MICHIGAN STATE UNIVERSITY

Project Plan Presentation

Augmented Reality Utilizing IoT Technology

The Capstone Experience

Team GM

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From Students…
…to Professionals

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

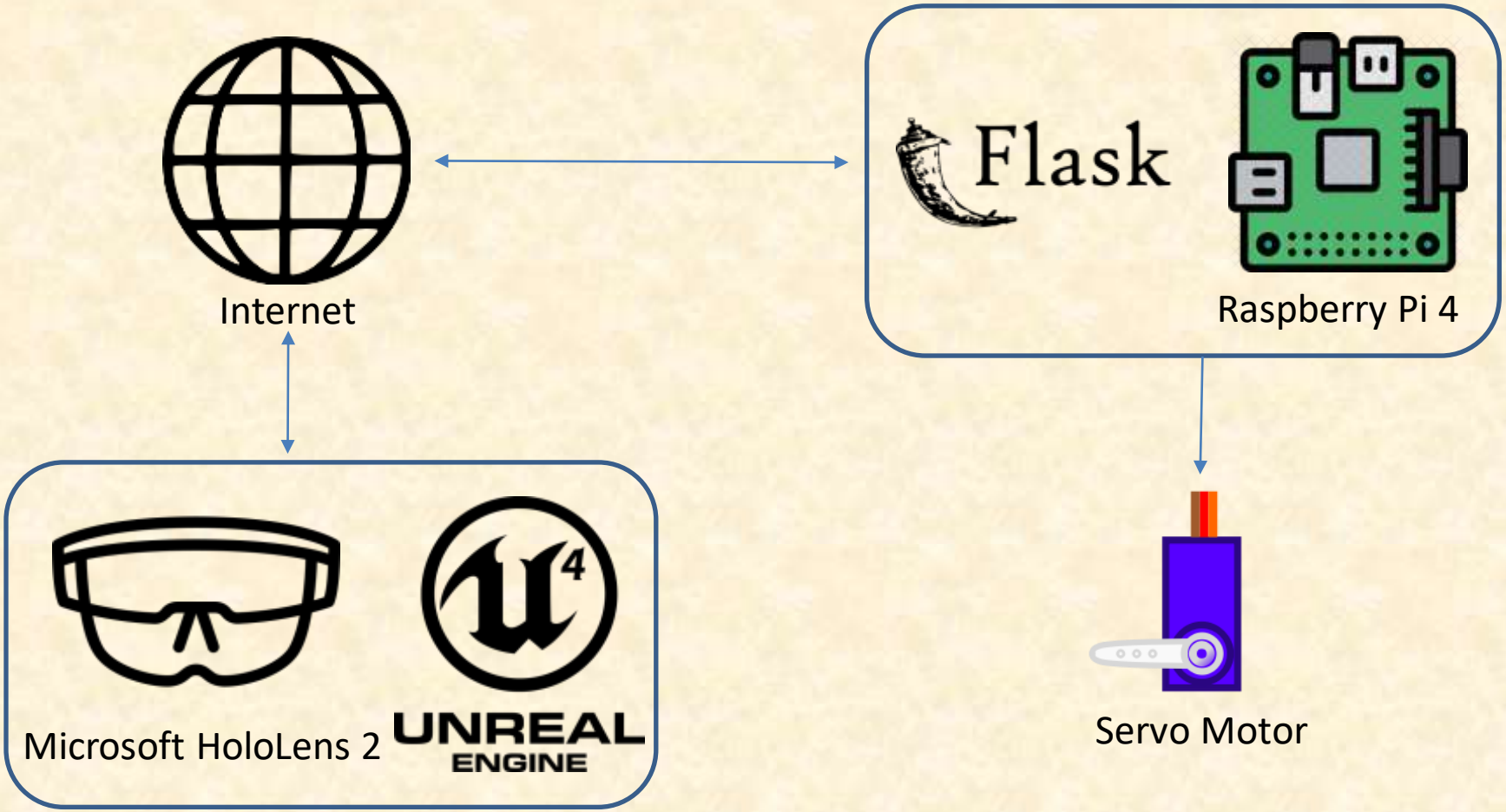
Screen Mockup: Unlocking Door

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



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

Questions?