Project Plan Presentation
Augmented Reality Utilizing IoT Technology

The Capstone Experience

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Project Sponsor Overview

• Global automotive company in Detroit, MI
• 155,000 employees, 118 facilities in the US
• Company goals: zero crashes, zero emissions, and zero congestion
• Chevrolet, Buick, GMC, and Cadillac
Project Functional Specifications

• Uses AR technology to perform action in the physical world
• Workplace application
• Creates potentially viable user safety/security option utilizing AR
• HoloLens 2 is easy-to-use/intuitive
Project Design Specifications

• Make a CAPTCHA security system in AR
• Simplicity for anyone in GM to utilize
• Focuses on making this AR security a valuable alternative to current workplace security systems
Screen Mockup: User Menu
Screen Mockup: AR Button
Screen Mockup: Unlocking Door
Screen Mockup: Scanning QR Code
Project Technical Specifications

- Microsoft HoloLens 2
  - Main device that will host the application
- Raspberry Pi 4
  - Mini-computer that will communicate with the HoloLens 2
- SG90 9g Micro Servo
  - The mechanism that will act as the lock
Project System Architecture

Internet

Microsoft HoloLens 2

UNREAL ENGINE

Raspberry Pi 4

Flask

Servo Motor
Project System Components

• Hardware Platforms
  • Microsoft HoloLens 2
  • Raspberry Pi 4
  • SG90 9g Micro Servo

• Software Platforms / Technologies
  • Unreal Engine 4.27.2
    • Microsoft OpenXR
    • Mixed Reality Toolkit Hub
    • Mixed Reality UX Tools

• Flask
Project Risks

- Communication between Unreal and Raspberry Pi
  - Making Unreal communicate through a button press in a virtual environment to a Raspberry Pi
  - Planning to use an HTTP request to then in turn activate the Raspberry Pi
- Keeping security high and maintaining easy use
  - Ensuring that any employee can use the AR quickly to make it a valuable alternative to other security options
  - Keeping front-end as simple as possible in the HoloLens AR
- Pushing Unreal to the HoloLens 2
  - The libraries used for AR development in Unreal can be extremely buggy when trying to push builds to the hardware
  - Working with smaller builds to gain a firm understanding on how more easily deploy our larger builds later in development