Project Plan
Office Navigation Using Augmented Reality

The Capstone Experience

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Functional Specifications

• iOS Application
• Indoor Navigation of Large Complex Buildings
  ▪ Administrator configures environments
  ▪ Users follow turn-by-turn instructions
• Utilize Augmented Reality for localization and navigation
Design Specifications

• Administrator Mode
  ▪ Configuration of places and routes
  ▪ Version control

• User Mode
  ▪ Navigate from place to place
  ▪ Self-healing functionality
Screen Mockup: Home Screen

Where to?

- Conference room 234
- BEGIN
- ADMIN MODE
Screen Mockup: User Mode Dashboard

Do you know where you are?

Front entrance

YES  NO
Screen Mockup: User Mode Localization

- Destination: Conference room 234
- Scan your surroundings (Walls and doors work best)
- END
Screen Mockup: Administrator Mode
Technical Specifications

• Development Software
  ▪ Xcode: IDE
  ▪ ARKit: Library for AR function calls
  ▪ Placenote: Third party SDK for extended functionality
  ▪ Pods: Integrate third party SDK to Xcode

• Server-Side Software
  ▪ Placenote: Cloud storage
  ▪ Amazon SageMaker: Machine Learning
System Architecture

Data Exchange

SDK

Swift

AR

Placnote

aws
System Components

• Hardware Platforms
  ▪ Apple device with A9 core and above
  ▪ iMac Pro

• Software Platforms / Technologies
  ▪ iOS 12 and above
  ▪ Swift and ARKit
  ▪ macOS
Risks

• Placenote Map Size Limitations
  ▪ Databases only handle maps of up to 2000 sq. ft and they do not have a built-in system to connect maps to each other.
  ▪ Working on connecting multiple small maps locally.

• Machine Learning Data for Self-Healing
  ▪ This data is not readily available and would have to be generated through use of app.
  ▪ The data gathering will be through video. Training could be done by Amazon SageMaker to train and deploy machine learning model.

• iPhone Hardware Limitations
  ▪ iPhone hardware only allows for AR detection of up to 4m in front of camera. This will limit feature detection capabilities.
  ▪ Prompt all users to avoid open areas all the time.

• Choosing Long Lasting Feature Points
  ▪ Uncertainty of recognizing constantly changing places or routes.
  ▪ Direct administrator to map more concrete feature points.
Questions?