

MICHIGAN STATE

U N I V E R S I T Y

Project Plan

Ford Augmented Reality Owner's Manual

The Capstone Experience

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

Functional Specifications

- The Ford AR Owner's Manual app provides information about a Ford vehicle
 - The app has an augmented reality or a text-based view of the resources
- A web portal allows Ford employees to upload new information for vehicles
 - Information for a vehicle includes the owner's manual, FAQs, links to videos, and other relevant media

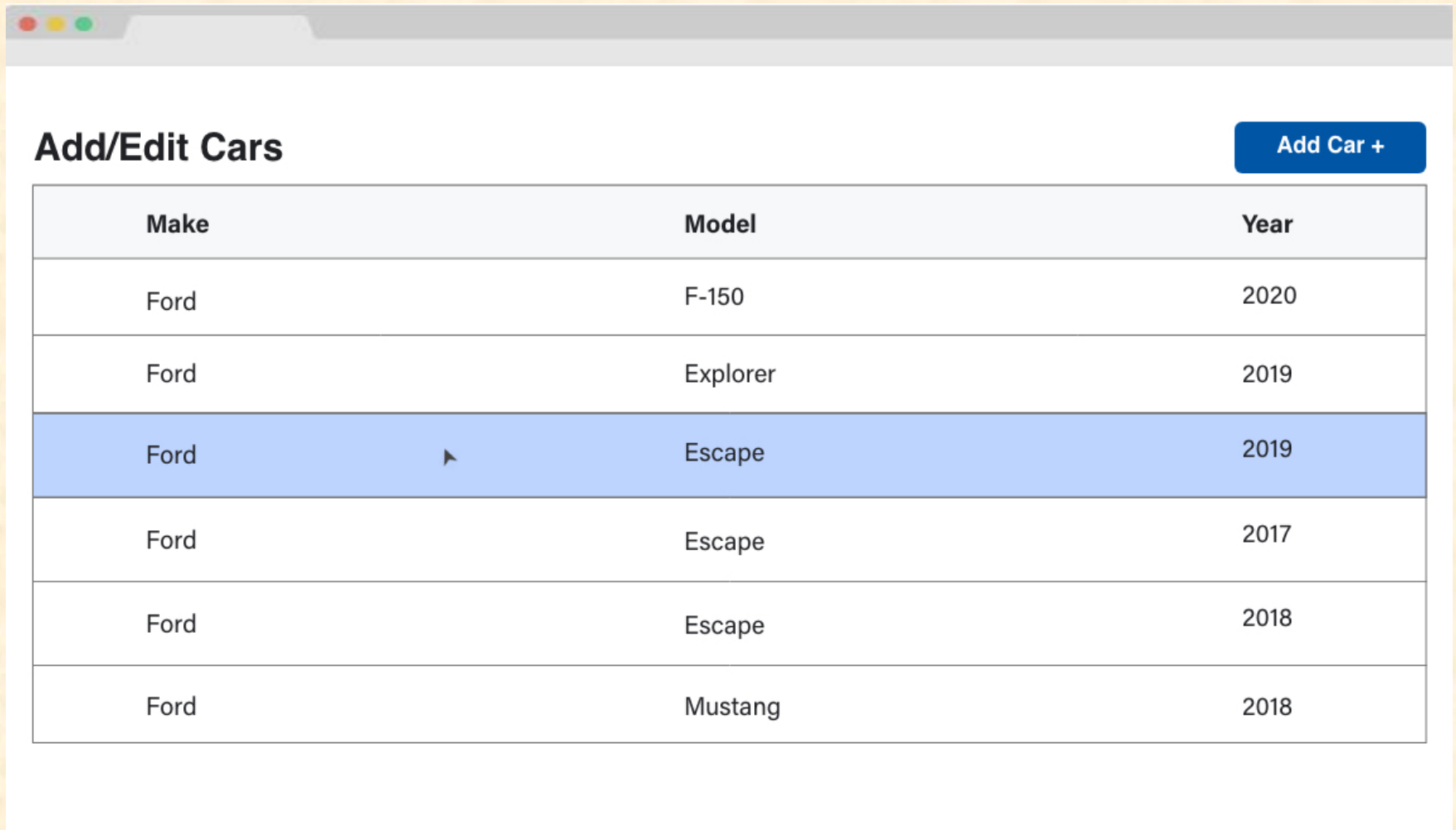


Design Specifications

- iOS
 - Digital Search view to locate owner's manual references, media, or other related documents
 - AR search view to locate vehicle features using iPhone camera
- Web application
 - Home page listing current vehicles
 - Vehicle page displaying uploaded media
 - Upload page to add new media for a vehicle



