MICHIGAN STATE UNIVERSITY

Project Plan

VW Car-Net Smart Hub Web Apps

The Capstone Experience

Team Volkswagen

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From Students…
…to Professionals

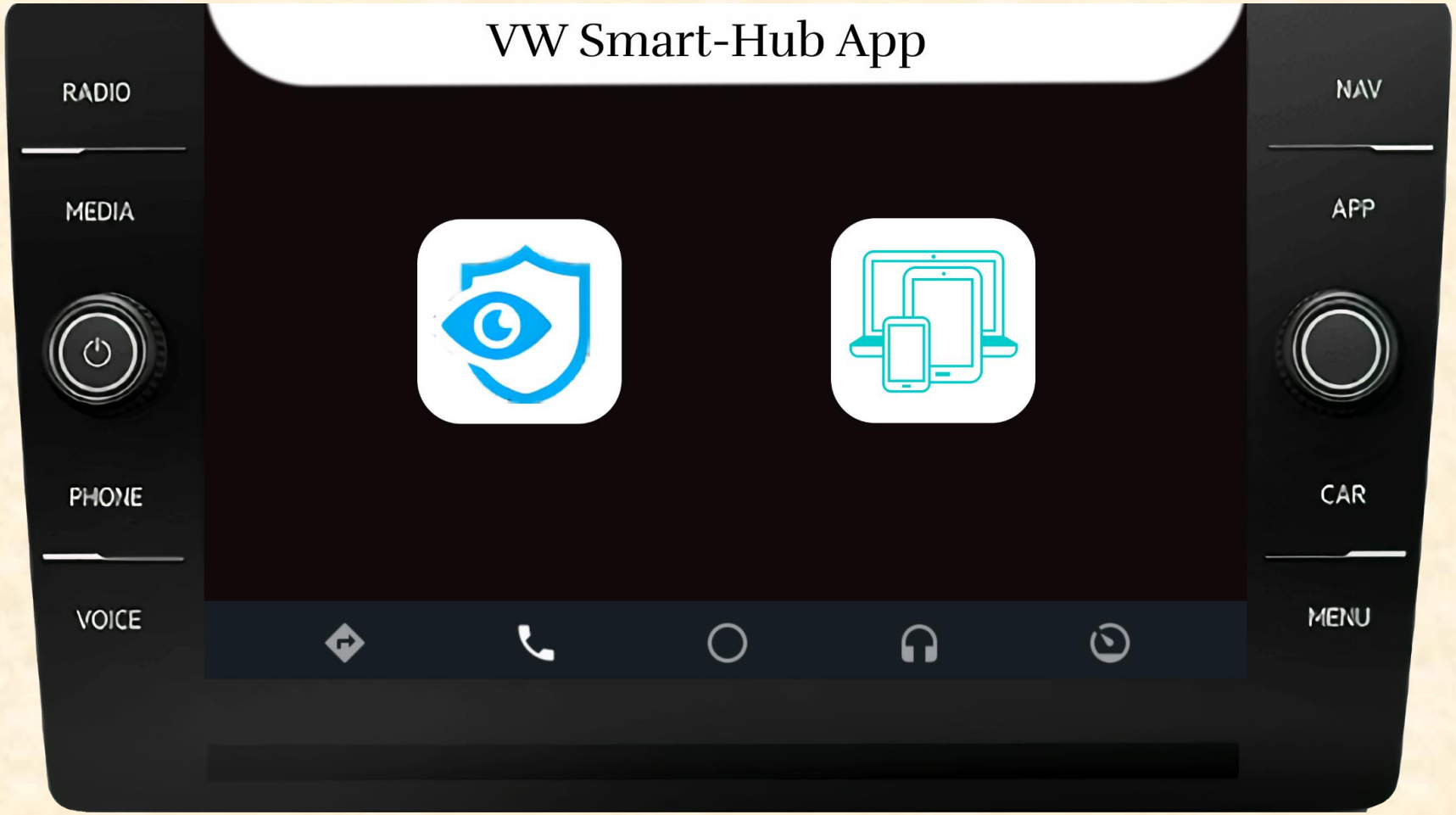
Functional Specifications

- Web app for use in VW cars' head units
- Create, edit, and view boundaries
- Detect when the car has crossed over a geo-fence surrounding the driver's house
- Trigger the automatic opening/closing of the garage door
- Use a similar approach to trigger events on other smart home devices

