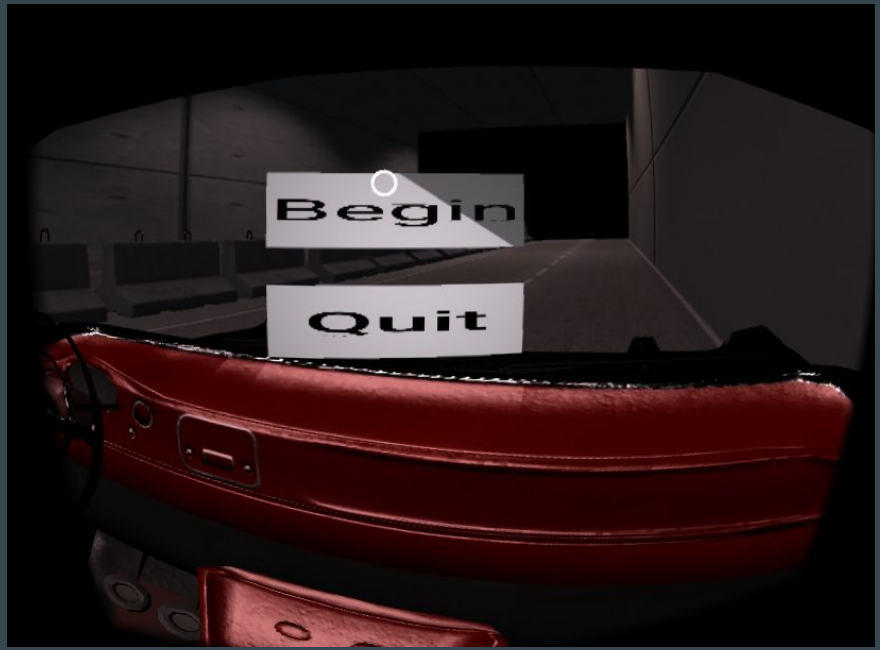
Planned System Features

- AI driver navigates user through the level
  - Looks at phone and has driving animations
- User controls a passenger
  - First person, VR view on Android device
- Car moves along path through level
  - Transition between levels
- Point system depending on performance
- Solvable scenarios
  - User interacts with distracted driver to solve
  - User can fail or overcome
  - Main source of points
- Features sounds
  - Ambient noises, engine noise, music, etc.
- User can interact with the objects in the car
- Erie Insurance branded orbs throughout levels
  - Collect additional points
  - More user interaction

User Interface - Start Menu

No option selected

Begin option is selected



User Interface - Scenario Completion

- Making scenario decisions
  - Binary system
  - Must interact with driver to succeed

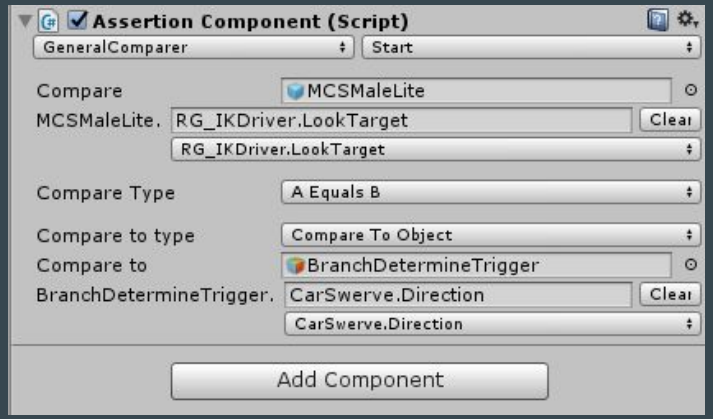
- Future additions to UI:
  - Score counter as object in car
  - Results upon completion

