

**MICHIGAN STATE**  

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**UNIVERSITY**

# Project Plan Presentation

## Personalizing the Culinary Experience

### The Capstone Experience

#### Team Whirlpool

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

# Project Sponsor Overview

- Sponsor Overview
  - Global household appliance manufacturer
  - HQ: Benton Harbor, MI
  - Strong emphasis on user-centric design
  - Committed to being the best global kitchen and laundry company, in constant pursuit of improving life at home
  - 61,000 global employees
  - \$20 Billion in sales



# Project Functional Specifications

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- Utilize a machine learning algorithm to identify patterns and preferences in user's interactions
- Generate and refine personalized user profiles based on the analyzed interaction data
- Offer customized recipe suggestions, cooking settings/cycles, and food cooking characteristics to users



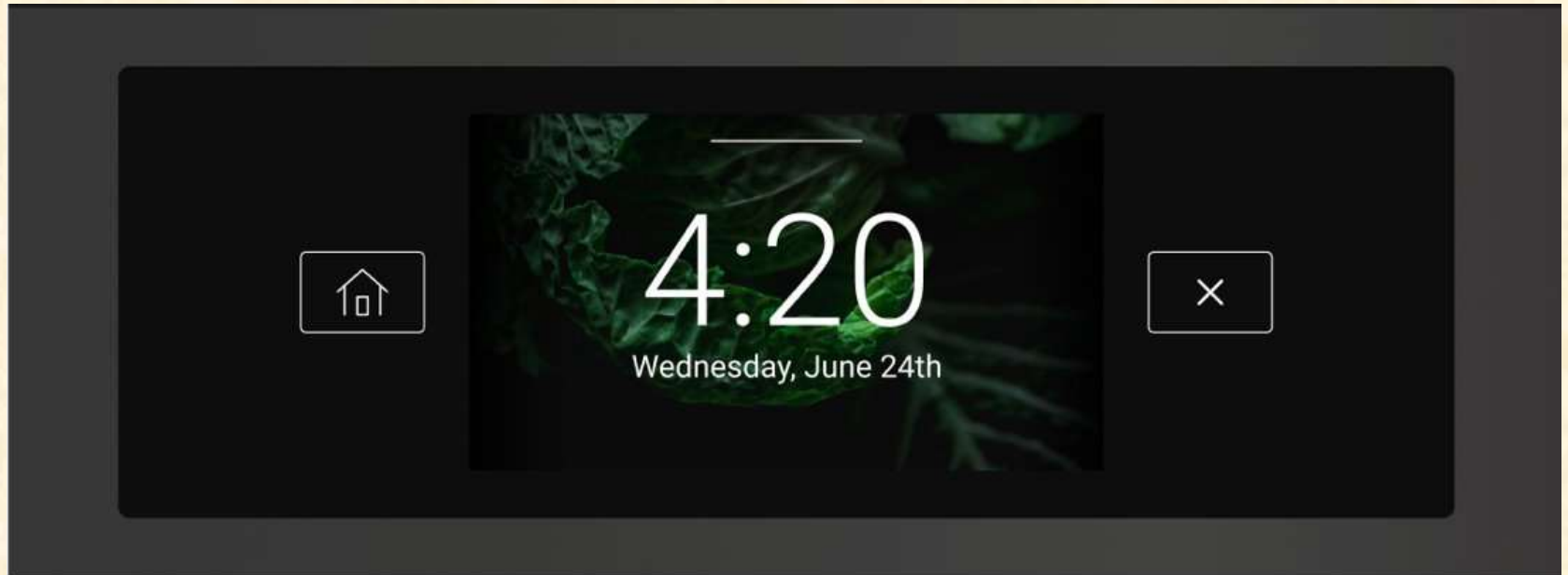
# Project Design Specifications

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- Track user interaction and learn user preferences
- Create synchronous experience between app and HMI
- Provide the user with personalized culinary experience



