A photograph of a woman from behind, wearing a red hoodie and black leggings, stretching her arms behind her head on a paved path in a park. The path is lined with trees, and the scene is bathed in warm, golden sunlight filtering through the leaves.

Managing My Health is easier
than ever before.

We are team YTL-LTY

"YEARS TO LIFE - LIFE TO YEARS"

Bid Data Hackathon 2024 San Diego

Date: 12.10.2024 - 19.10.2024

Team Roles and Responsibilities



Anuujin Tsedenbal
Project Manager
Design Lead

UCSD



Alisha Gaikwad
Data Scientist

SDSU



Raymond Loung
User Interviewer
Data Analyst

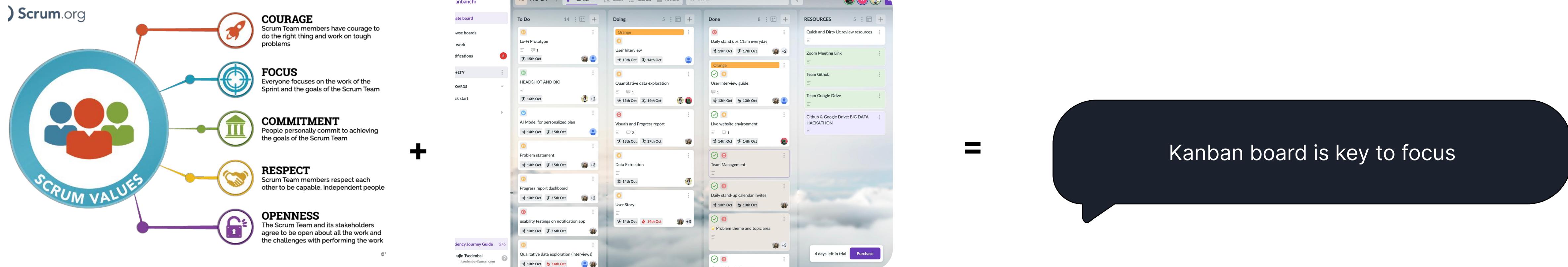
UCSD



Ezer Patlan
Web Developer
Gen AI Engineer

SDSU

Team Collaboration & Project Management tools



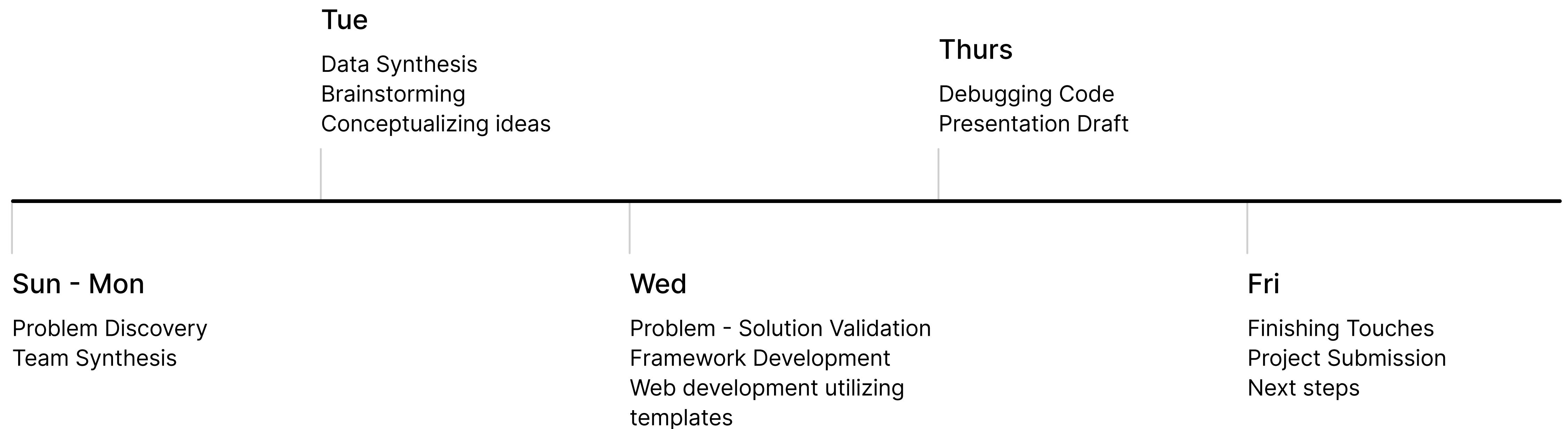
Theme and Topic

Managing My Health

Design, Framework, and Decision Making

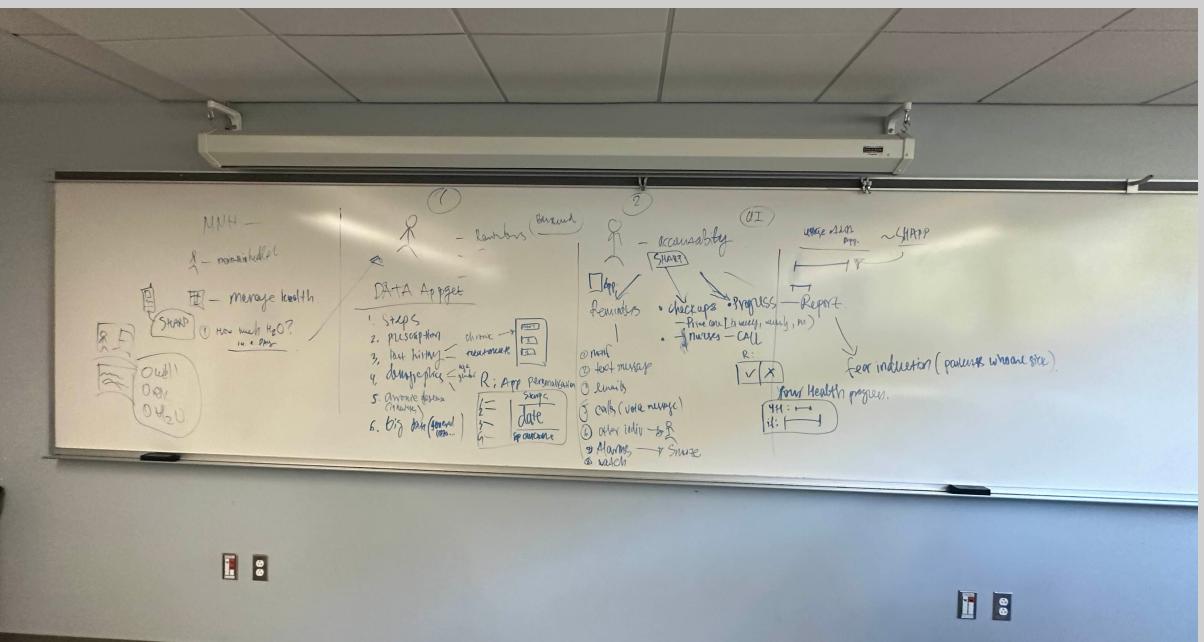
DATA DRIVEN

Project Timeline



Brainstorming

10/12 - Saturday



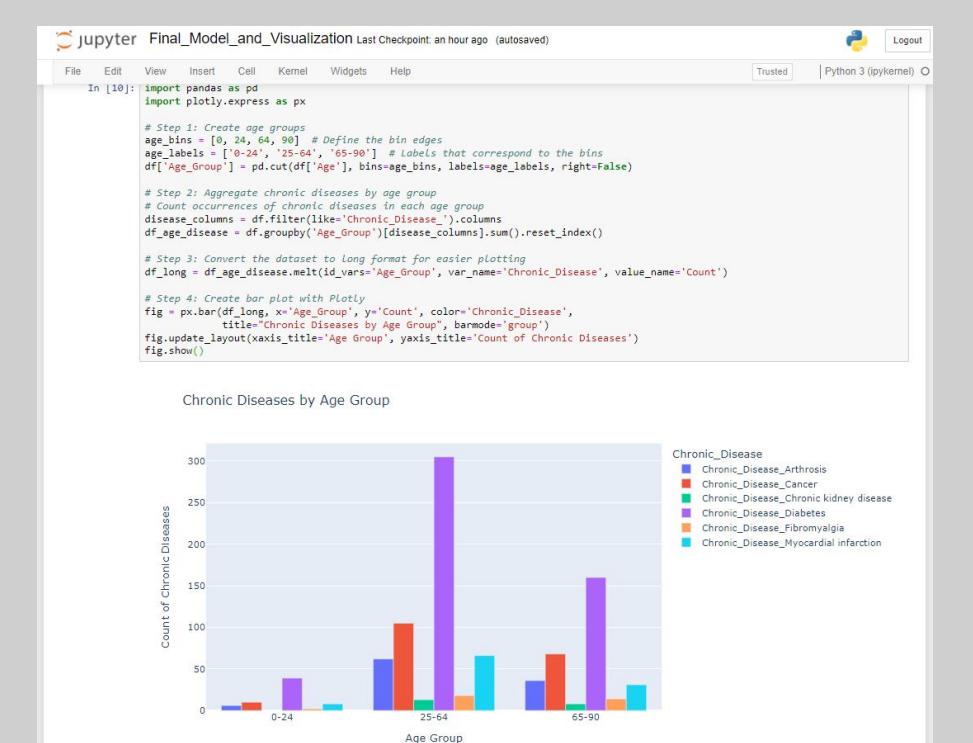
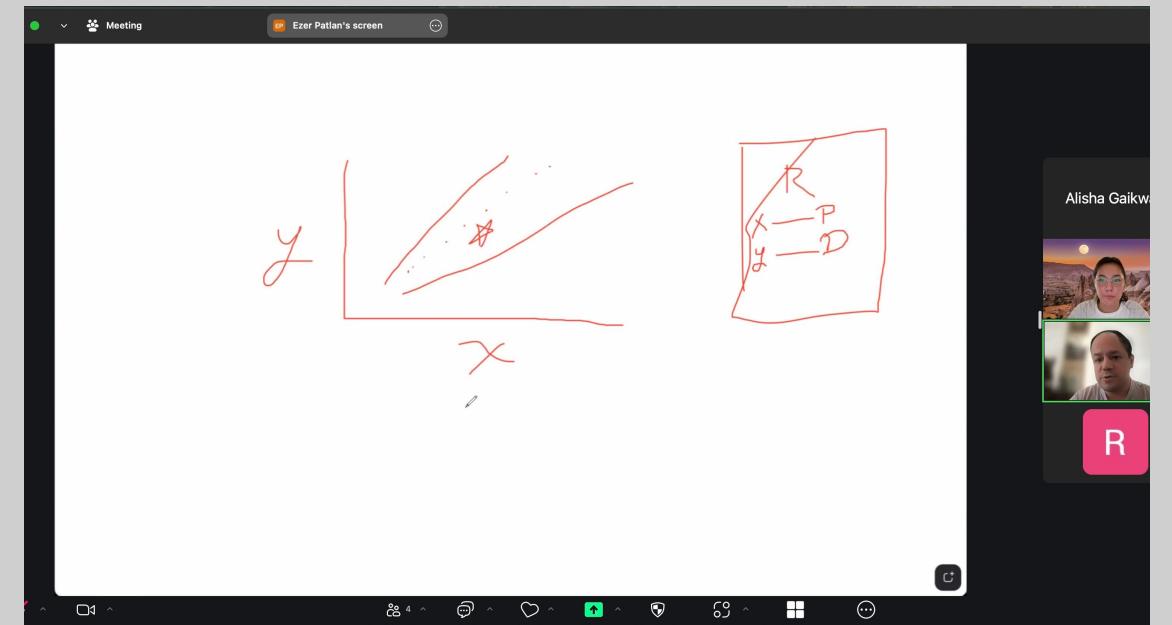
Idea generation

10/15 - Tue



Quick sketches

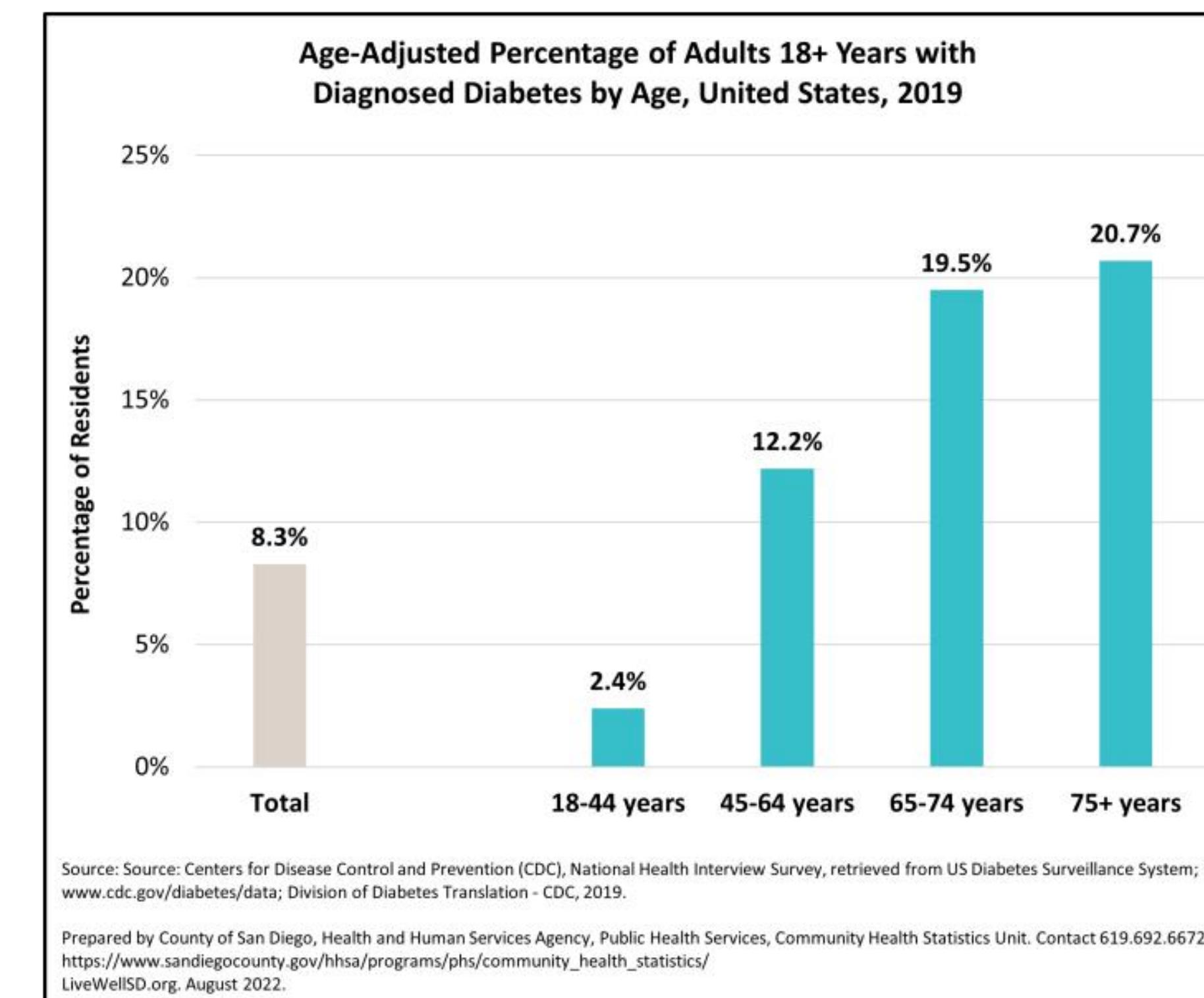
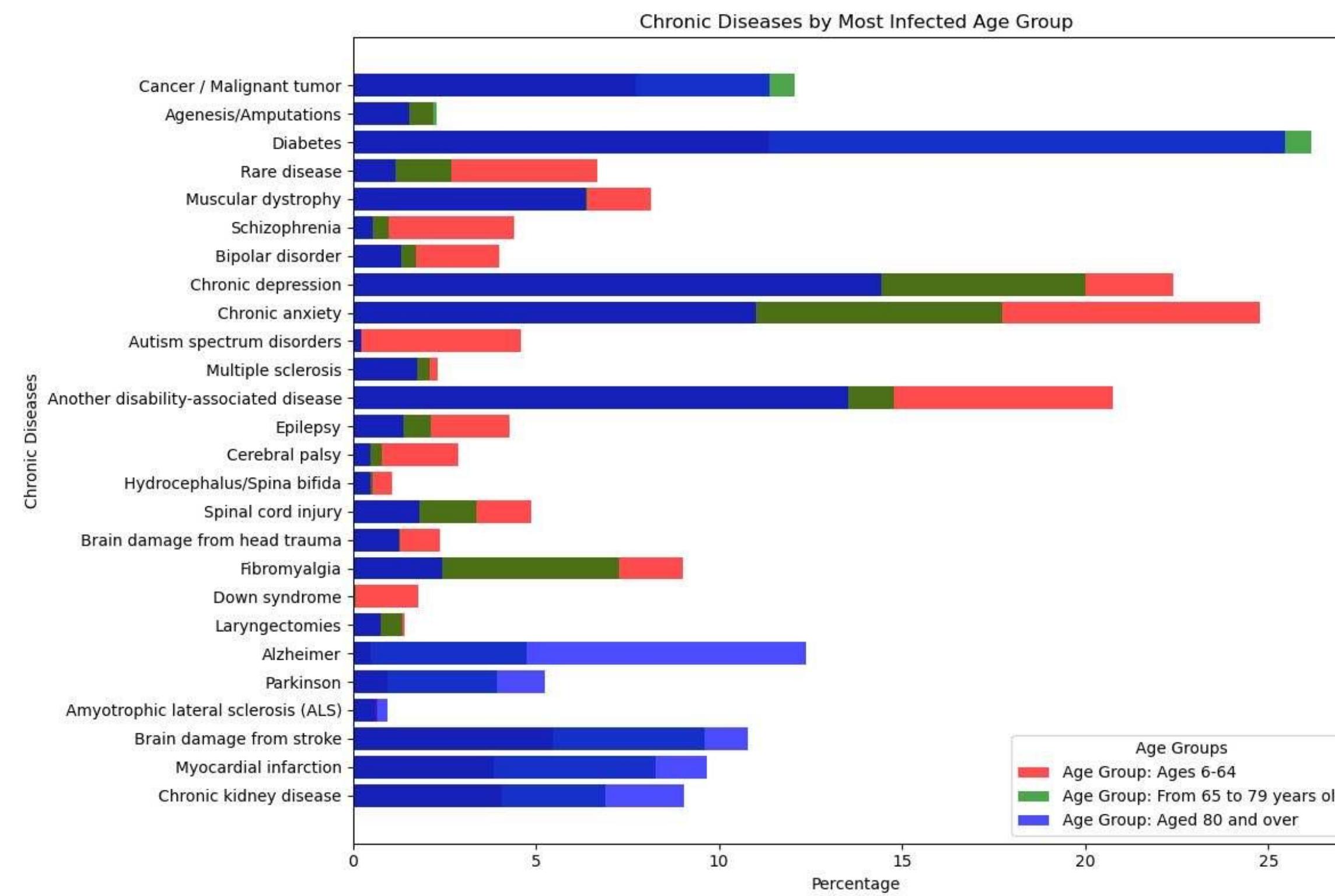
10/16 - Wed



