MICHIGAN STATE UNIVERSITY

Project Plan Presentation

Flexible VR Training

The Capstone Experience

Team Vectorform

Matthew Burkett
Jiuhua Wu
Casey Stironek
Michael Burkett
Gabe Misajlovski
Ayaan Shaik

Department of Computer Science and Engineering
Michigan State University

Spring 2023

From Students…
…to Professionals

Project Sponsor Overview

- Team of inventors founded in Detroit
- Strategic consultancy and digital product development
- Re-invent products to be relevant with technological growth
- Key focuses on immersive technology and intelligent computing

Project Functional Specifications

- Dangerous workplace training and high training demand
- Virtual reality training with a human or AI trainer
- Web app to review training
- Safe and convenient
- Saves human capital and money

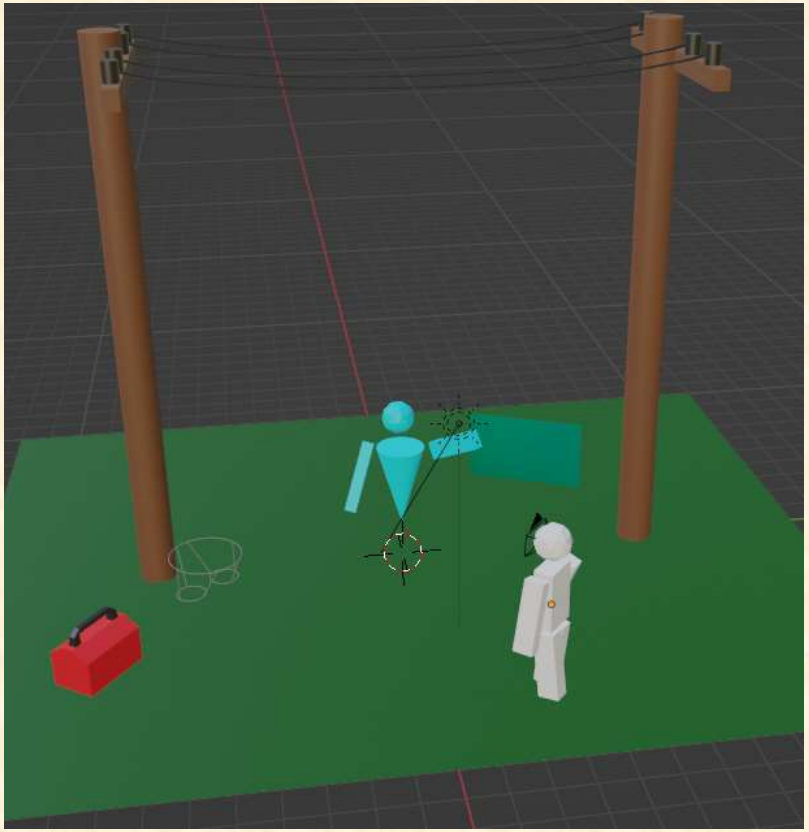
Project Design Specifications

- Simulator main menu
  - Basic menu option
  - Room code for training sessions
- VR training simulator environment
  - Modelled using Unity
- Wrist menu
  - Basic simulator controls
- Web application video player