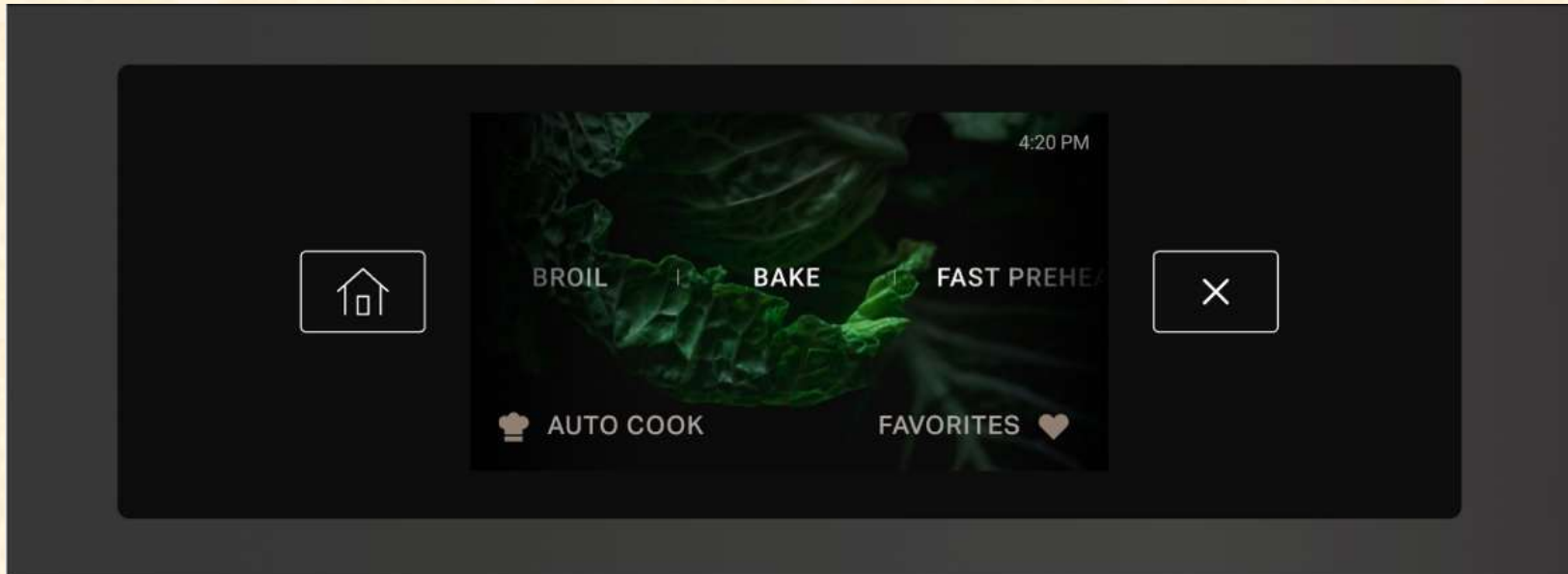
# Screen Mockup: HMI Idle screen



The appliance stays on the idle screen until the user opens the appliance door or interacts with the screen



# Screen Mockup: Home screen



The home screen has the basic cooking modes, and options for auto cook and favorites



