

Project Plan Presentation

Volkswagen Shopping App with Augmented Reality

The Capstone Experience

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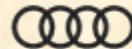
Fall 2023



*From Students...
...to Professionals*

Project Sponsor Overview

- Volkswagen Group of America, Inc. – U.S. subsidiary of Volkswagen Group
 - One of the world's top automakers - Europe's largest



VW CREDIT, INC.

- Driven by innovation across various automotive technologies
- Pioneering sustainable solutions, including electric mobility



Project Functional Specifications

- AR App to streamline the car buying process
 - Help users envision how the car will look at home
 - Customization options – tailored to liking
 - Fewer trips to dealerships and showrooms
- User experience, intuitive placement of vehicle model
 - Camera direction, gesture controls
 - Accurate scale
- Realistic models that fit in environment
 - Photo capture to share with friends and family



Project Design Specifications

- Model Selection
 - Users choose between various models of cars to display and customize
- Preview/Anchor Placement
 - Ensure the user places car model in an appropriate space
- Car View
 - Options to interact with the virtual car
- Accessory Selection
 - Options to add accessories
- Capture and Share
 - Captures the current view and has options to share and save the image



Screen Mockup: Model Selection



Screen Mockup: Placing Anchor



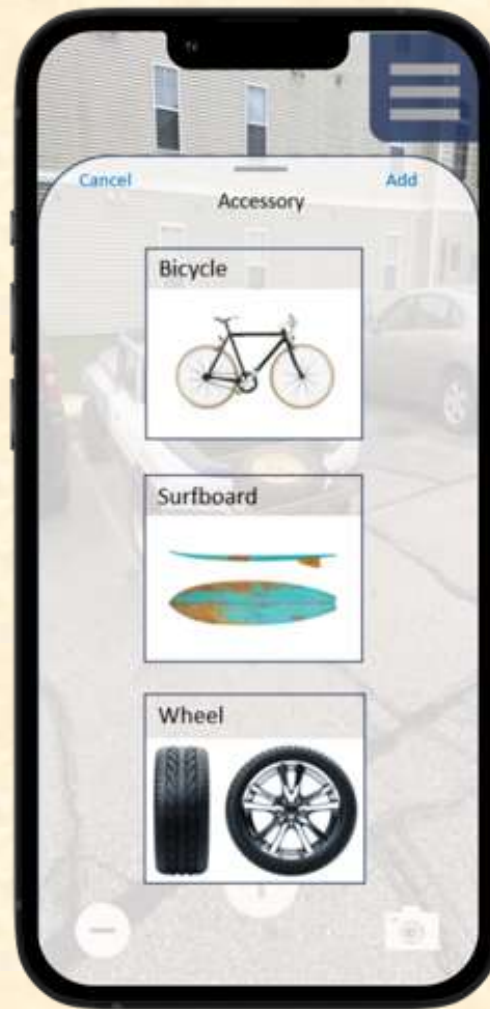
Screen Mockup: Car Placed



Screen Mockup: Menu



Screen Mockup: Accessories



Screen Mockup: Capture and Share

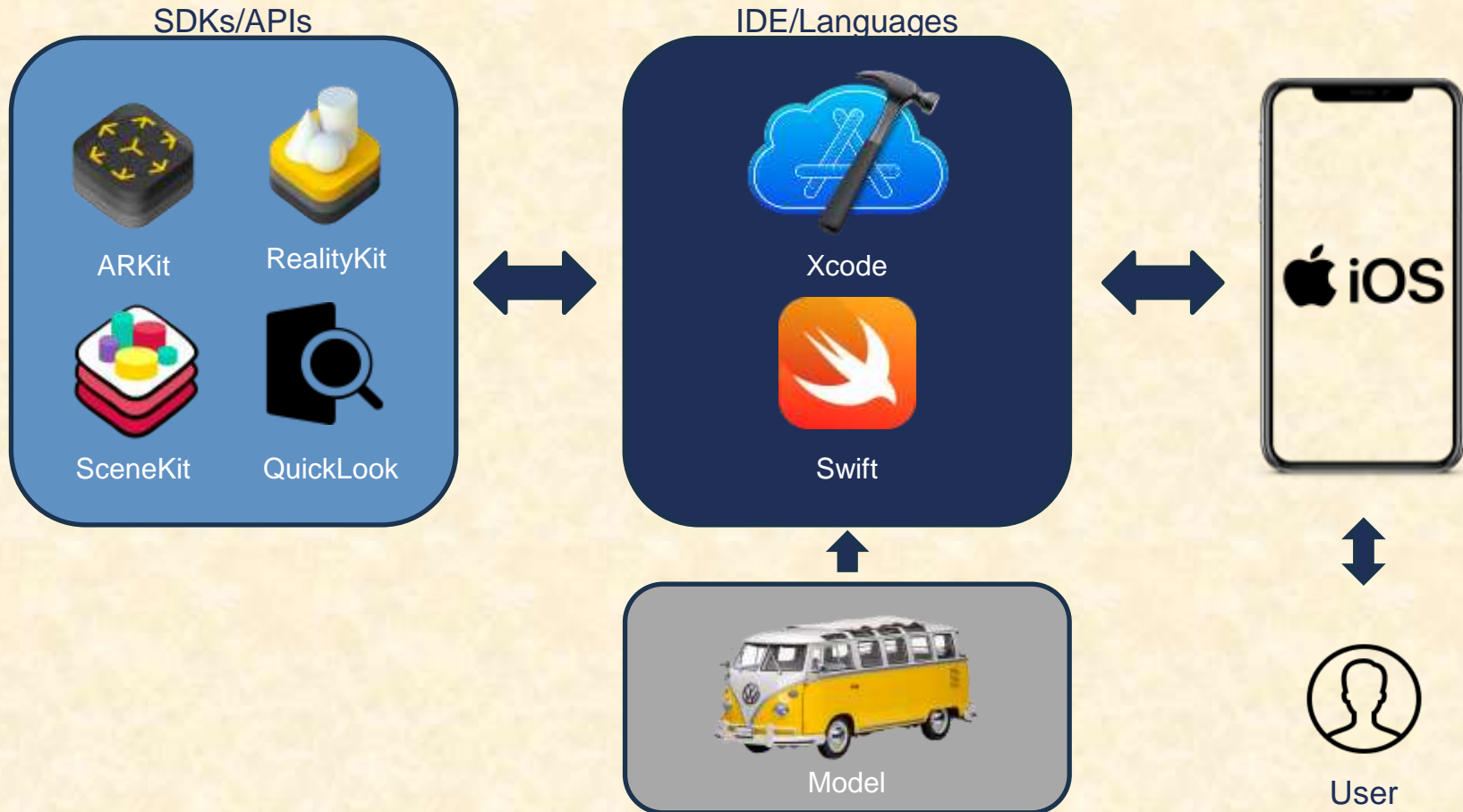


Project Technical Specifications

- Xcode
 - Provides developers with a platform to write comprehensive code that can be distributed to capable iOS devices
 - Combines the tools described below in a powerful IDE
- ARKit
 - Detect and track the real world through a device's camera
 - Allows for the use of Apple's Augmented Reality features
- RealityKit
 - Adds key details to AR scenes that allow for seamless integration of virtual objects in the real world