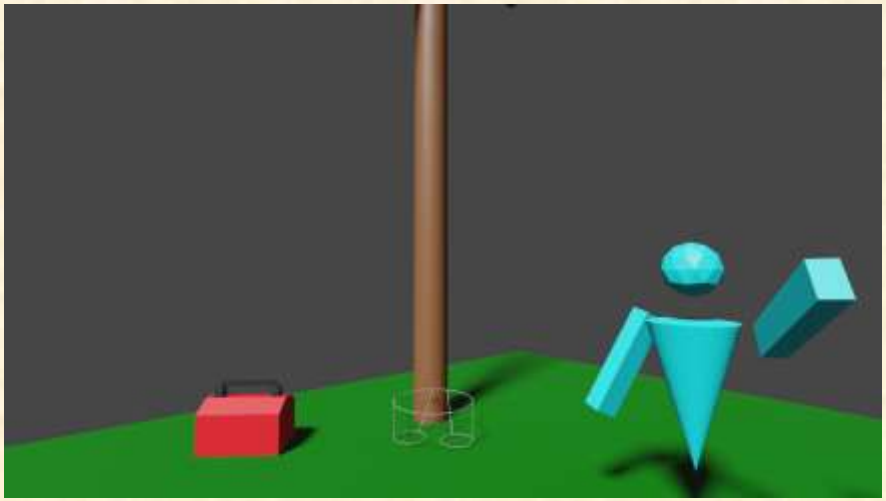
Screen Mockup: Simulator Main Menu

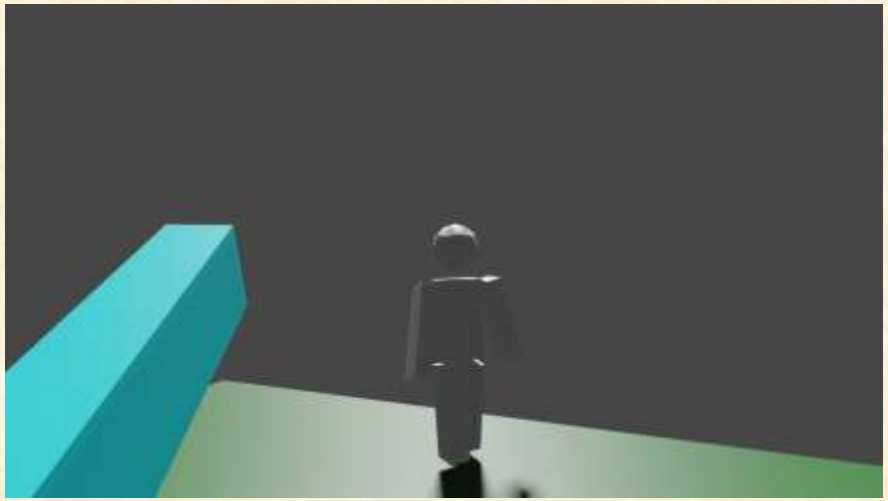
Screen Mockup: Simulator Wrist Menu

Screen Mockup: VR Environment

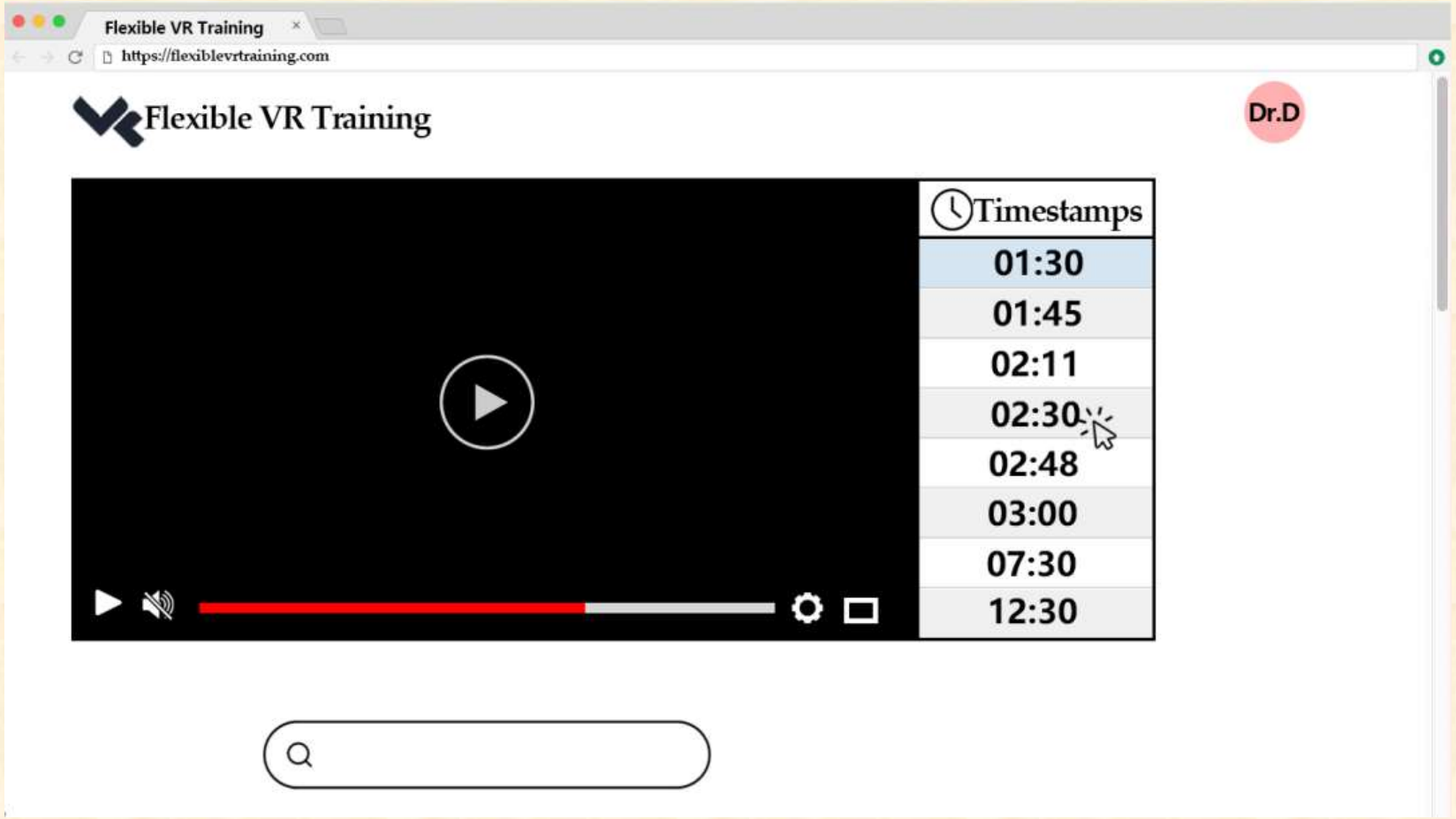


Screen Mockup: VR Environment

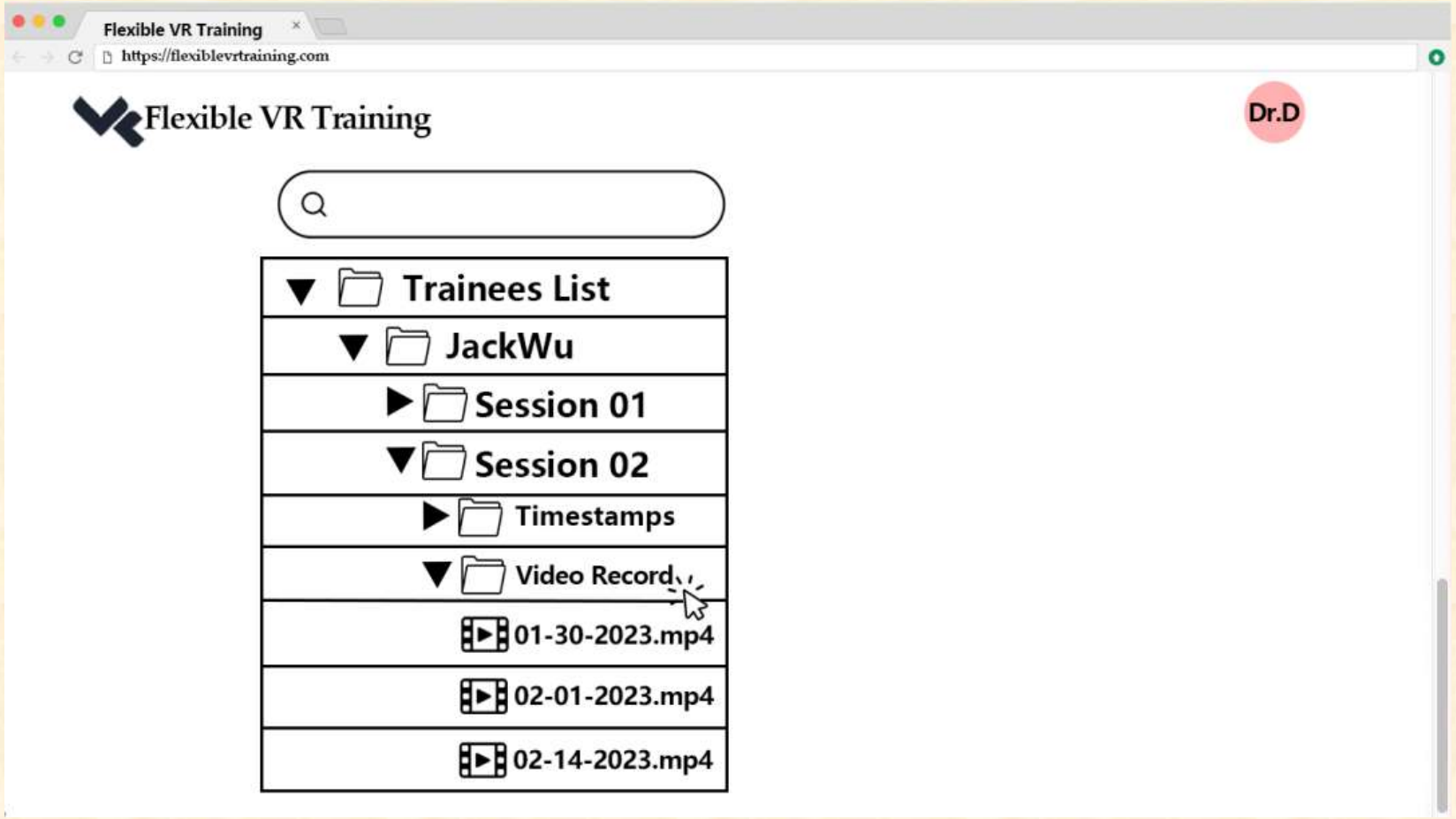




Screen Mockup: Web App Video Player



Screen Mockup: Scroll Down Menu



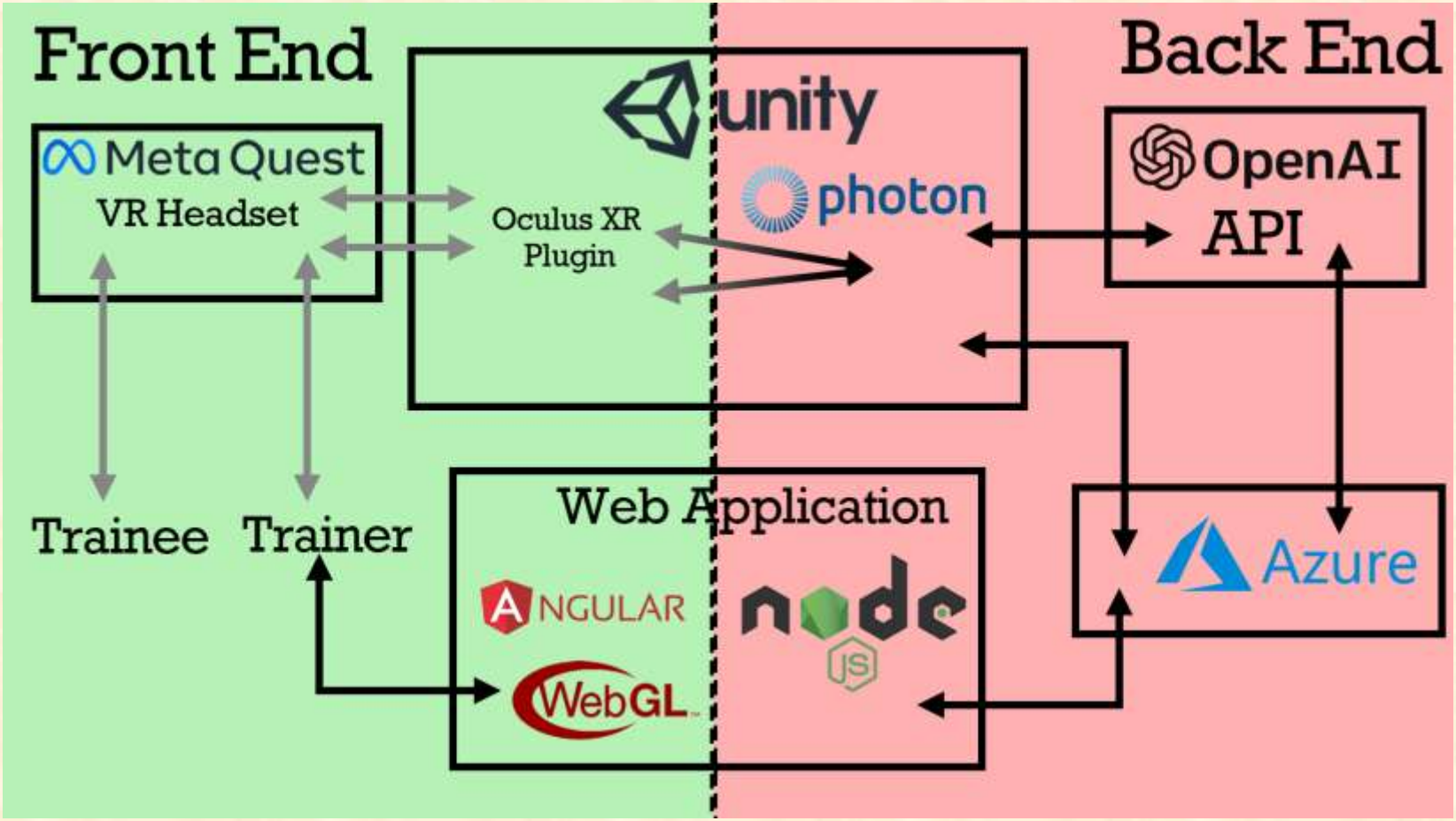
Project Technical Specifications

- VR Training Simulator
  - Unity-built application
  - Oculus XR plugin used for VR development
  - Photon for multiplayer
