MICHIGAN STATE UNIVERSITY

Project Plan

Predictive Rich Cards - Gemini

The Capstone Experience

Team GM

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From Students…
…to Professionals

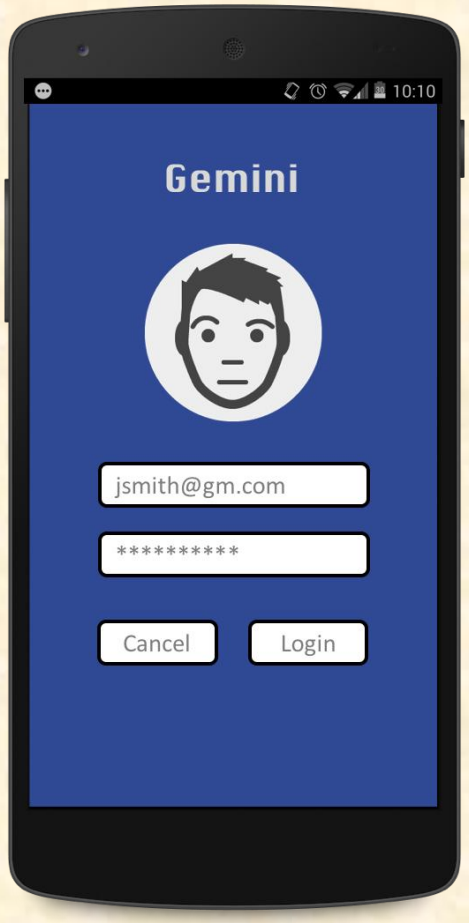
Functional Specifications

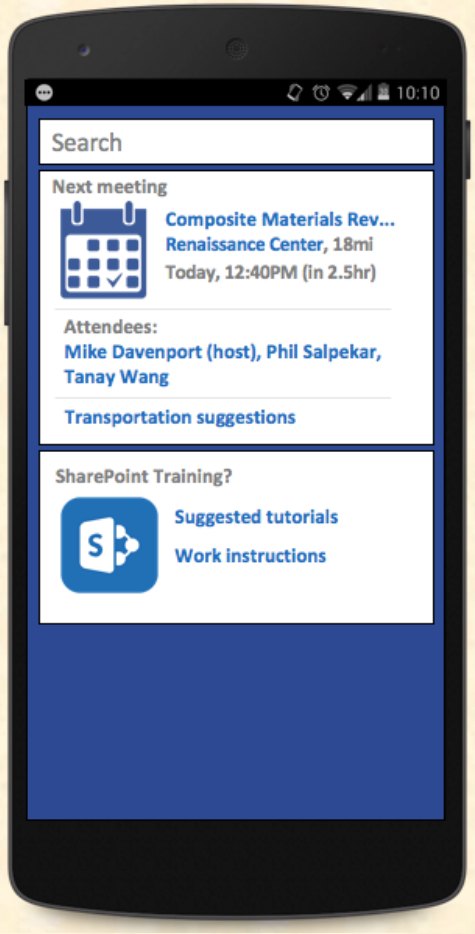
- Mobile Application for GM employees
- Uses predictive learning to help with employees' daily lives
- Learn user tendencies to deliver "cards" of information
- Ex: If an employee typically uses the shuttle as mode of transportation, automatically build shuttle into their schedule when they have an upcoming meeting

