MICHIGAN STATE
U N I V E R S I T Y

Project Plan
Patient Training Tool

The Capstone Experience

Team Spectrum Health

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From Students…
…to Professionals

Functional Specifications

- Patient lists their symptoms or voices a medical condition to the Google Home speaker.

- Application then explains potential condition to patient.

- Application recommends a Spectrum Health service to patients.

  o includes ER, urgent care, virtual appointments (MedNow), questionnaires (eVisits)

- Patient informs app which service they utilize, used for future recommendations.
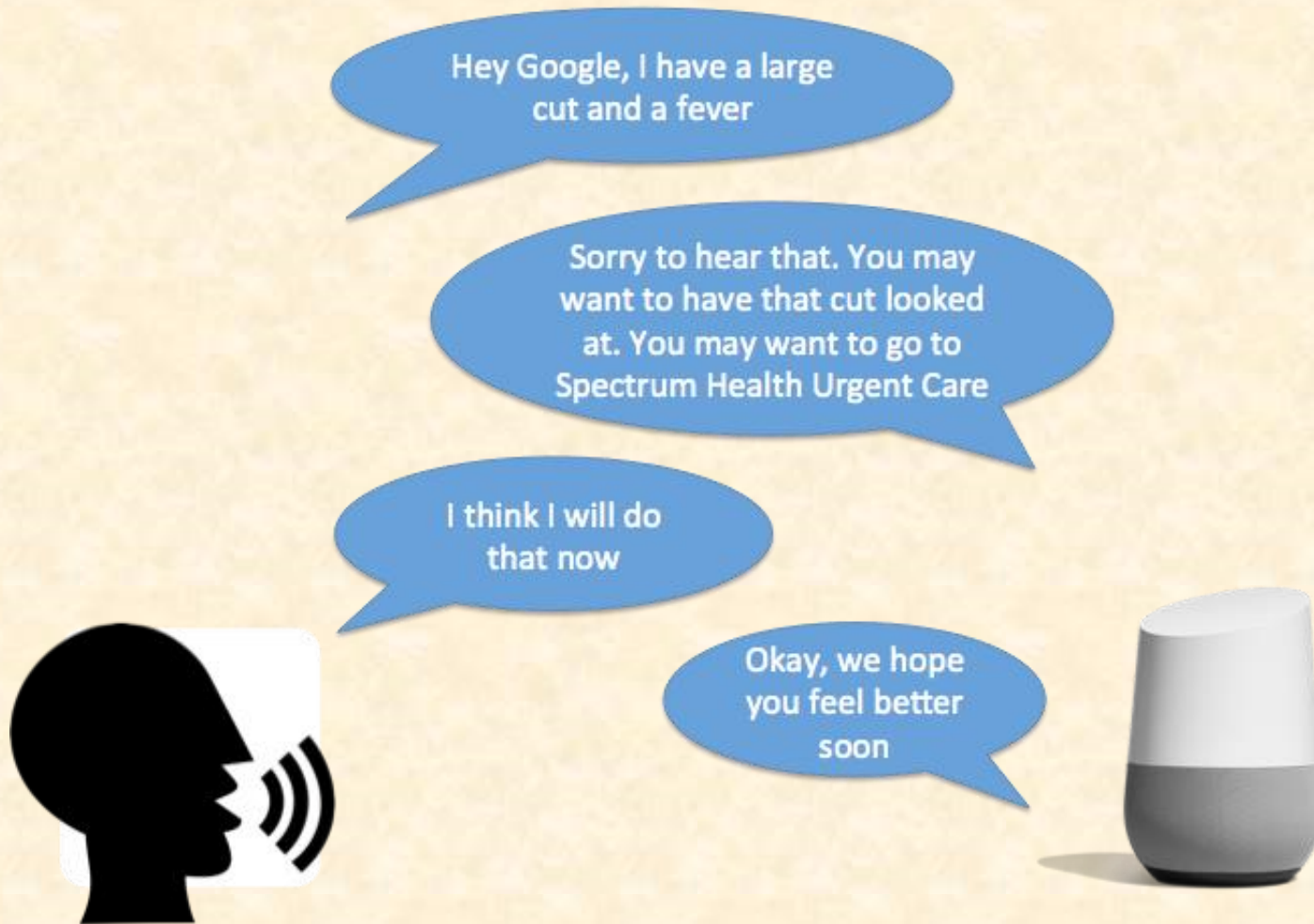
Design Specifications

- Patient interaction occurs through verbal input.

- Dialogflow will be used to implement Natural Language Processing in order to understand what the patient is conveying to the application.

- If application is unable to differentiate between two conditions with similar symptoms, patient will be asked to state other symptoms.

- Spectrum Health service recommendations are weighted for each condition. Weights are adjusted based on user feedback.

