Project Plan Presentation
Switch Alignment Mobile Game

The Capstone Experience

Team Union Pacific

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Project Sponsor Overview

• Founded under the Pacific Railroad Act of 1862.
• Operate over 32,000 miles of railways and 8,300 locomotives.
• Building America through efficient, reliable, and sustainable transportation.
Project Functional Specifications

- There are a lot of different switches, some of them are hard to identify.
- Misidentifying railroad switch alignment often has severe consequences.
- Union Pacific operates all over the U.S. so there are many different weather conditions.
- Many employees are moved from place to place.
- Our mobile game will be captivating and educational.
Project Design Specifications

• Train new employees to learn and practice aligning switches.
• First person view and realistic game environment.
• Random, repeatable conditions.
• Immediate feedback will be shown on screen.
Screen Mockup: Android Application
Screen Mockup: Android Application
Screen Mockup: Android Application
Screen Mockup: Web Interface
Project Technical Specifications

• Unity 3D Project - A Unity 3D Project will be used to carry out of frontend aspects of the project.

• Oracle Database - A database hosted by Oracle will be used to store all Union Pacific data necessary for the game.

• Spring - We will use Spring to create a REST API to allow for communication between the frontend elements in Unity and the backend elements in the Oracle Database.

• Zebra Phone – The app has to be functional on the Zebra phone, which is the phone provided to Union Pacific Employees.
Project System Architecture
Project System Architecture
Project System Architecture

Unity Assets - Available free under Extension License

- Hail Particles Pack
- 4 Snow Materials
  [High Quality]
  [Materials Collection]
- Rain Maker - 2D and 3D
  Rain Particle System
  for Unity
Project System Architecture
Project System Components

• Hardware Platforms
  ▪ Zebra Phone: All Union Pacific employees are provided a Zebra phone.

• Software Platforms / Technologies
  ▪ Oracle Database: Oracle Database will be used for all backend purposes of this project.
  ▪ Spring: Spring will be used to create a REST API to enable communication between our Oracle Database backend and Unity 3D frontend.
  ▪ Unity: Unity 3D will be used to create the switch alignment simulation.
Project Risks

• REST API is compatible with both the client’s preferred database and Unity framework.
  ▪ A REST API is necessary in order to communicate between the client’s database and the Unity project.
  ▪ Create a REST API capable of communicating with an SQL database and determine how to utilize it in Unity to call queries.

• Incorporating snow in the terrain.
  ▪ There are no free snow models on the unity store.
  ▪ Create our own models to show snow on the tracks or acquire models with proper licensing from a free source.

• Game performance when running on Zebra phone.
  ▪ Team Union Pacific does not have a Zebra phone; and clients can not provide one in a short time.
  ▪ We will use Unity device simulator and test the game on our own Androids.

• Scalability of database and queries based on employees active.
  ▪ If the scale of database is too large, the project will cost more.
  ▪ Team Union Pacific will talk to clients and make sure the cost is not out of their price range.
Questions?