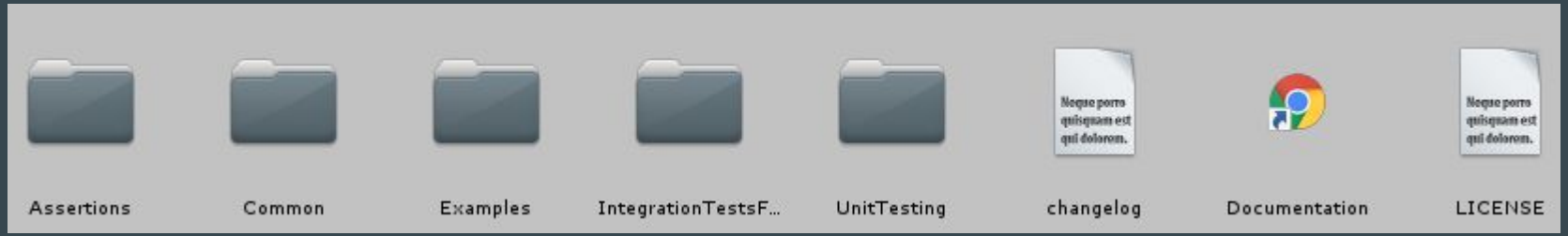
Driver is paying attention

Driver is distracted

Testing

- Using Unity Test Tools
  - Unit testing
  - Integration testing
  - Assertions





Testing Execution

Table 8.3.4. Execution Report of Test Case TC-002

Project Name:	Virtual Reality---Texting While Driving					
Test Case ID:	TC-002					
Testing Tools Used:	Unity Test Tools					
Testing Type:	Agile (automated) testing					
Execution Steps:	1 Begin the experience 2 Allow the car to proceed to a predefined trigger point					
Test Execution Records:						
#	Tester	Test Date	Actual Result	Status	Defect	Correction
1	Nick Kapty	11/9/2016	No scenario presented	Fail	Not yet implemented	1/14/2017 by Jake Wheeler
2	Nate Christiansen	2/8/2017	A scenario is presented passing the trigger	Pass		
Execution Summary:						
Acknowledgment: Generated from the CapStone process management system ©2015						

Table 8.3.5. Execution Report of Test Case TC-006

Project Name:	Virtual Reality---Texting While Driving					
Test Case ID:	TC-006					
Testing Tools Used:	Unity Test Tools					
Testing Type:	Agile (automated) testing					
Execution Steps:	1 Begin the experience 2 Wait for the vehicle to move to the first scenario 3 Wait for the scenario to play out 4 Choose the wrong decision presented					
Test Execution Records:						
#	Tester	Test Date	Actual Result	Status	Defect	Correction
1	Nick Kapty	11/9/2016	No outcomes occur	Fail	Not yet implemented	
Execution Summary:						
Acknowledgment: Generated from the CapStone process management system ©2015						

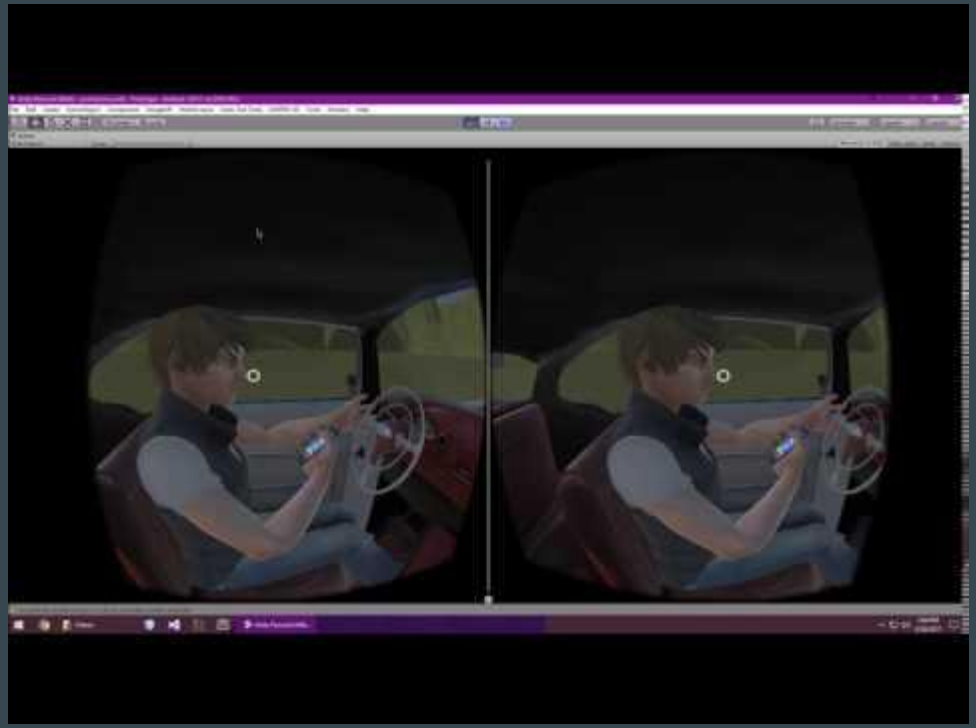
Table 8.3.3. Execution Report of Test Case TC-005