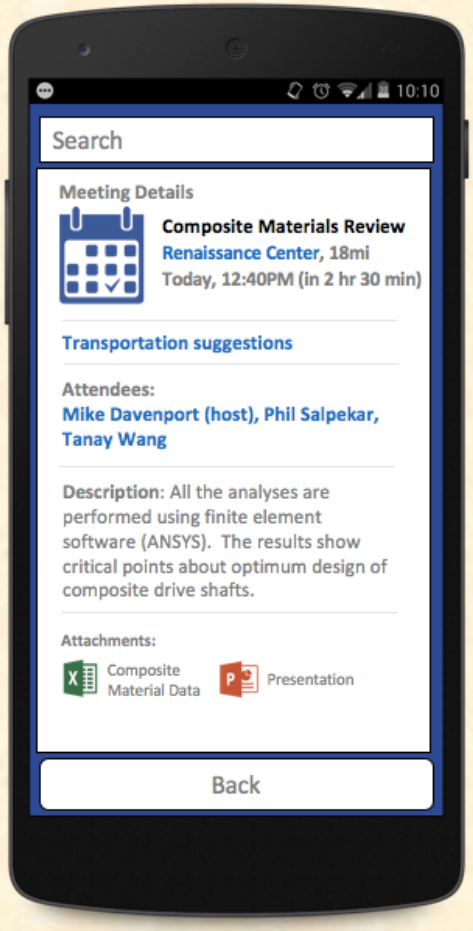
Design Specifications

- Mobile application features “cards” that show snippets of upcoming information that is relevant to the employee
- Push notifications for urgent information
- Example: For a meeting, a card is composed of meeting time, attendees and their profiles’, documents, and most importantly the transportation method