Framework & Dev.

Why we chose our problem

Demographics



Type II Diabetes (90-95%)

We wanted to focus on a major chronic disease that is affected worldwide to have the biggest impact possible when we deploy our solution.

According to the HHSA, Type 2 diabetes accounts for 90-95% of all cases of diagnosed diabetes and can be prevented or delayed with healthy lifestyle changes such as diet and physical activity.

The Elderly

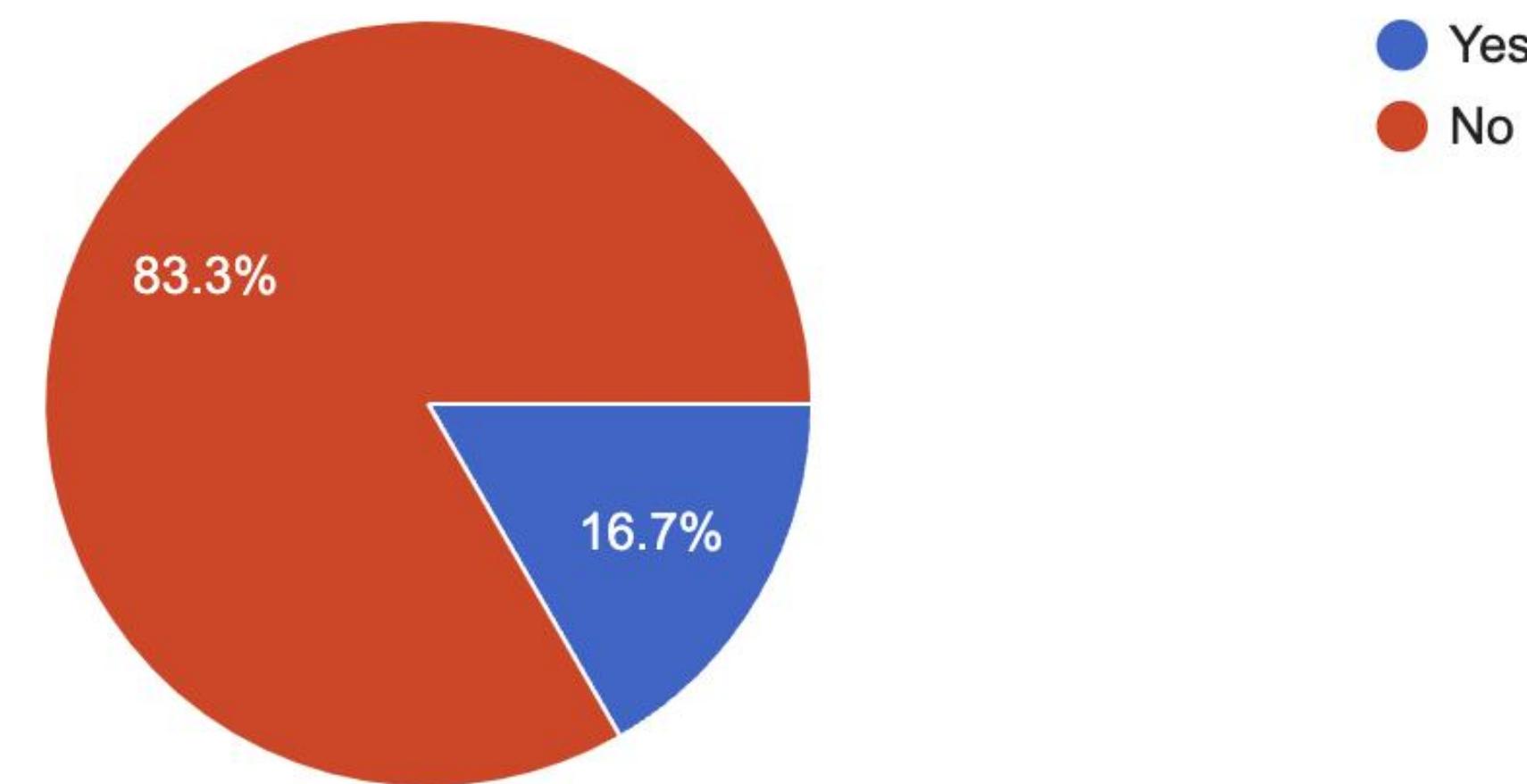
With the projected growth of older adults needing healthcare services, we wanted to address a chronic disease that impacts that population the most.