Screen Mockup: ER Case

Screen Mockup: Urgent Care Case

Screen Mockup: MedNow Case

Screen Mockup: eVisit Case

Screen Mockup: Training
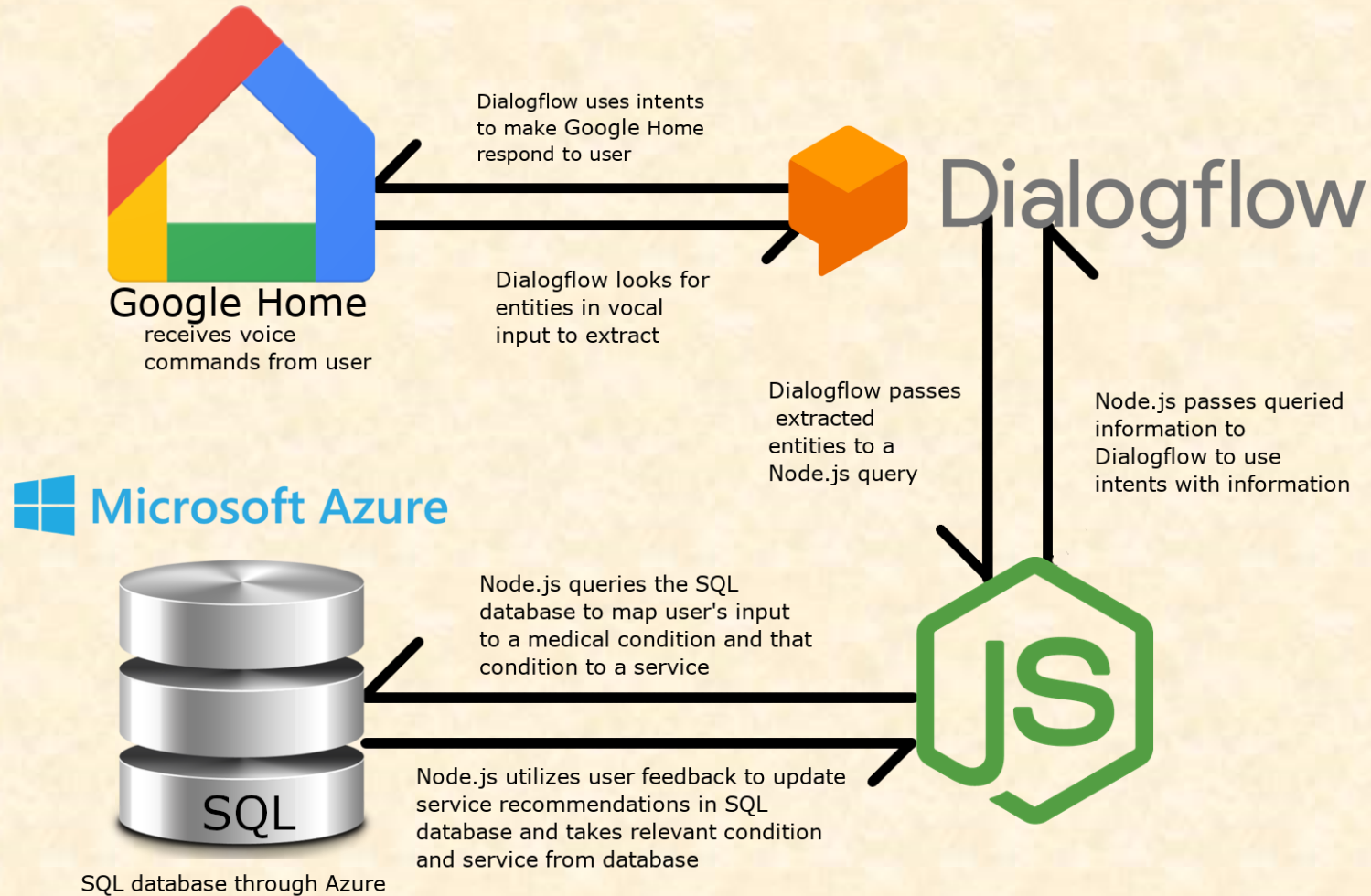
Technical Specifications

- Natural Language Processing handled by Dialogflow to identify entities and generate intents.

- Condition Classification using Microsoft Azure SQL database to map symptoms to different medical conditions.

- Logic done in Node.js which queries the SQL database and returns relevant information to Dialogflow. This information is then conveyed to the patient.

System Architecture

Dialogflow uses intents to make Google Home respond to user

Dialogflow looks for entities in vocal input to extract

Dialogflow passes extracted entities to a Node.js query

Node.js passes queried information to Dialogflow to use intents with information

Google Home receives voice commands from user

Node.js queries the SQL database to map user's input to a medical condition and that condition to a service

Node.js utilizes user feedback to update service recommendations in SQL database and takes relevant condition and service from database

SQL database through Azure

System Components

- Hardware Platforms
  - Google Home
  - Amazon Alexa

- Software Platforms / Technologies
  - Microsoft Azure DevOps – Project management
  - SQL Database – Store medical information
  - Dialogflow – Interaction with patient
  - Node.js – SQL Queries and logic
  - Google Assistant SDK – Testing purposes

Risks

- Risk 1
    - Risk: Some medical conditions will share a common list of symptoms.
    - Mitigation: More questions for the user to pinpoint the exact condition.
- Risk 2
    - Risk: Creating Azure SQL Database from Excel Data while properly matching symptoms to conditions.
    - Mitigation: Export the Excel data as a text file and use Azure Data Factory to store the information in a SQL database. Organize the database to account for the different number of symptoms with each condition.
- Risk 3
    - Risk: Explaining a patient's condition in user-friendly, easy to understand.
    - Mitigation: Concisely present information free of jargon and will use Google to look up the condition and a layman's dictionary for medical terminology to translate the explanation if the patient did not understand the explanation.
- Risk 4
    - Risk: Updating Spectrum Health service recommendations based on user feedback.
    - Mitigation: Implement a ranking system that takes in user feedback and uses it to adjust recommended service.

Questions?