VR for Social Simulations

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Introduction

Goal: Use virtual reality (VR) as a tool for users with social development disorders and researchers to learn from.

Client & Faculty Mentors

Dr. Vicky Tsang

Associate Professor of Occupational Therapy

Client

Scott Griffith

Assistant Professor of Computer Science

Client & Faculty Mentor

Dr. Pete Tucker

Professor of Computer Science

Faculty Mentor

Client Requirements

Our client has 3 main research questions:

- What kind of **social interactive data** can be captured using the eye, face, and hand tracking functions of the VR headset?
- How can the VR headset be used to develop an **interactive VR architecture** with a temporal dimension?
- Can we use the existing technological functions of a 3D camera to create **simulated social scenarios** in VR as an **intervention** program?

01

About Our Project

Why is our project interesting?

- Use of VR in a research project
- New experience unlike other courses
- Visual programming for Unreal Engine
- Neural network to identify faces
- A Simlation to Practice Social Scenarios

Product Specifications - Hardware

Insta360

Camera capable of recording 360˚

Meta Quest Pro

VR headset equipped with eye and motion tracking technology

Product Specifications - Software

- **Unreal Engine:** VR development program.
- **Android Studio:** packaging VR project for Meta Quest Pro

Completed Backlog Items

- Wrote the script for scenarios
- Research and test VR programming tools
- Successfully record 360 videos and import them into Unreal
- Optimize the videos so it looks as realistic as possible in the headset
- Create branching options based on user selection
- Started data export from the simulation for analysis
- Started a neural network learning model

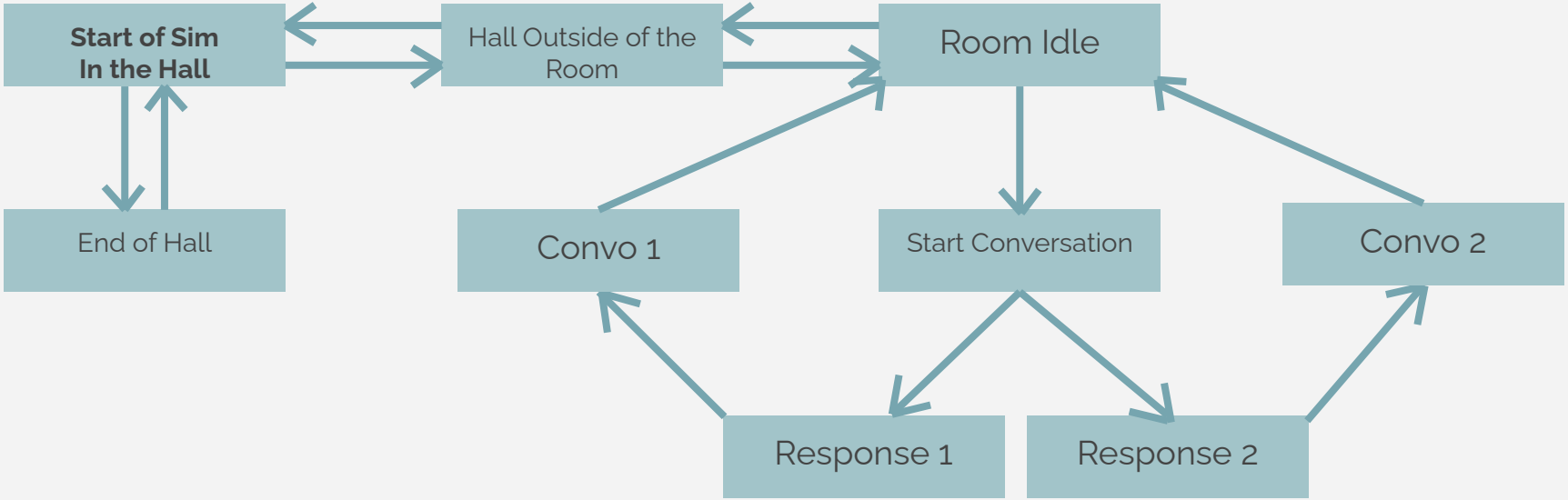
Unmet Backlog Items

- Replacing videos with ones filmed in the HUB
- Dynamic data output
- Face, hand, body motion tracking
- Eye or motion selection for options

02

Demo Walkthrough

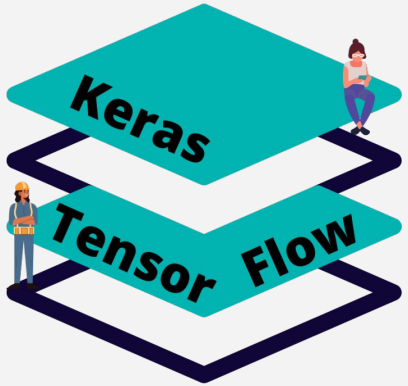
Simulation Structure



Video Demo

Neural Network Model

- Built using Keras and TensorFlow
- Interpret data from user (eye contact)
- Correctly recognize human faces within images
- Images need to be extracted/adjusted for use in the network



03

Future Work

Future Work

Audio Input

Take voice as an input from users

Body Motion

Track body and hand motions

Data Analysis & Visualization

Present the data in a dynamic manner

Option Selection

Options proceed as users move

04

Post Mortem

What went well?

- Successfully built the project despite lack of familiarity
- Thorough Documentation
- Image Processing Model
- A Foundation and Direction for Future Development
- Customizable Simulation

What did not go well?

- Steep Learning Curve
- Hardware Issues
- Minimal support with resolving most issues

Thank you!

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