Survey Insights

Mobile app usage in medication management

Do you use any mobile apps to help you remember to take your medication?

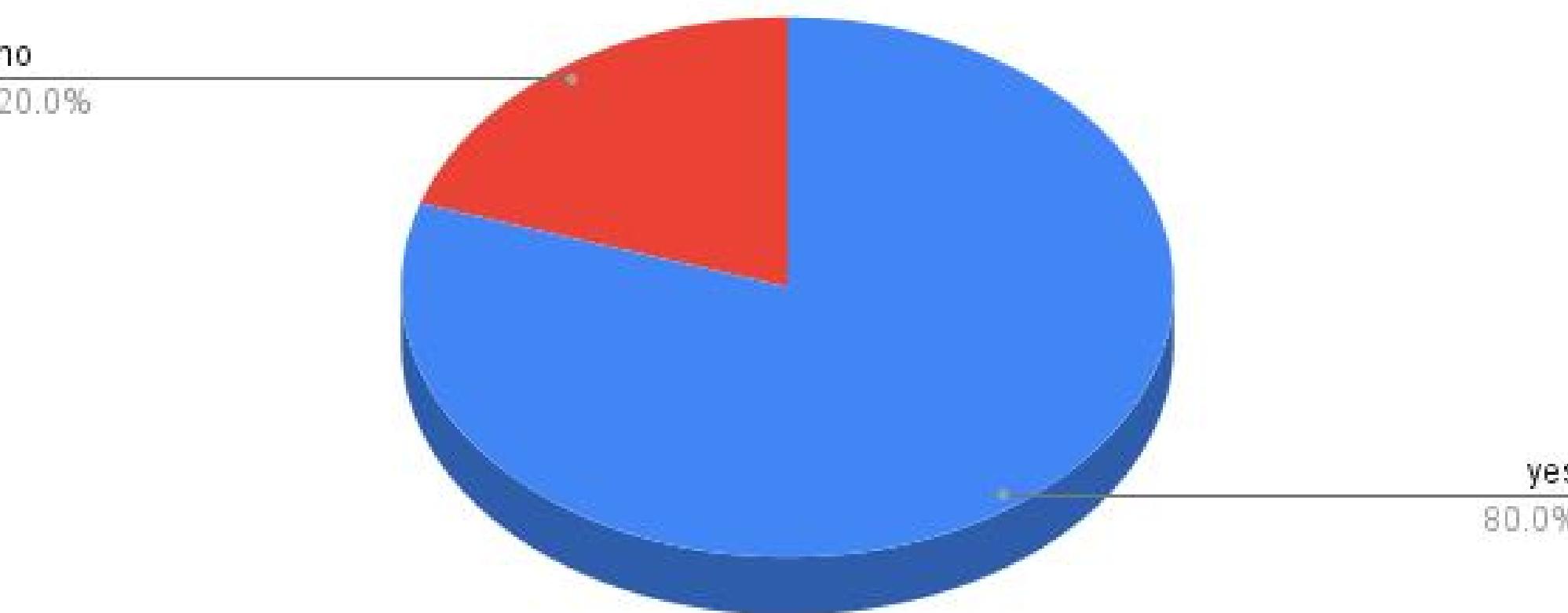
24 responses



Survey Insights

Motivation in maintaining health

Would a graph that shows your health statistics help motivate you in maintaining your health?



Diet

According to our survey, over 40% of people with diabetes need a strategy / application to manage their diet

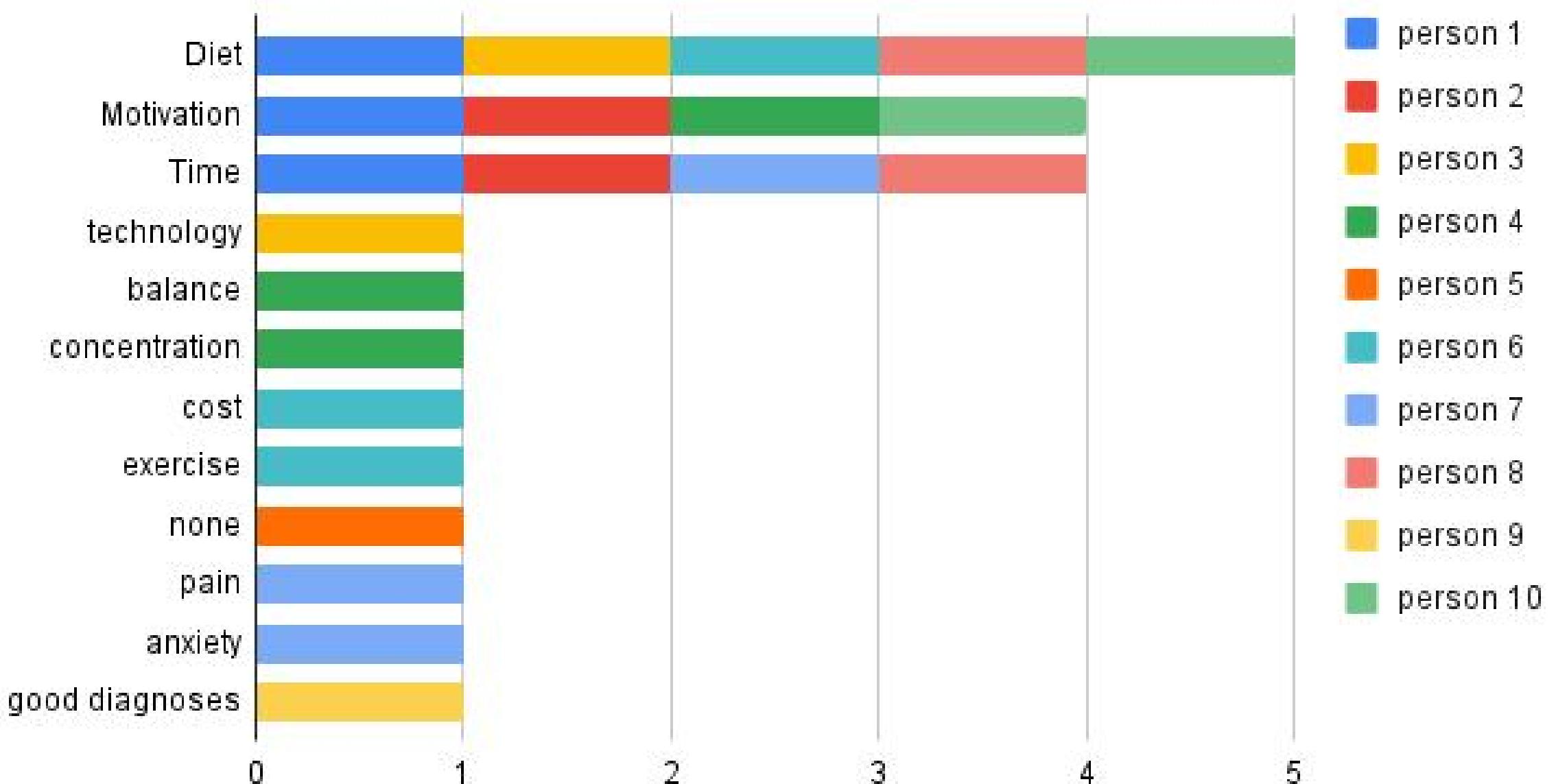
Motivation

Our survey also shows motivation being the second major problem that the diabetes community faces.

Time

Our data displays a large majority of the demographic explicitly mentioning time as major road blocks as well.

Diet, Motivation, Time, diabetes technology, balance...



