MICHIGAN STATE UNIVERSITY

Project Plan

Virtual Reality Simulation for Railcar Loading

The Capstone Experience

Team Dow

David Wang

Matthew Smith

Kyle White

JD Hayward

John Yoo

Department of Computer Science and Engineering

Michigan State University

Spring 2018

From Students…

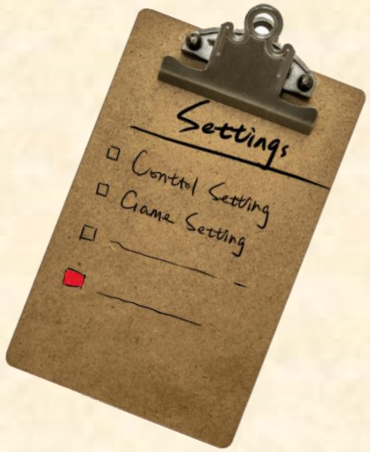
…to Professionals

Functional Specifications

- Dow has to train employees to load railcars with hazardous chemicals
- Training new employees can be very dangerous
- Creating a VR game to make training safer
- Train users to
  - Load railcars
  - Handle various dangerous scenarios
  - Gain virtual certification
  - Get ready for the real work

Design Specifications

- Starting Screen and Menu
- Scene 1 : Equipment Gathering
- Scene 2 : Railcar Loading
- Scene 2 : The Process
- Ingame Menu
- Score Screen
- Scoring System
- Sound



Screen Mockup: The Loading Area

Screen Mockup: The Railcar

Technical Specifications

- Unity Game Engine
  - GameObject Interaction
  - Movement
  - Feedback System
  - Hint System
  - Hazard System
  - Weather System

System Architecture

Software

Ps

3DS MAX

Audacity®

NVIDIA GEFORCE GTX

VR READY

Hardware

unity

C#

VRTK
virtual reality toolkit

STEAM® VR

SDK

Languages

Assets

System Components

- Hardware Platforms
  - HTC Vive and Touch Controllers
  - Computer with GTX 1060 or better
- Software Platforms / Technologies
  - Unity Game Engine
  - Microsoft .NET / C#
  - 3DS Max
  - Photoshop CS6
  - Audacity
  - HTC Vive SDK

Risks

Unity Game Engine
- **Difficulty:** Easy to Medium
- **Description:** Understand how to develop with Unity.
- **Mitigation:** Follow online tutorials through Unity, websites, and YouTube.

Vive SDK
- **Difficulty:** Medium
- **Description:** Import and understand Vive SDK plugin for Unity.
- **Mitigation:** Download SDK and create test scenes.

Accurate Simulation
- **Difficulty:** Medium
- **Description:** Need to accurately replicate a scenario of loading railcars
- **Mitigation:** Watch/analyze videos of different railcar loading/filling

Project Assets
- **Difficulty:** Easy
- **Description:** Need to search through 8000 provided assets to build the game.
- **Mitigation:** Split the assets into folders and subfolders to organize assets.

Questions?