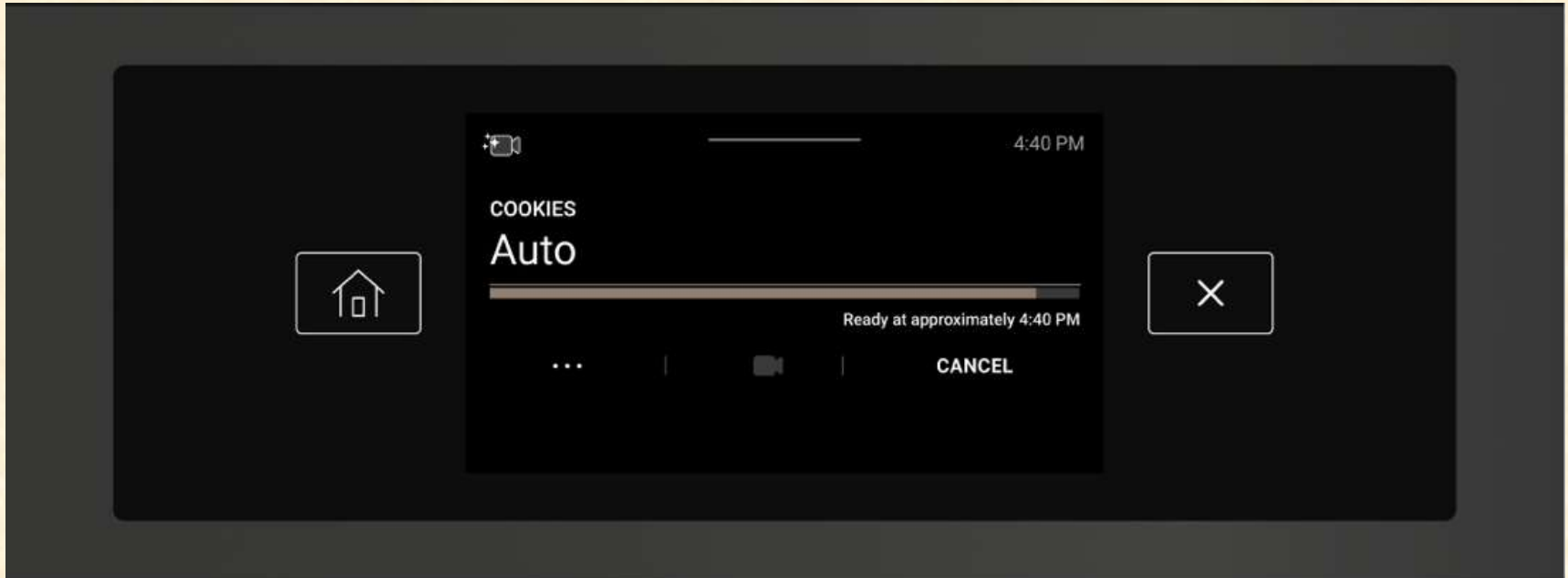
# Screen Mockup: Cooking Instructions



Once the user selects the recipe, they'll be redirected to the cooking instructions screen