*populated from our survey

Survey Insights

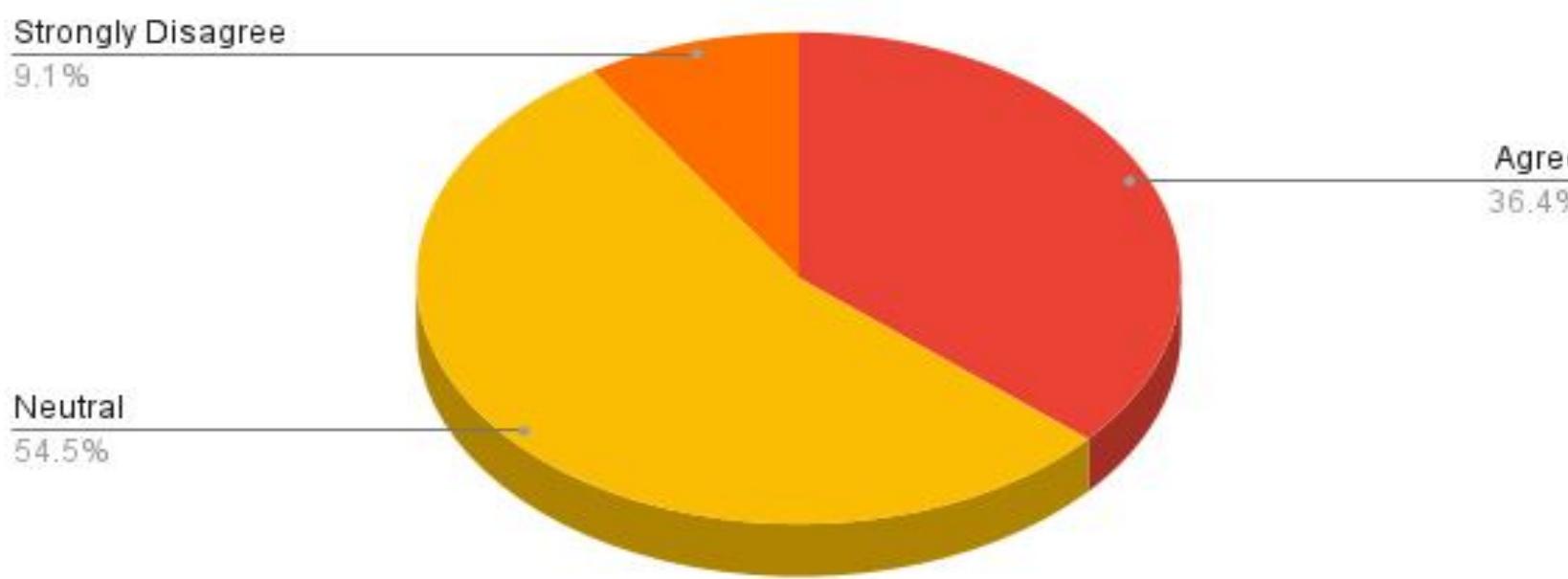
Are there any apps you use to track or manage your health goals?



50%

The percentage of diabetics that use mobile apps is close to 50 percent each

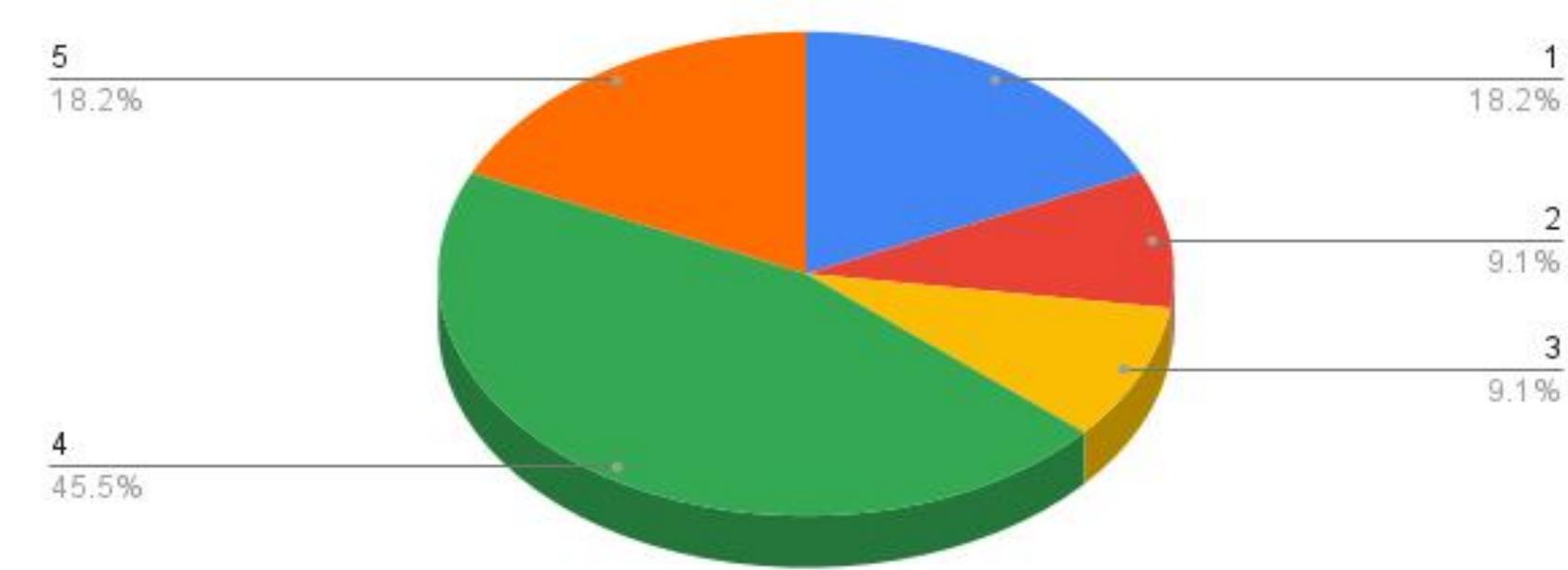
I find the application effective in helping me manage my medication.



54%

but 54% say the effectiveness of the application is only neutral.

How important do you think it is to be aware of your health compared to national standards? 1 being least. 5 being most.



45%

45% of survey takers gave a 4 rating (on a scale of 1-5 with 5 being most important) when asked how important being aware of their health is when compared to national standards.

USER PERSONA



Name	Mark	Robert	Jessica
Description	Busy Professional	Retired	Mom of 2
Age	52 years old	70 years old	45 years old
Location	Chula Vista	La Jolla	San Diego
Occupation	Sales Manager	Engineer	Administrative office assistant
Health Condition	Type 2 Diabetes	Type 2 Diabetes	Type 2 Diabetes

USER PERSONA



Name	Mark	Robert	Jessica
Goals	Simplify diabetes management, find enjoyable ways to be active, improve diet, reduce reliance on memory	Better blood sugar control, maintain independence, stay on top of medication and supplements	Affordable diabetes management, budget-friendly meal planning, incorporate more activity, better integrate technology
Health Management Technology	MyNetDiary, Apple Health	White board, pen and paper	Libre 2, Renpho Health, Apple Health
Frustrations	Current apps lack personalization and support, difficulty integrating healthy habits into a busy schedule, feeling overwhelmed	Not many of the family members are available to help with medication management	Taking multiple medications at different times of the day leads to missing doses due to work, parental responsibilities
Quotable Quote	"I just try to remember to take [medications] through memory."	"Sometimes I forget."	"I place my one medication at the kitchen counter where I can see it before eating breakfast"