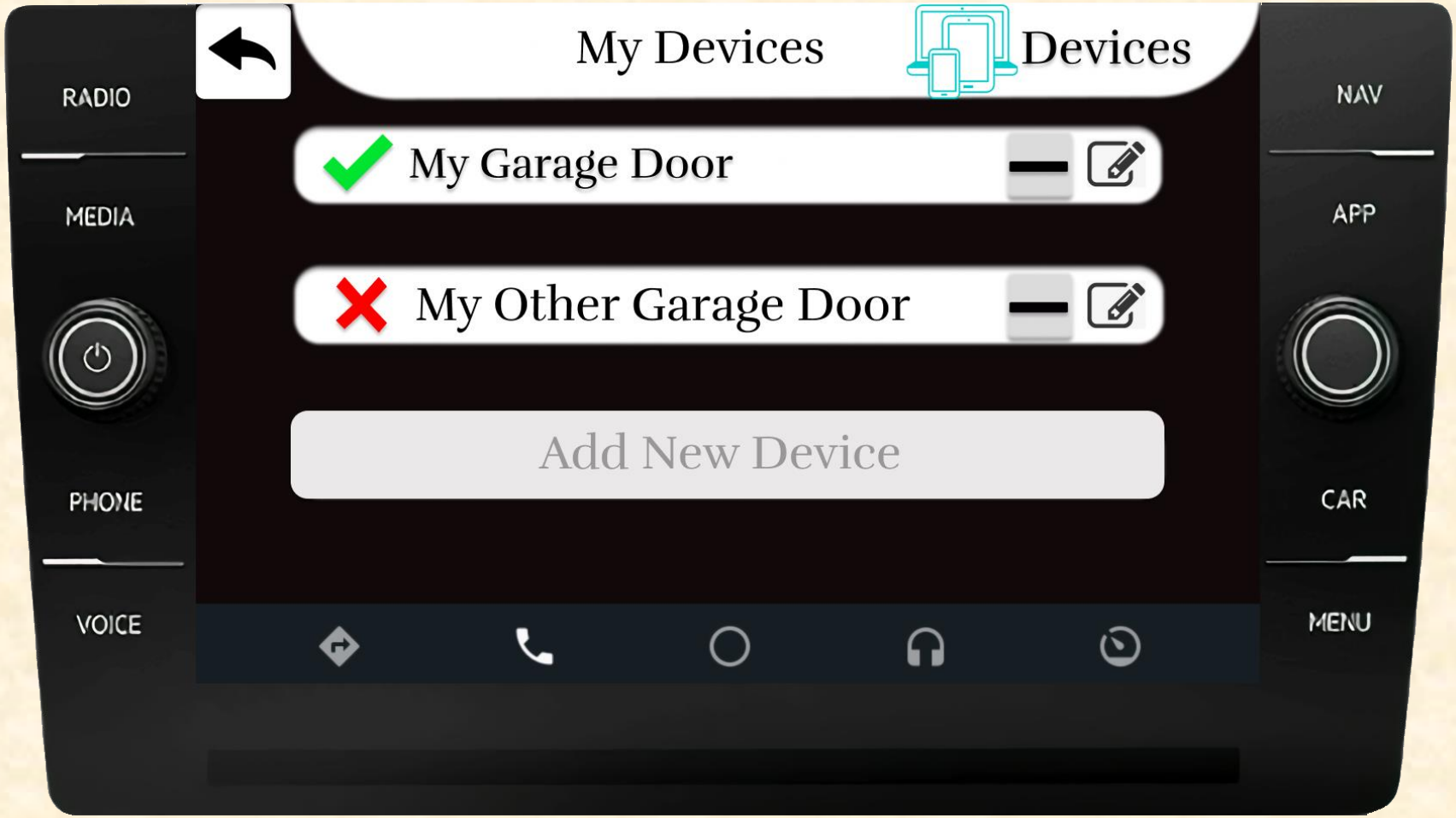
Design Specifications

- Web App displayed on infotainment unit along other Volkswagen applications
- Allows creation of Geo-Fences which, when crossed, can act as triggers for various devices
- Allows users to connect their smart home devices
  - This project officially focuses on connection with Chamberlain Garage door openers, but could be applied to other smart devices in the future