Screen Mockups: Web Interface

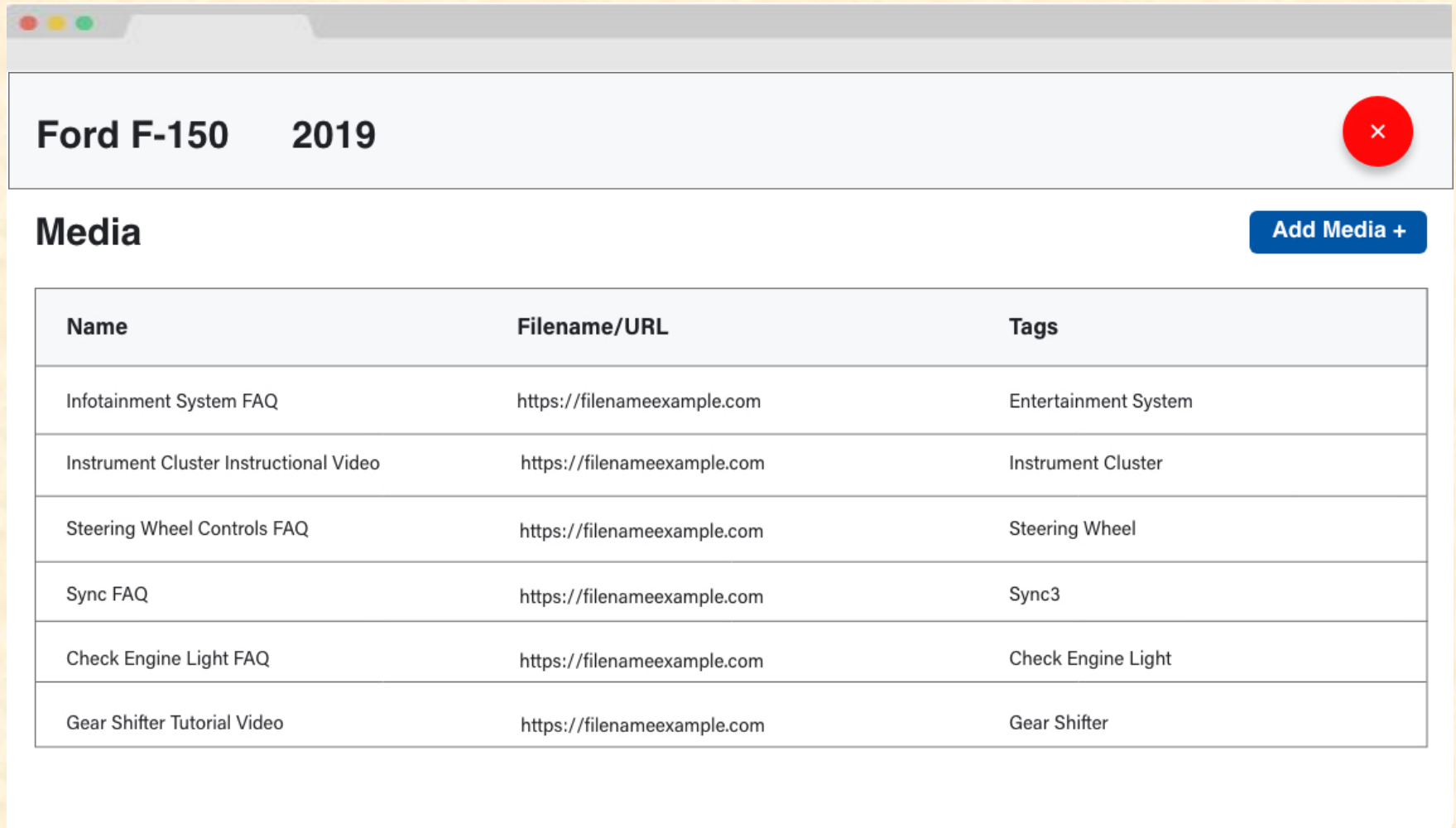


Add/Edit Cars [Add Car +](#)

Make	Model	Year
Ford	F-150	2020
Ford	Explorer	2019
Ford	Escape	2019
Ford	Escape	2017
Ford	Escape	2018
Ford	Mustang	2018



Screen Mockups: Web Interface



The mockup shows a browser window with a header for 'Ford F-150 2019' and a 'Media' section. The media section contains a table with columns for Name, Filename/URL, and Tags. A red close button is in the top right, and a blue 'Add Media +' button is in the top right of the media section.

Ford F-150 2019

Media [Add Media +](#)

Name	Filename/URL	Tags
Infotainment System FAQ	https://filenameexample.com	Entertainment System