USER PERSONA

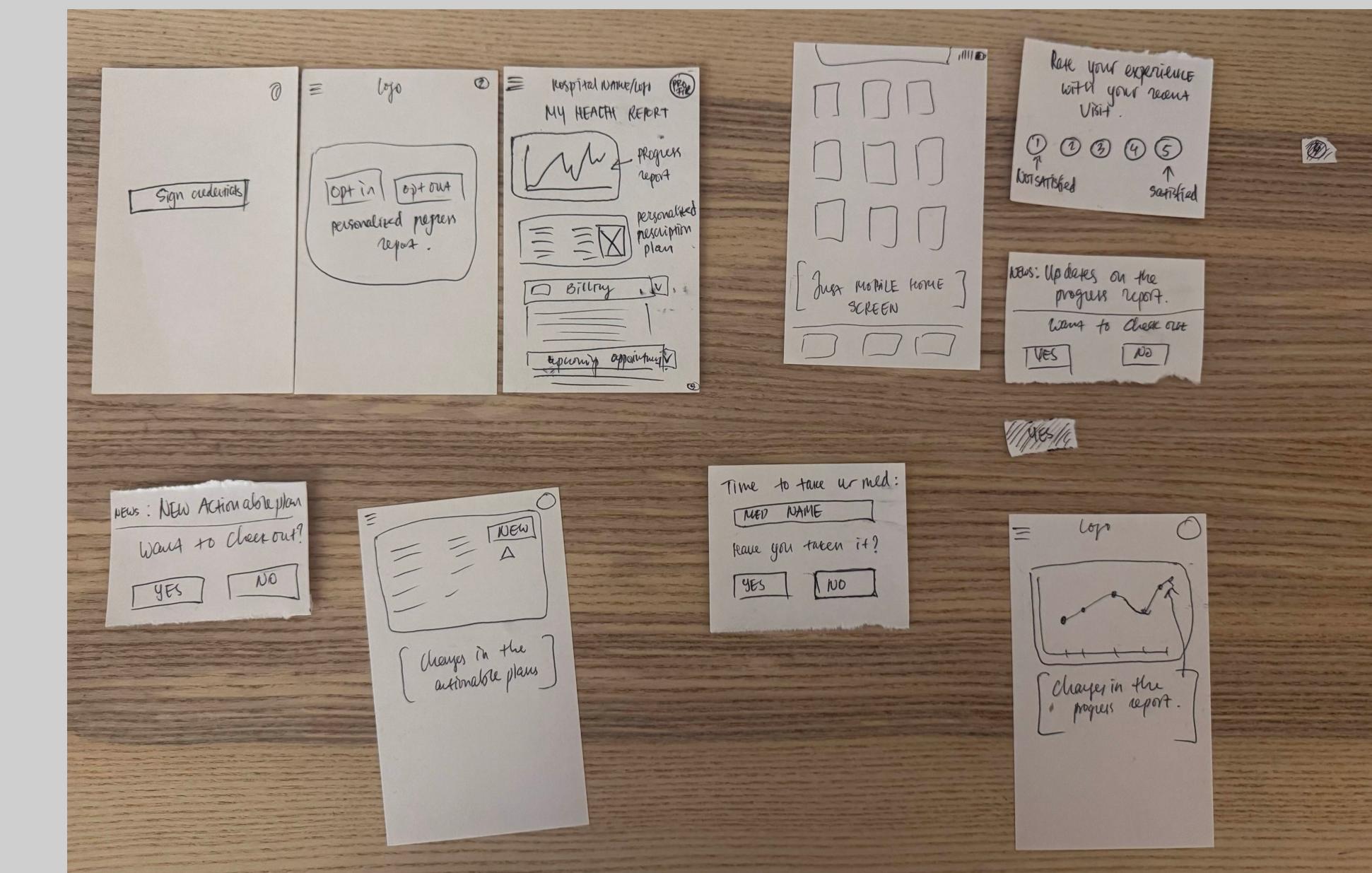
Need help with medication
management and
personalized support



Problem Statement

Many older adults (45+) with type II diabetes face challenges with medication management, often leading to missed doses and difficulty understanding how these lapses affect their overall health. Relying on memory alone can be unreliable, and the lack of personalized feedback hinders their ability to make informed decisions.

10/15 - Tue

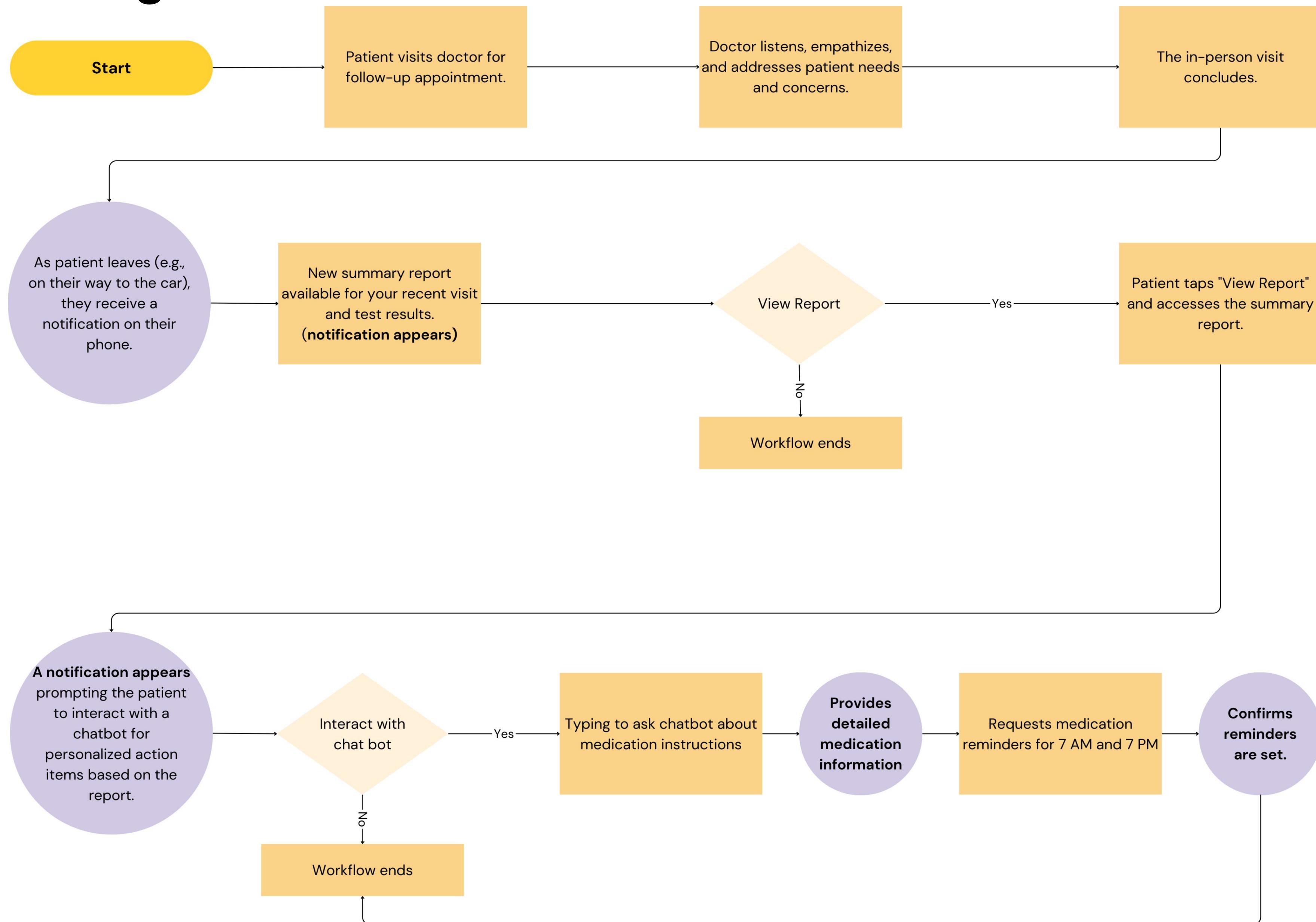


Quick sketches

Solution

Simplifies medication tracking and adherence.
Provides clear and personalized reports on their health progress.
Empowers them to actively manage their diabetes and improve their quality of life.