Screen Mockup: Landing Page



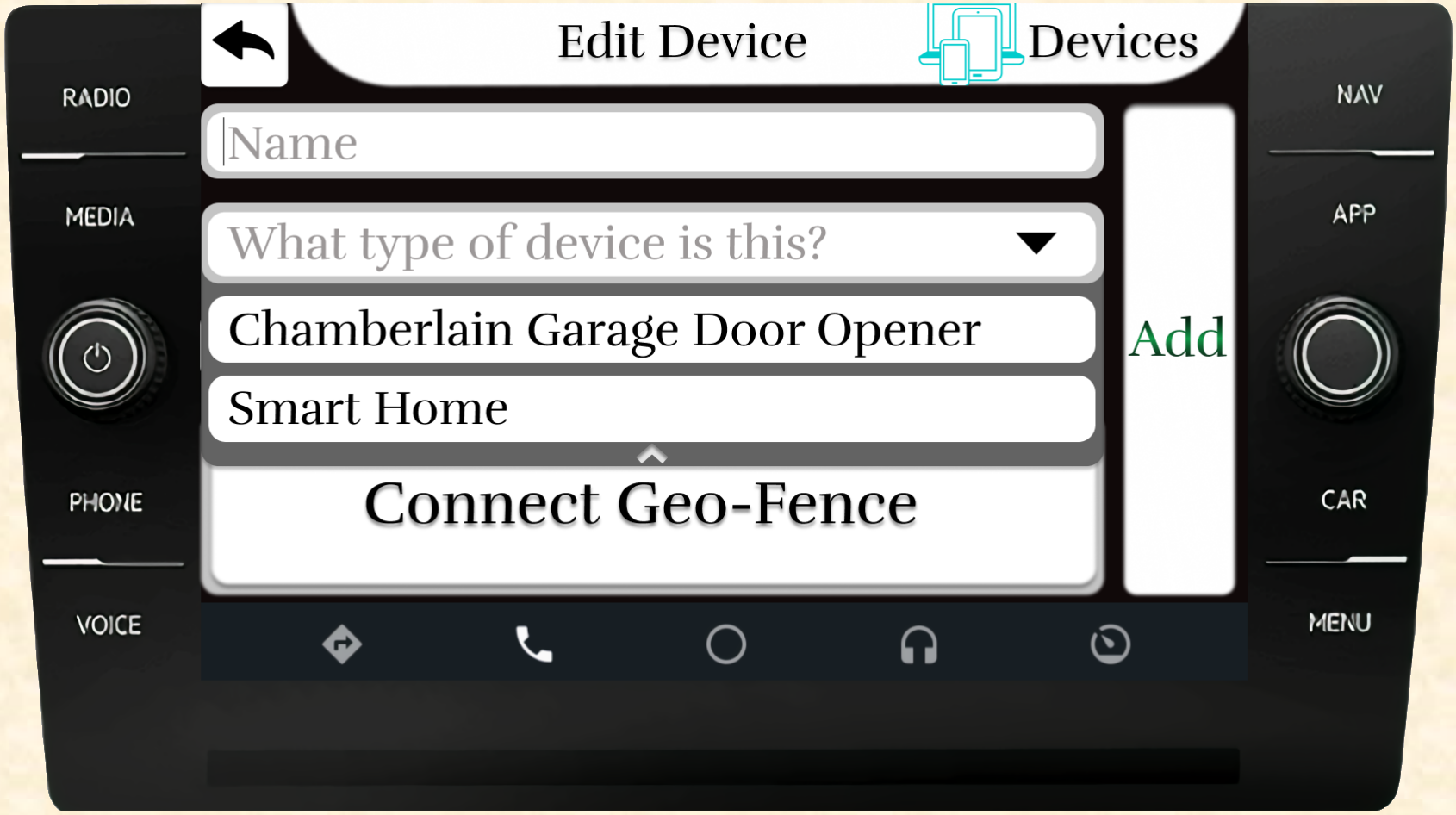
Screen Mockup: My Devices



Screen Mockup: Edit Device