Instrument Cluster Instructional Video	https://filenameexample.com	Instrument Cluster
Steering Wheel Controls FAQ	https://filenameexample.com	Steering Wheel
Sync FAQ	https://filenameexample.com	Sync3
Check Engine Light FAQ	https://filenameexample.com	Check Engine Light
Gear Shifter Tutorial Video	https://filenameexample.com	Gear Shifter



Screen Mockups: Web Interface

Add Media

Name

Upload

Media Type

Video ▾

Tags

Primary

Select... ▾

Secondary

Select... ▾

Seatbelts

Steering Wheel

Climate Control

Cancel Submit



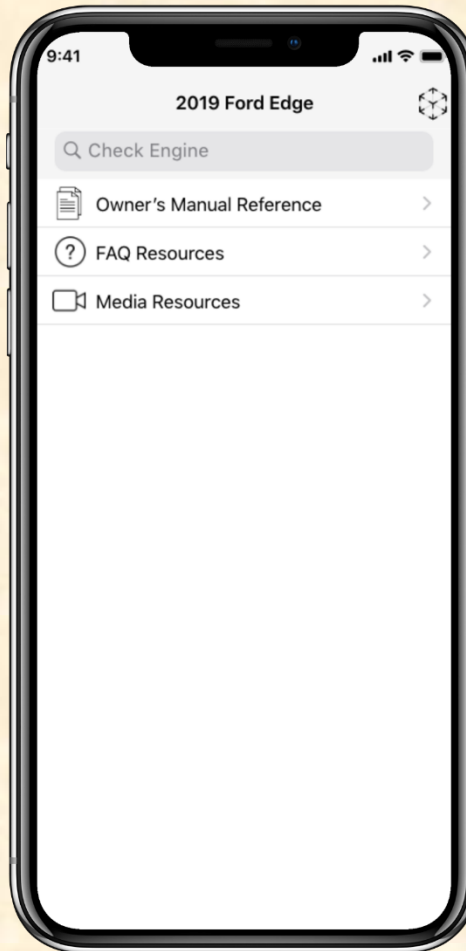
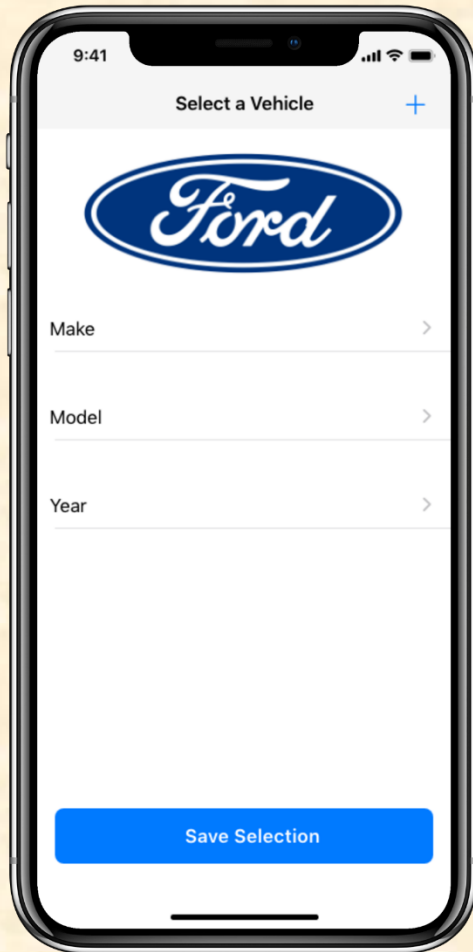
Screen Mockups: Web Interface

