Project Plan
Adjust AR App

The Capstone Experience

Team Herman Miller
Mike Bremiller
Kevin Gaban
Han Huang
Kyle Kinsey
Jacob Weber

Department of Computer Science and Engineering
Michigan State University
Spring 2018
Functional Specifications

• Mobile application for users of high-end Herman Miller office chairs
• Uses augmented reality to assist in correct ergonomic adjustments
• Identifies chair automatically via camera
• Interactive 3D model of chair provides step-by-step adjustment instructions
• Provides alternative to on-site instructional sessions
Design Specifications

• Chair is identified using phone camera
• Once identified, provides a full walkthrough on proper ergonomic adjustments for chair via 3D model
• Allows returning users to view all adjustable parts or choose their model from existing gallery
• Tapping on a highlighted part provides text and video adjustment tips
Screen Mockup: Identifying Chair

Tap the "Adjust" button and sit in your chair to begin guided adjustment.

Aeron (remastered)
Screen Mockup: Interactive 3D Model
Screen Mockup: Adjustment Instructions

Height Adjustment

Adjusts the vertical height of the chair

To increase the height of your chair, pull on the lever while standing. To decrease the height of the chair, pull on the lever while sitting down. Your feet should sit flat on the ground, and your knees should be at a 90 degree angle.
Technical Specifications

• Vuforia
  - Used Model Target Generator to create Unity Model Target assets
  - Model Targets are matched with camera input to identify chair
  - Vuforia AR camera is used to place the name of the chair above it in the camera view

• Unity
  - Interactive 3D models guide the user through chair adjustment through scene switching
  - Tapping on a highlighted part directs the user to the corresponding adjustment instructions
  - Builds natively to Android and iOS
System Architecture

- 3D assets
- Model Target Generator
- Camera Input
- Vuforia matches model target to camera input
- Unity displays appropriate interactive 3D model
- Xcode
- Builds
- iOS
- Builds
- Android

The Capstone Experience
Team Herman Miller Project Plan Presentation
System Components

• Hardware Platforms
  ▪ iOS
  ▪ Android

• Software Platforms / Technologies
  ▪ Unity 3D (C#) for development and design
  ▪ Vuforia for AR and image recognition
  ▪ Blender for modification of 3D models
Risks

• Risk 1 – Recognizing chair models via camera
  ▪ Experimenting and developing with Vuforia
  ▪ Testing other solutions (OpenCV, Microsoft Computer Vision)

• Risk 2 – Properly integrating augmented reality
  ▪ Built working prototype with Vuforia
  ▪ Can fall back on Apple ARKit or other technologies

• Risk 3 – Testing multiple configurations
  ▪ Herman Miller has provided us with fully-loaded models so that many possible configurations can be tested

• Risk 4 – Cross platform development
  ▪ Using technologies that are natively cross-platform
Questions?