  - OpenAI API for the AI trainer
    - Access the GPT-3 model
    - Train using Azure SQL cloud database
  - Speech-to-text and text-to-speech
  - Recordings saved to database

Project Technical Specifications

- Web Application
  - Angular front end
  - Node.js back end
  - Only trainers can access
  - Video player page
    - Functionality for timestamps
    - Retrieve videos form database

Project System Architecture



Project System Components

- Hardware Platforms
  - Meta Quest Pro headsets
- Software Platforms / Technologies
  - Unity
    - Oculus XR Plugin
    - WebGL
  - Photon
  - OpenAI API
  - Microsoft Azure
    - Cognitive Services
    - SQL Cloud Database
  - Angular
  - Node.js

Project Risks

- Minimizing lag and delays that would disrupt interaction (Hard)
  - Multiplayer functionality might cause lag for the users and the response time for the GPT-3 model might cause delayed instructions or replies
  - Approximating the sum duration of possible delays via test projects and experimenting with faster GPT-3 submodels
- Creating human-like AI (Hard)
  - Create cohesive and human-like body language, speech, and facial expression systems
  - Two team members assigned to researching and rapidly prototyping these systems
- Making our own training data for the AI (Medium)
  - Create our own training data sets for the AI instructor to learn from
  - One team member looking into implementing data sets and another team member is creating data for these data sets
- Preventing irrelevant dialogue with the AI (Low)
  - Don't allow the trainee to begin incongruous or irrelevant dialogue with the AI
  - Experimenting with GPT-3 prompts and preempt possible distractions

Questions?