Project Name:	Virtual Reality---Texting While Driving					
Test Case ID:	TC-005					
Testing Tools Used:	Unity Test Tools					
Testing Type:	Agile (automated) testing					
Execution Steps:	1 Begin the experience 2 Look at an interactive environment object 3 Click on object if reticule expands					
Test Execution Records:						
#	Tester	Test Date	Actual Result	Status	Defect	Correction
1	Nick Kapty	11/9/2016	Object does not move	Fail	Not yet implemented	
2	Nate Christiansen	2/8/2017	Window rolls down, driver looks up	Pass		
Execution Summary:						
Acknowledgment: Generated from the CapStone process management system ©2015						

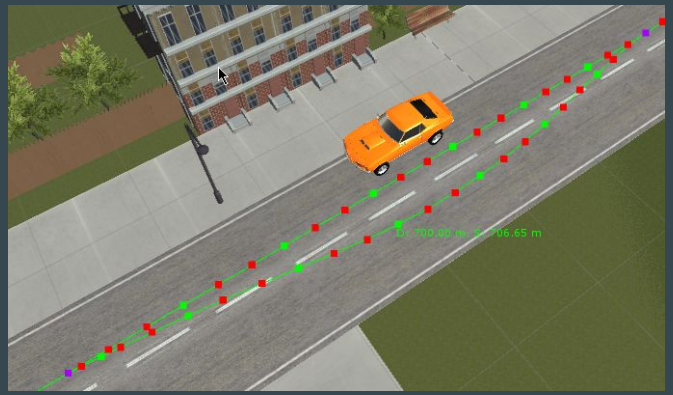
Table 8.3.1. Execution Report of Test Case TC-001

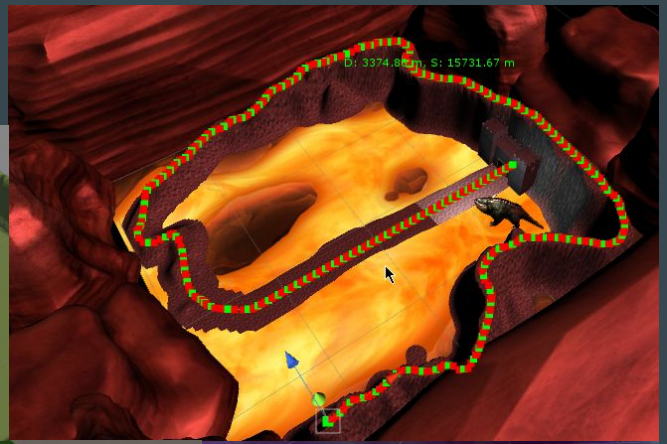
Project Name:	Virtual Reality---Texting While Driving					
Test Case ID:	TC-001					
Testing Tools Used:	Android, Google Cardboard, Unity Remote 5					
Testing Type:	Function coverage					
Execution Steps:	1 Begin the experience 2 Turn the camera in some direction away from the default view 3 Quickly double tap the Cardboard input button					
Test Execution Records:						
#	Tester	Test Date	Actual Result	Status	Defect	Correction
1	Nick Kapty	11/9/2016	Double tapping does nothing	Fail	Not yet implemented	10/10/2016 by Jake Wheeler
2	Nick Kapty	11/15/2016	Double tapping recenters the camera	Pass		
Execution Summary:	Upon implementation, the feature works as intended.					
Acknowledgment: Generated from the CapStone process management system ©2015						