Workflow Diagram



Solution

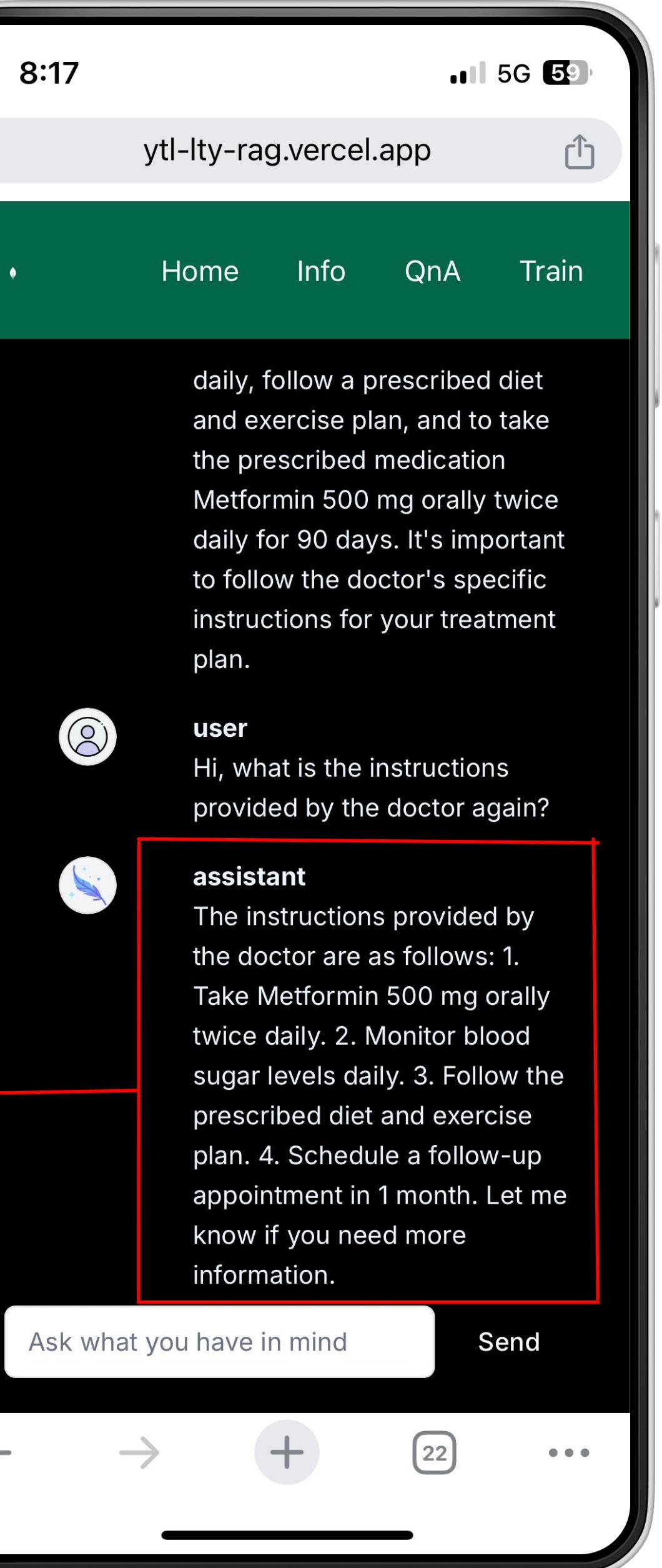
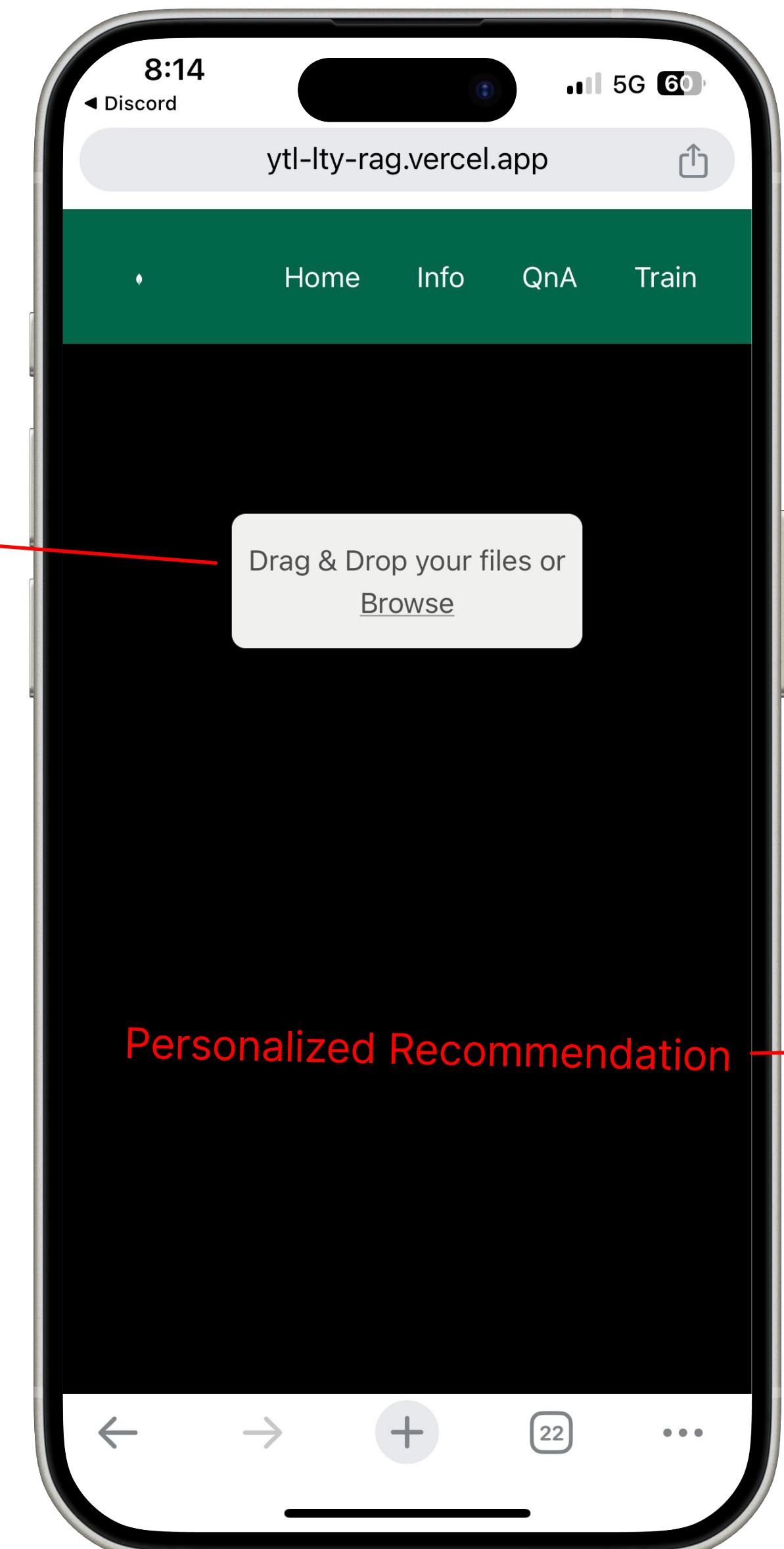
AI powered personalized assistant

A huge majority of health management apps fail to give a holistic dynamic approach between progress and action. This allows the user to take guided action right away whenever they wish to.