 - Allows developers to harness ARKit's power through the creation of AR Views
- SceneKit
 - Powerful API and rendering engine used to build, customize, and animate 3D models
 - Create scenes with embedded sound and where models have different accessories
- QuickLook
 - Leveraged by other frameworks to display AR elements with improved quality
 - Spatial audio will give the user a more immersive experience



Project System Architecture



Project System Components

- Hardware Platforms
 - iOS 13.4 or higher
- Software Platforms / Technologies
 - Xcode & Swift
 - The industry standard for developing for iOS
 - ARKit & RealityKit
 - ARKit: foundational framework for AR development on iOS
 - RealityKit: higher-level framework that builds on ARKit and allows developers to quickly and easily create Augmented Reality
 - SceneKit
 - 3D graphics framework provided by Apple. It is designed for building 3D interactive scenes
 - Quicklook
 - Offers several features to help display AR scenes realistically



Project Risks

- 3D Models for cars and accessories
 - Availability of 3D models may pose a challenge. Low-quality models would not be suitable
 - **Mitigation:** Placeholder models for prototypes, Leverage QuickLook features to improve models' display quality
- Loading customization options
 - Selecting accessories and loading updated models may slow performance
 - **Mitigation:** Load all models on startup
- Object projection in different environments
 - Placement of an object can be hard to determine due to limited space, slanted inclines, and even lighting conditions
 - **Mitigation:** Build prototypes based on established examples
- Adjusting car audio based on vehicle specifications and location
 - Changing the sound based on user distance from vehicle, and vehicle type could require acoustics knowledge and complex calculations
 - **Mitigation:** Spatial Audio with QuickLook and sounds embedded in models through SceneKit



Questions?

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