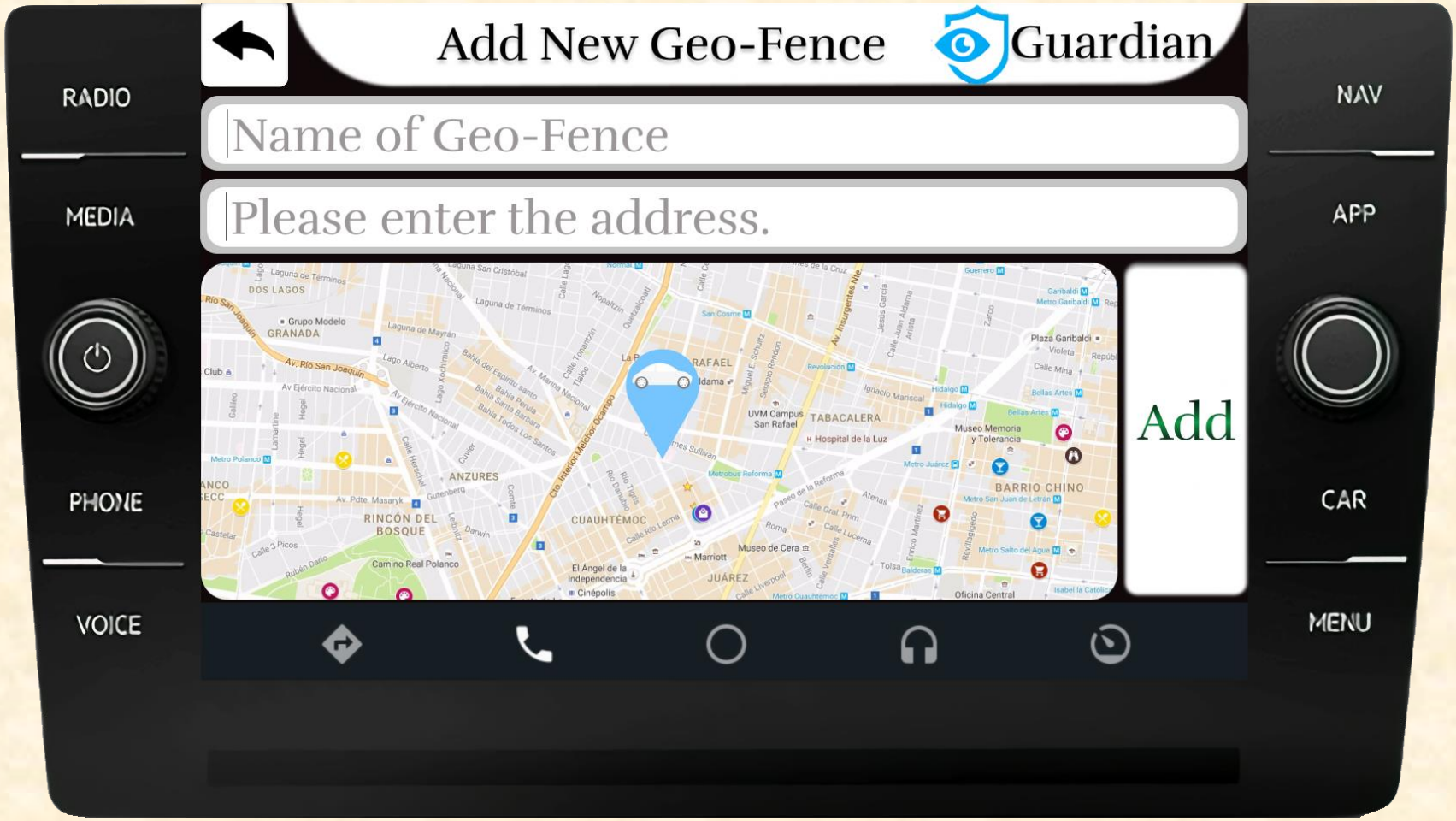
Screen Mockup: Edit Device (Textbox)

Screen Mockup: Edit Device (Dropdown)