AR Tagging

Steering Wheel	<input type="checkbox"/> Gear Shifter	<input checked="" type="checkbox"/> Steering Wheel	<input type="checkbox"/> Climate Control	<input type="checkbox"/> Garage Door Opener	<input type="checkbox"/> Doors and Locks	<input type="checkbox"/> Wipers and Washers	
	<input type="checkbox"/> Windows and Mirrors	<input type="checkbox"/> Seatbelts	<input type="checkbox"/> Fuel and Refueling	<input type="checkbox"/> Security	<input type="checkbox"/> Seats	<input type="checkbox"/> General Information	<input type="checkbox"/> Rear Seat Armrest
	<input checked="" type="checkbox"/> Heated Steering Wheel	<input type="checkbox"/> Automatic Transmission	<input type="checkbox"/> Electric Parking Brake	<input type="checkbox"/> Starting a Gasoline Engine	<input type="checkbox"/> Keyless Starting		
Entertainment System	<input type="checkbox"/> Gear Shifter	<input type="checkbox"/> Seatbelts	<input type="checkbox"/> Transporting the Vehicle	<input type="checkbox"/> Garage Door Opener	<input type="checkbox"/> Doors and Locks	<input type="checkbox"/> Wipers and Washers	
	<input type="checkbox"/> Windows and Mirrors	<input checked="" type="checkbox"/> SYNC™	<input type="checkbox"/> Fuel and Refueling	<input type="checkbox"/> Security	<input type="checkbox"/> Seats	<input type="checkbox"/> General Information	<input type="checkbox"/> Rear Seat Armrest
	<input checked="" type="checkbox"/> SYNC™3	<input type="checkbox"/> Towing the Vehicle on Four Wheels	<input type="checkbox"/> Electric Parking Brake	<input type="checkbox"/> Starting a Gasoline Engine	<input type="checkbox"/> Keyless Starting		
Instrument Cluster	<input type="checkbox"/> Gear Shifter	<input type="checkbox"/> Doors and Locks	<input type="checkbox"/> Information Displays	<input type="checkbox"/> Garage Door Opener	<input checked="" type="checkbox"/> Gauges	<input type="checkbox"/> Wipers and Washers	
	<input type="checkbox"/> Windows and Mirrors	<input type="checkbox"/> Seatbelts	<input type="checkbox"/> Fuel and Refueling	<input type="checkbox"/> Security	<input type="checkbox"/> Seats	<input type="checkbox"/> General Information	<input type="checkbox"/> Rear Seat Armrest
	<input type="checkbox"/> Automatic Transmission	<input type="checkbox"/> Electric Parking Brake	<input checked="" type="checkbox"/> Warning Lamps and Indicators	<input type="checkbox"/> Starting a Gasoline Engine	<input type="checkbox"/> Keyless Starting		



Screen Mockup: iOS Application



Technical Specifications

- AWS RDS provides a PostgreSQL database to store vehicle information
- AWS Lambda and API Gateway combine to create a RESTful API
- AWS Cognito provides user authentication for the web app
- Swift and ARKit are used to create a native iOS application with augmented reality capabilities
- React used to create web app user interface