# Screen Mockup: Cooking screen

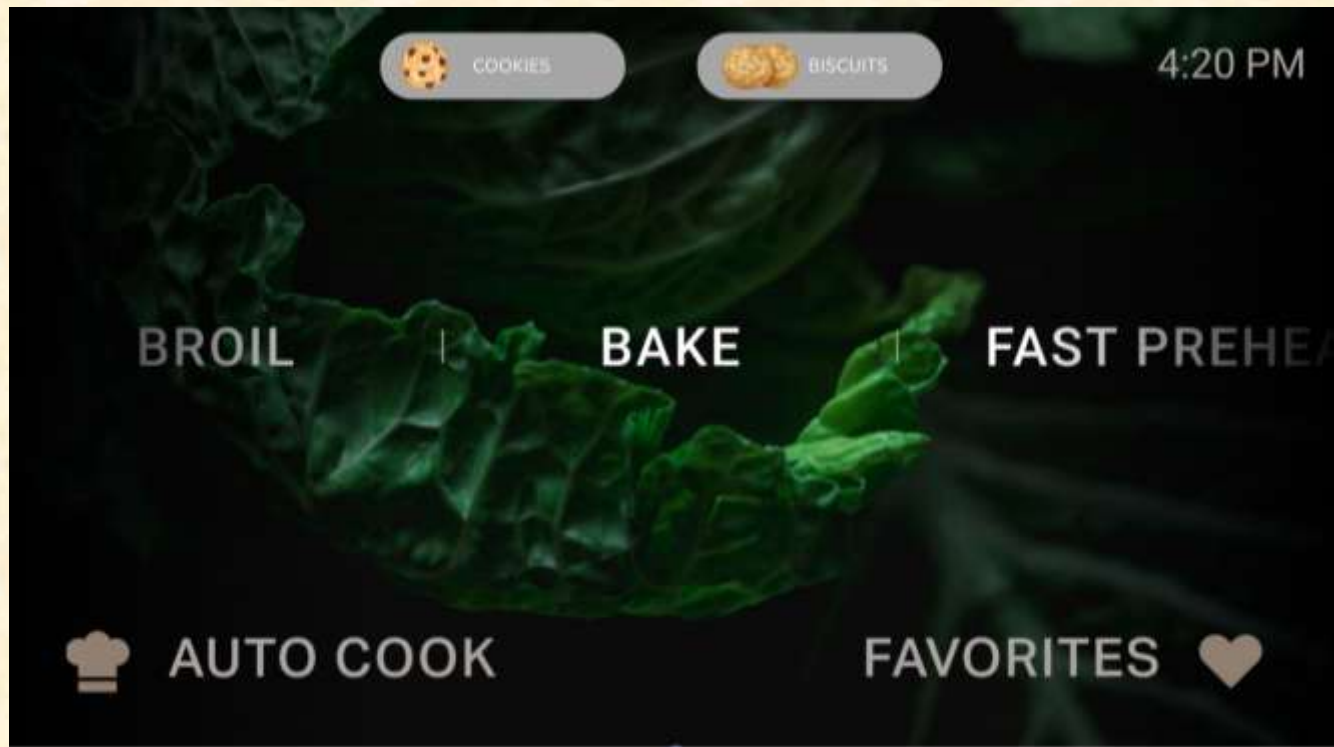


The cooking screen shows the progress of the cooking cycle





# Screen Mockup: Recommendations



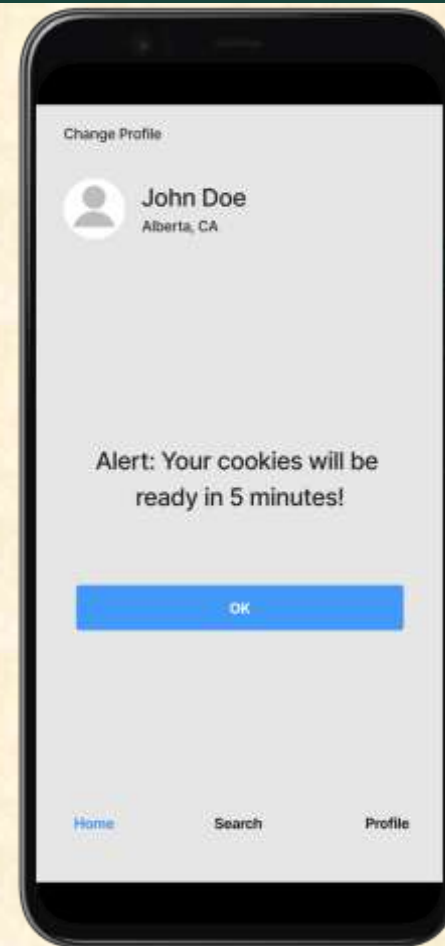
The recommendations will be shown based on the users interactions and preferences