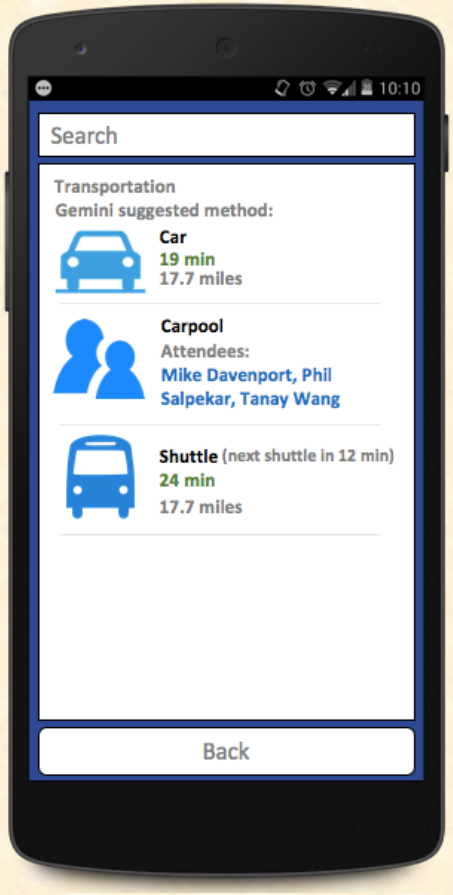
Screen Mockup: Gemini

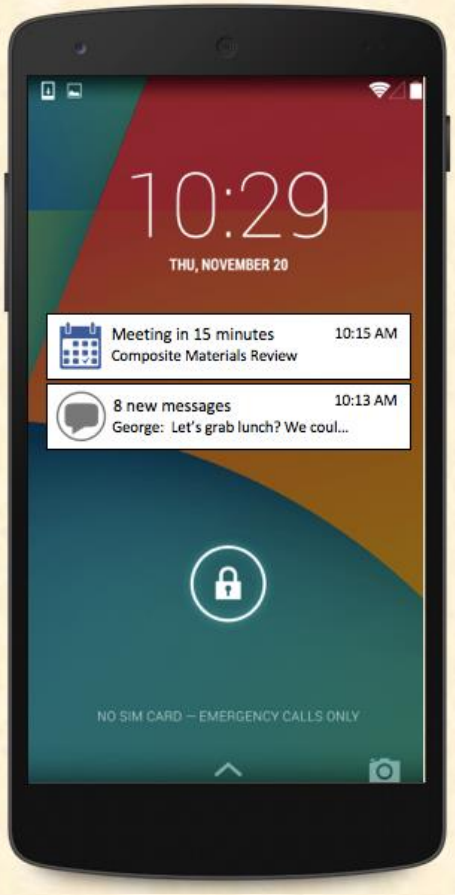






Screen Mockup: Gemini 2

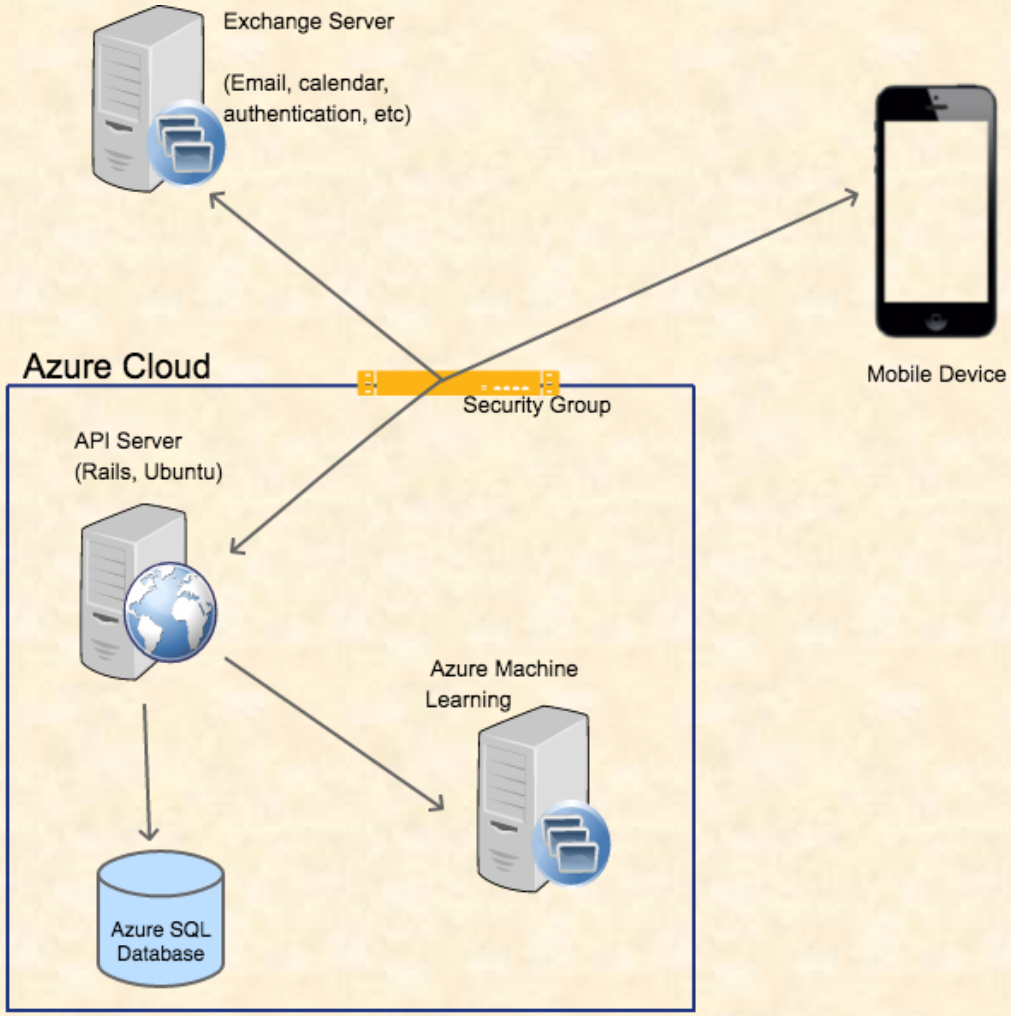




Technical Specifications

- Azure Cloud
  - Rails API – acts as communication medium between mobile application and data
  - PostgreSQL Database – persistent data store
  - Machine Learning – continuous processing of data to learn habits written in Python
- Xamarin
  - Cross-platform development mostly written in C#
- Exchange Server
  - Serves sample data that replicates GM internal environment

System Architecture



System Components

- Hardware Platforms
  - Azure Cloud
    - Two virtual machines – API and database
    - One Machine Learning environment – Azure-specific server for machine learning
  - Capstone Rack Server
    - Exchange Server that our application uses to get the employee's data
  - Android/iOS
    - Devices to use and test our mobile application
- Software Platforms / Technologies
  - Xamarin
    - C# cross-platform mobile development for iOS and Android
  - Ruby on Rails
    - API server to communicate between client application and all data
  - Python & Machine Learning
    - Unique Azure machine learning software and interface utilizing Python

Testing

- Unit testing for API
  - Login, fetching data, correct predictive analysis using rspec in Ruby
- Manual System Tests
  - Manually create meeting and ensure push notifications and cards appear on the attendee's device
- Performance Tests
  - Ensure our design and infrastructure provide timely delivery of cards and notifications

Risks

- Accurate Sample Data
  - Replicating an accurate model of GM data they use internally
  - For each new test case or data model, get approval from a technical GM contact
- Valuable Machine Learning
  - Need a large amount of data that a correctly configured machine learning environment can process. Can anything be predicted from this data?
  - Start creating and testing large amounts of sample data as early as possible
- Up-to-date Client Application
  - Machine learning algorithms might be too slow to predict urgent user items. Mobile application needs to present information only when it is relevant
  - Mitigate by continuous testing and ensuring all machine learning is done well before the project end date.