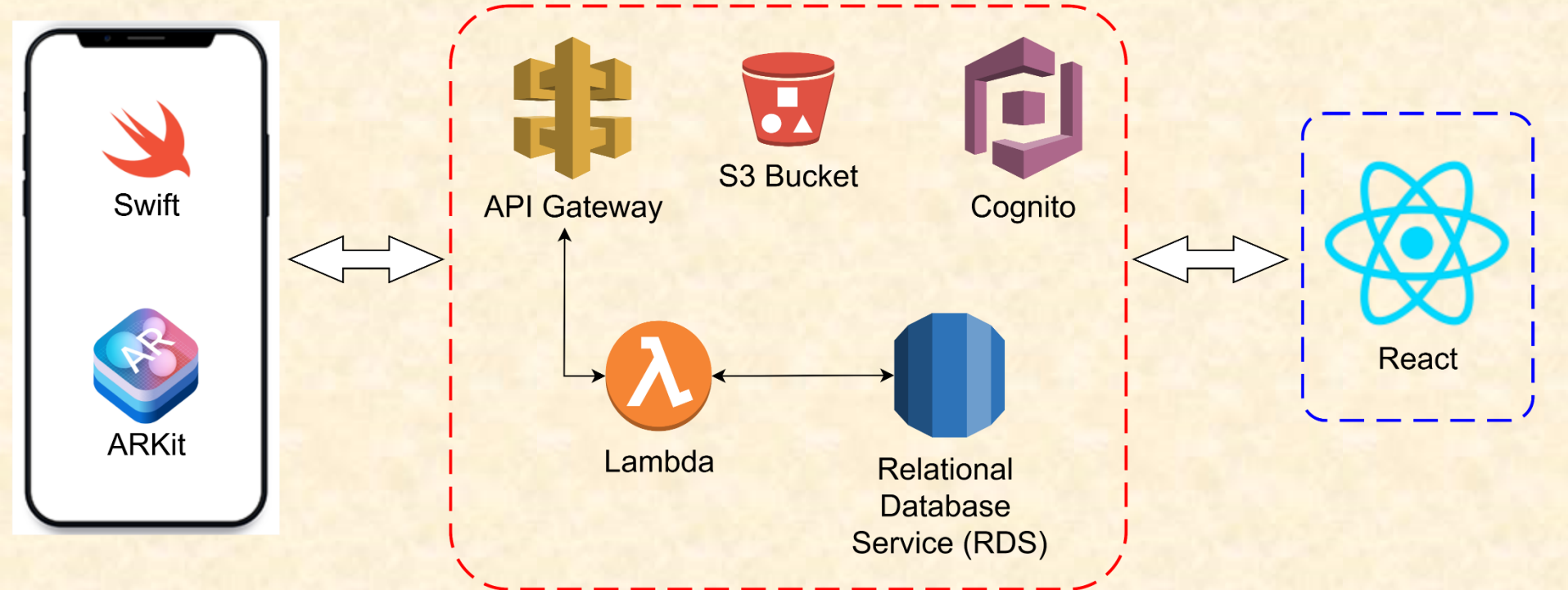


System Architecture

iOS Application

AWS

Web Application



System Components

- Hardware Platforms
 - iOS
- Software Platforms / Technologies
 - Amazon Web Services
 - RDS
 - Lambda
 - API Gateway
 - S3
 - Cognito
 - Swift
 - ARKit 3
 - React



Risks

- AR Detection

(Difficulty: Hard | Importance: High)

- Accurate data for AR mapping of vehicle targets
- Use mapped data from client of 1 specific vehicle as a baseline

- App is less convenient than physical copy

(Difficulty: Medium | Importance: Medium)

- Using the physical owner's manual is more efficient than the app
- Execute user experience testing amongst a diverse group

- Loss of access from loss of connectivity

(Difficulty: Easy | Importance: Low)

- Access to owner's manual is lost because there is poor or no internet connectivity
- User will identify the vehicle(s) they interact with, app will locally store respective owner's manual data



Questions?

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