# Screen Mockup: Mobile App



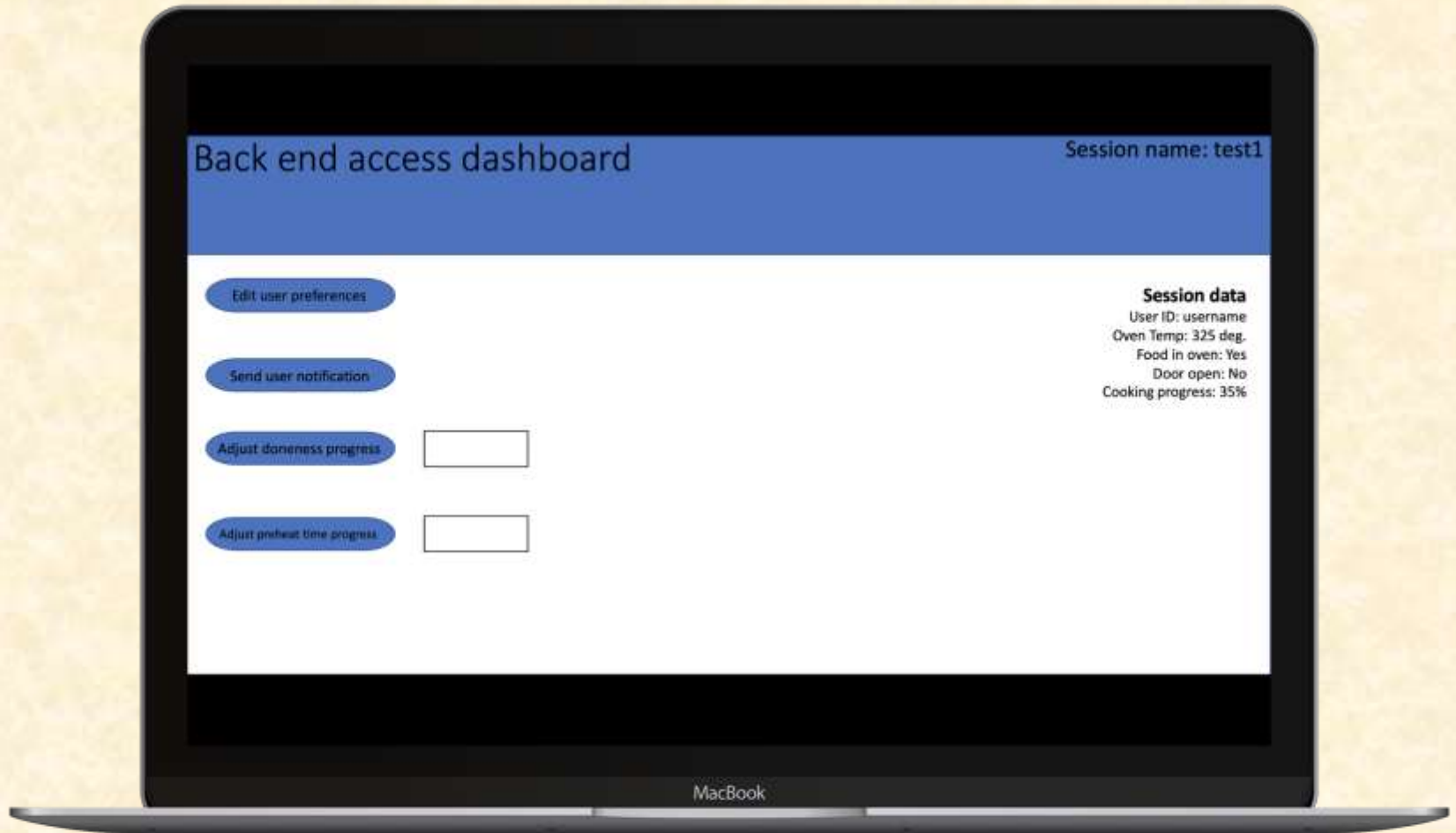
Home screen



Notification Screen



# Screen Mockup: Data Dashboard



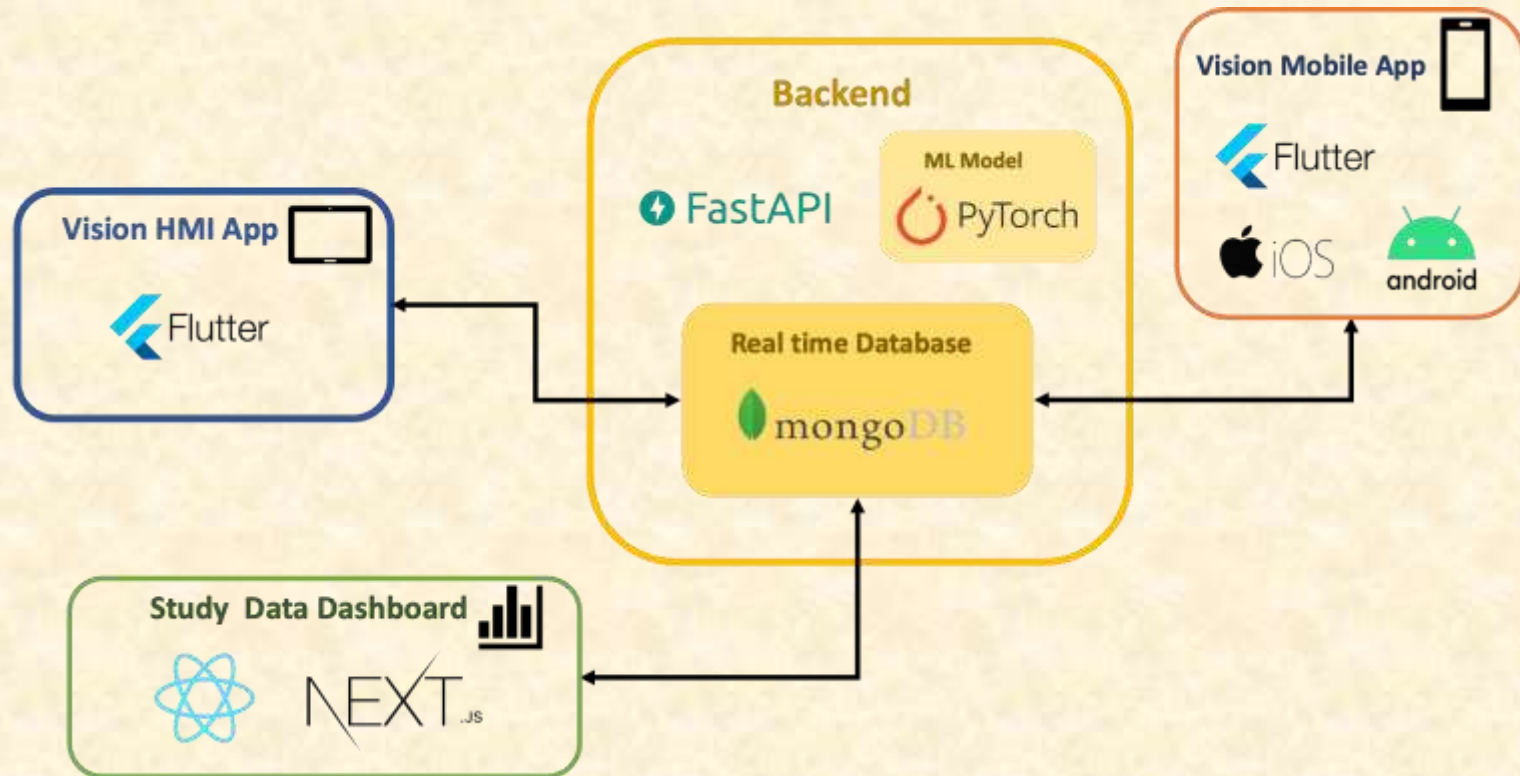
# Project Technical Specifications

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- Data Dashboard
- Vision HMI
- Vision Mobile App
- Backend
  - Database Server
  - Transformer (ML Model)



# Project System Architecture



# Project System Components

- Hardware Platforms
  - Oven - HMI App integrated with a physical oven
  - Pixel 3A – To develop and test our Android app
  - iPad – To develop and test our iOS app
- Software Platforms / Technologies
  - Flutter – For front-end development
  - FastAPI – For back-end development
  - React – For developing the dashboard
  - MongoDB – Our database management system



# Project Risks

- No training data: How do we train our model
  - We are tasked to create an ML model but have no training data to train the model.
  - We will have to simulate our training data
- Cold start problem: What to recommend to new users
  - We do not know the best way to recommend new users
  - Work with clients and develop a strategy to best recommend new users with no history.
- Connecting the HMI and Android applications
  - We do not know how to seamlessly integrate HMI with Android apps, ensuring efficient communication for a unified user experience
  - We will analyze HMI-Android communication, select compatible tech, and design a flexible, modular architecture for scalability.
- How do we avoid overfitting in our machine learning model:
  - Our model may perform well on training data but generalize poorly to new, unseen data
  - We will use techniques like cross-validation, regularization, and early stopping to prevent overfitting.



# Questions?

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