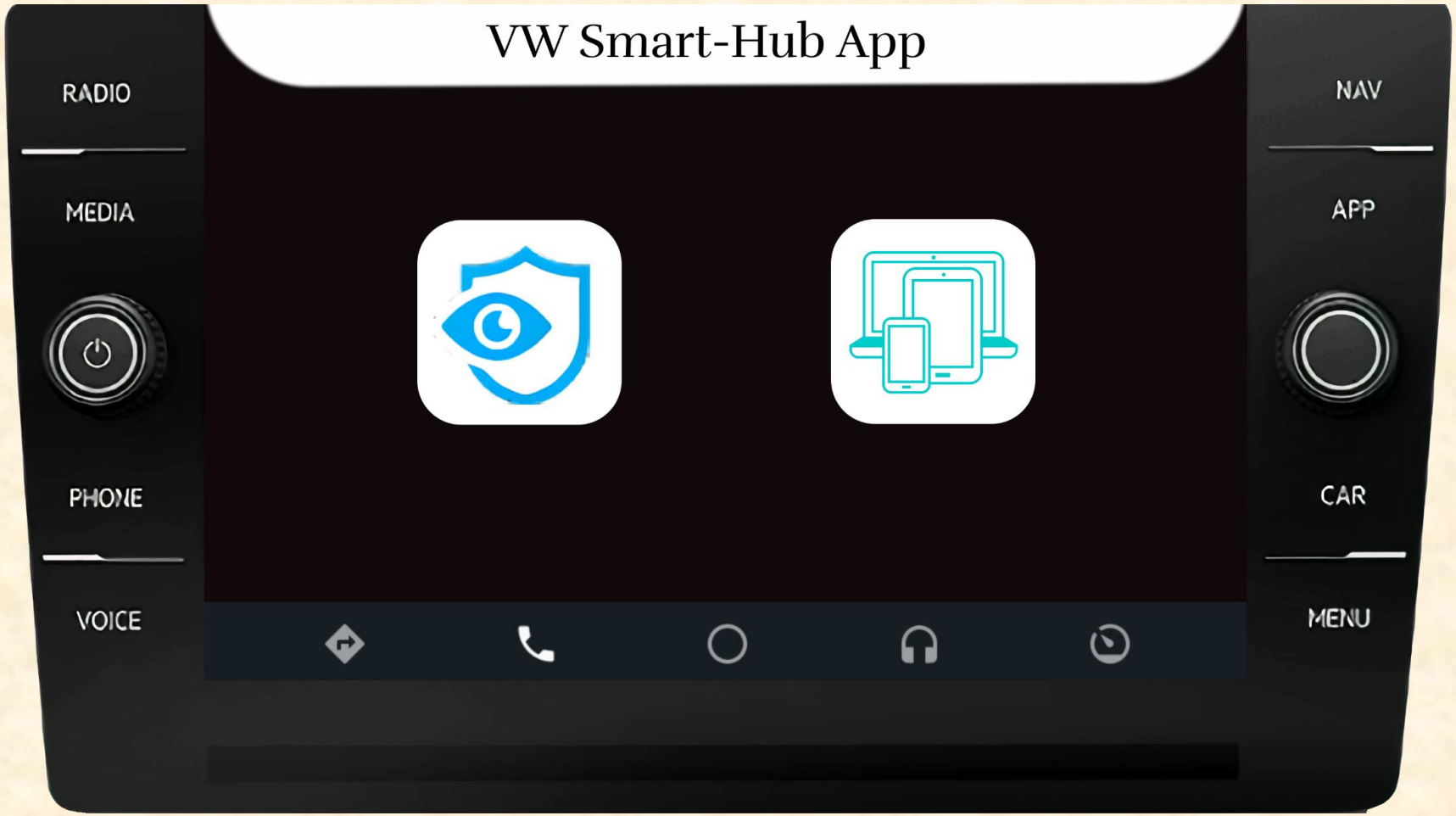


Screen Mockup: Connect Device

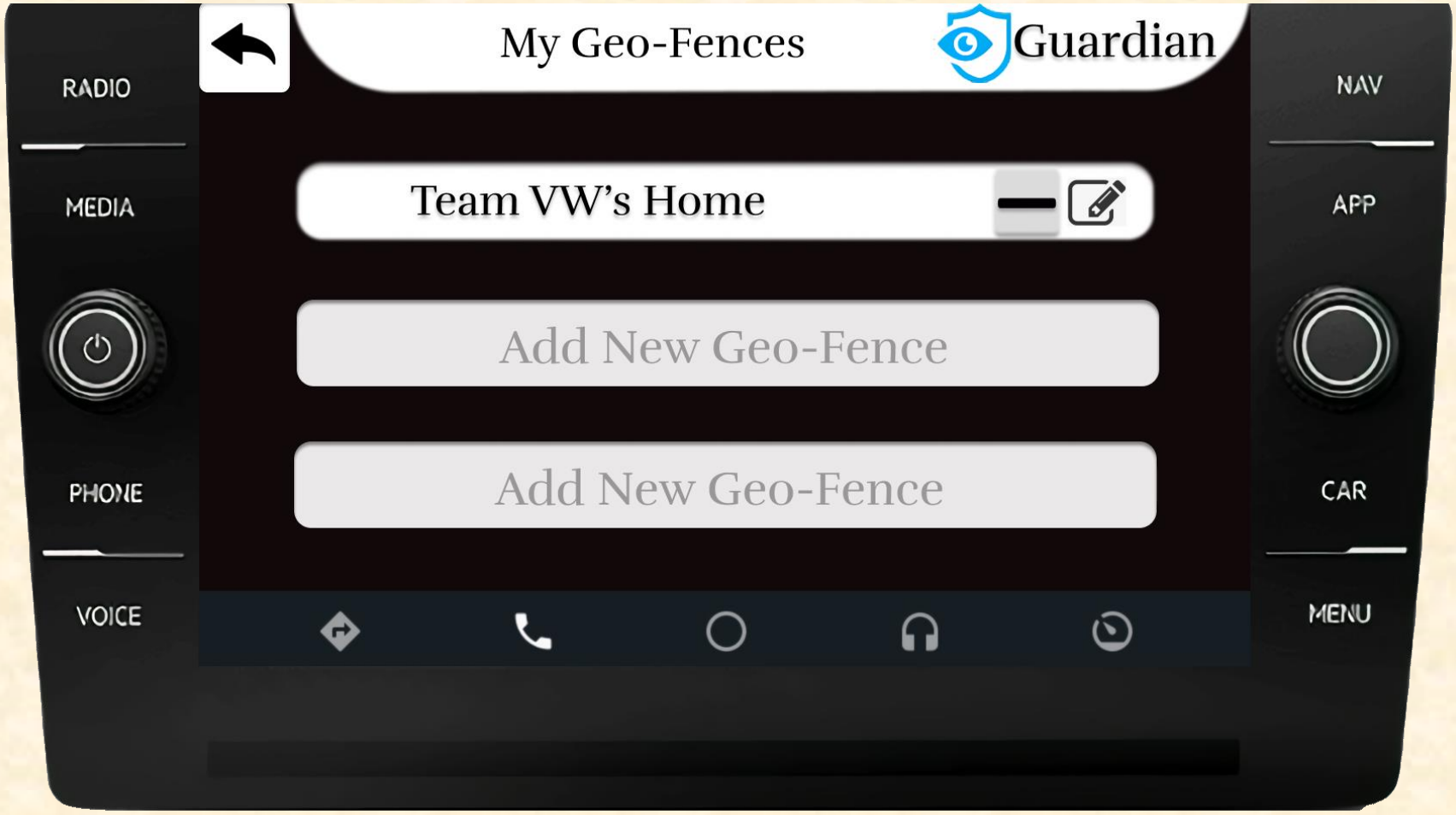
Screen Mockup: New Geo-Fence



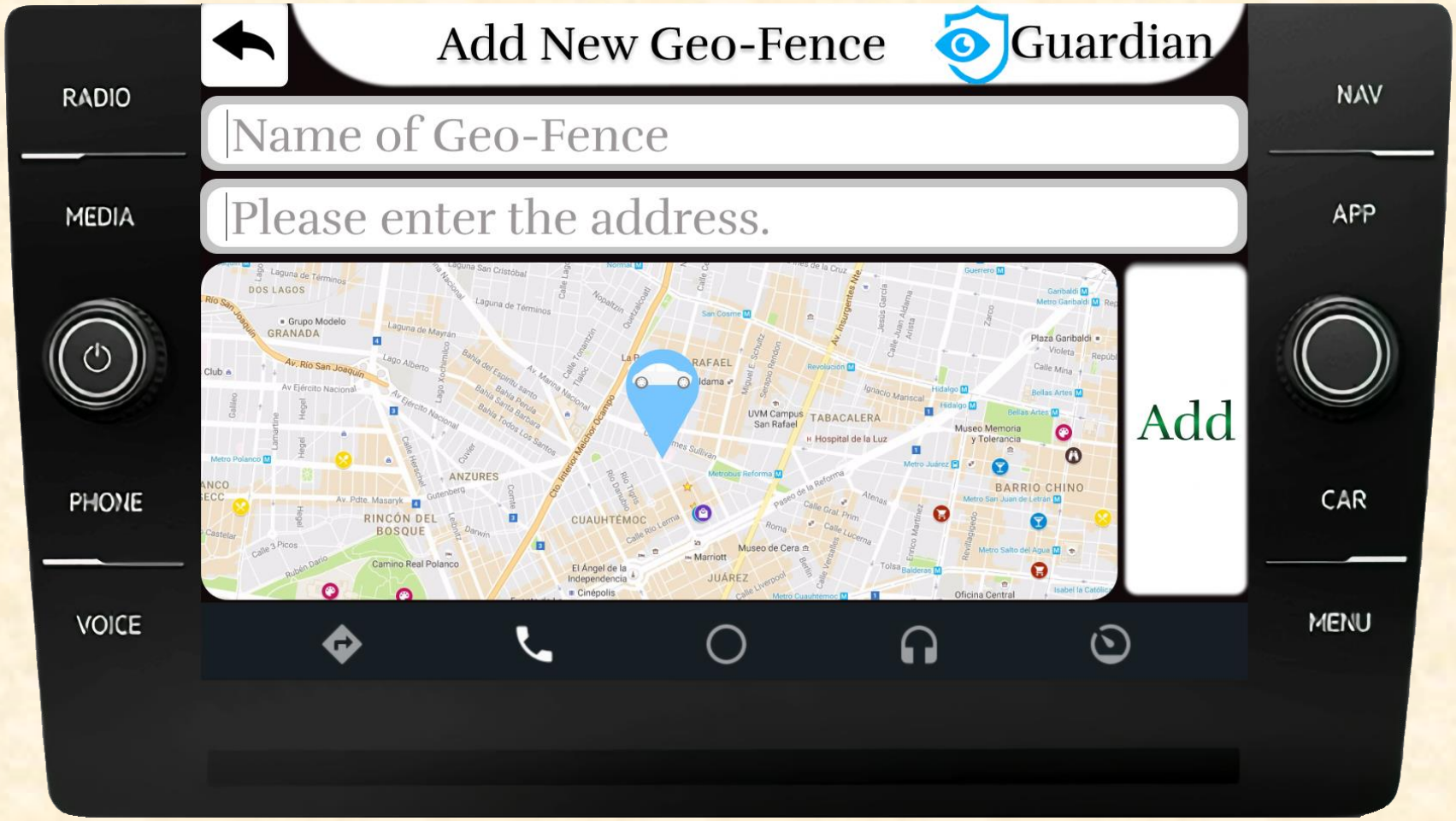
Screen Mockup: Landing Page



Screen Mockup: My Geo-Fences



Screen Mockup: New Geo-Fence

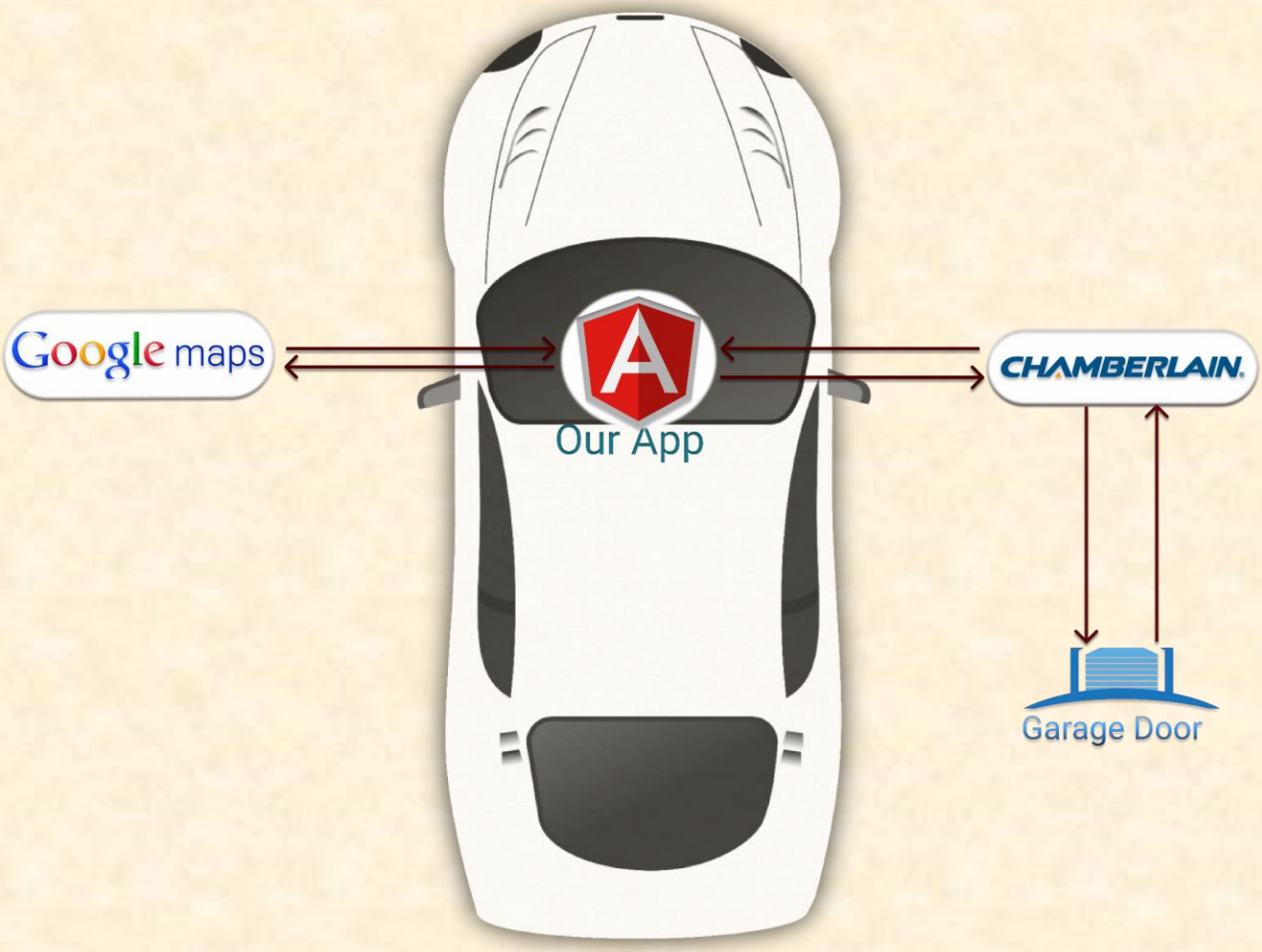


Screen Mockup: Edit Geo-Fence

Technical Specifications

- Written using Visual Studio Code
- Angular Web App
  - TypeScript
  - HTML5
  - CSS3
  - Webpack for task running/minifying code
- Interacting with:
  - Google Maps API
  - Chamberlain API

System Architecture



System Components

- Hardware Platforms
  - Will be downloaded from SIM card in VW vehicle, displayed on head unit
  - Automated connecting to Chamberlain garage door opener
- Software Platforms / Technologies
  - Google Maps API used to provide interactive map
  - Chamberlain API used for connecting to opener for automated opening/closing functionality
  - Angular app will eventually be run on a version of Chromium customized by the VW team
  - Development/testing using Chrome Browser

Risks

- Garage door behavior when inside geo-fence
  - Stop garage door from repeatedly opening and closing when near/inside boundary but not driving or GPS could be inaccurate
  - Add flags to detect car's status (on/off, under a certain speed, etc) and modify open/close detection algorithm appropriately. Limit the number of times the garage door can open/close within a given time.
- Accuracy of mocked data
  - We have to mock all of the geolocation data, and don't know how accurate that might be
  - Request access to coordinates from a test drive or generate simulated coordinates ourselves
- Testing Devices
  - We are missing devices that would be helpful for testing (garage door/opener, test bench)
  - Ask around to find someone with access to a garage door
- Boundary alert compatibility
  - We have to create a mocked boundary alert model that is compatible with the existing model used for Car-Net boundary alerts
  - Discuss with client about data model and request that they validate the one we produce

Questions?