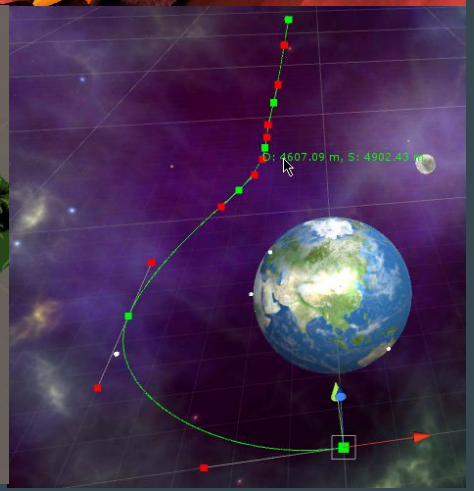
Working Features - Driving/Animations/User View



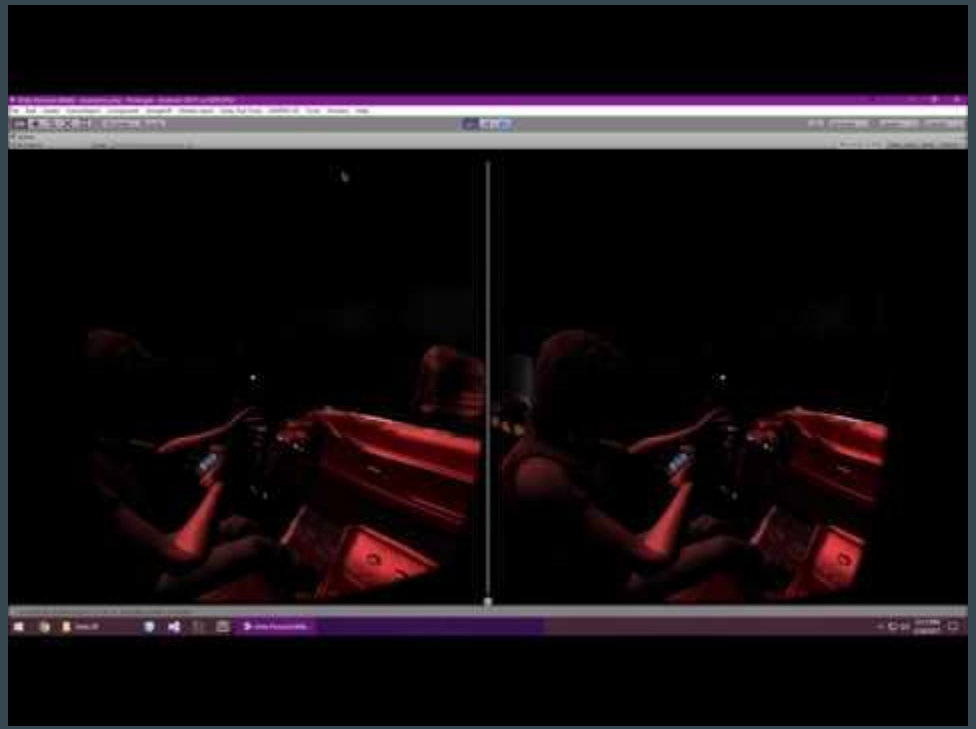
Working Features - Pathing





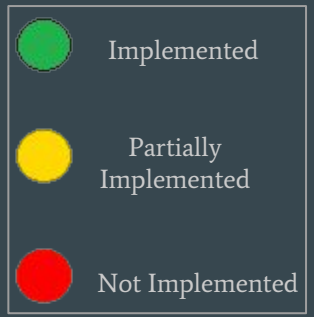


Working Features - Audio



Working Features - Scenario System / Point Collection

Implementation Status



Feature	Implementation Status
Backend scenario system	
AI driver drives the car and animates	
Driving path is complete in each scene	
Audio	
Backend point system	
Point orb collection	
User control	
Scenarios	
Level transitions	

Feature	Implementation Status
VR rendering on Android	
Object interaction in car	
Levels are complete in design	
Score sheet / conclusion	

Overall Progress Status

- 13 features listed on implementation status
  - 7 features are implemented
  - 5 features are partially implemented
  - 1 features has not been implemented

54% fully implemented

38% implemented and needs additional work

8% needs to be implemented

- Project is continuously being evaluated to make sure we are meeting our business sponsor’s needs

Questions?

- Partial project is available for demonstration on the Google Cardboard