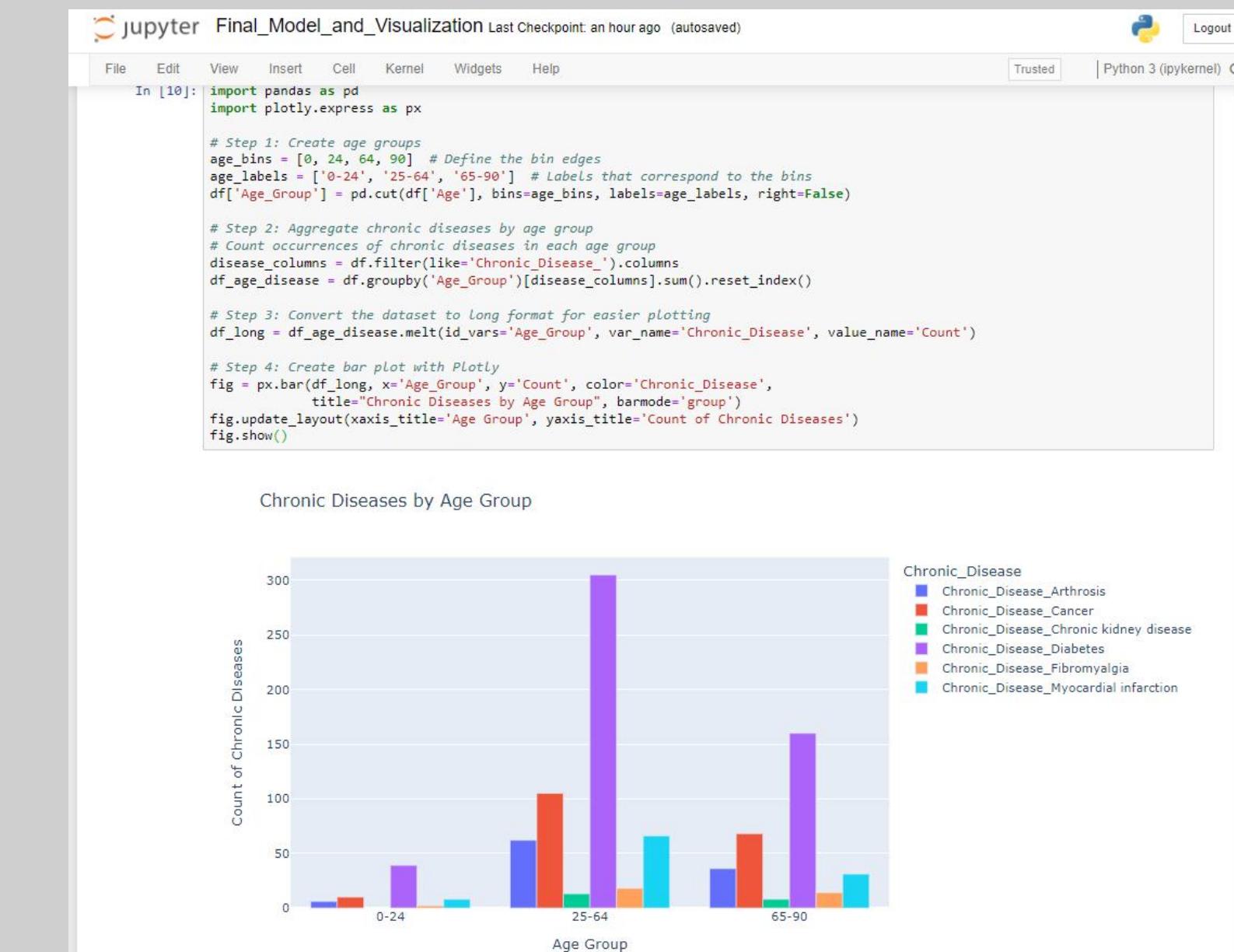
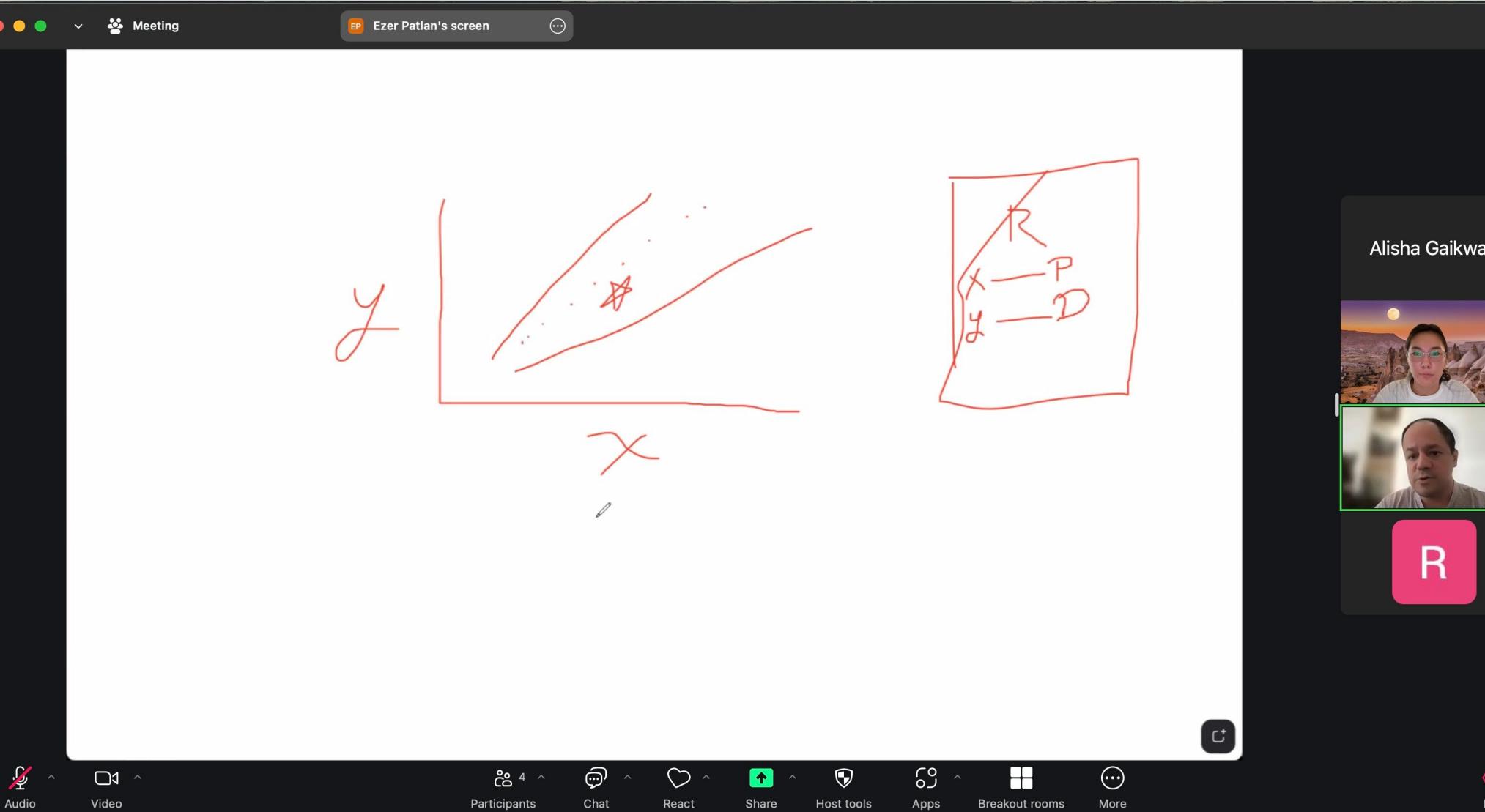
Upload Files

Drag & Drop your files or
[Browse](#)

Personalized Recommendation



10/16 - Wed



Framework & Dev.

Dataset

Overview

- Purpose: Generated for our model Training and Testing
- Tools/Technologies/Libraries : Numpy and Pandas

Characteristics

- Volume: Columns : 8 Rows : 1001
- Column Names : Age, Gender, Arthritis, Cancer, Chronic Kidney Disease, Diabetes, Fibromyalgia, Myocardial infarction.

ID	Age	Gender	Arthritis	Cancer	Chronic Kidney Disease	Diabetes	Fibromyalgia	Myocardial infarction	Income	Income	Gender
1	10	1	0	0	0	0	0	0	12000	12000	1
2	20	1	1	0	0	0	0	0	18000	18000	1
3	30	0	0	1	0	0	0	0	22000	22000	0
4	40	1	1	1	0	1	0	1	25000	25000	1
5	50	0	0	0	1	0	1	0	28000	28000	0
6	60	1	1	1	1	1	1	1	32000	32000	1
7	70	0	0	0	0	0	0	0	35000	35000	0
8	80	1	1	1	1	1	1	1	38000	38000	1
9	90	0	0	0	0	0	0	0	40000	40000	0
10	100	1	1	1	1	1	1	1	45000	45000	1

Source: <https://chat.openai.com>

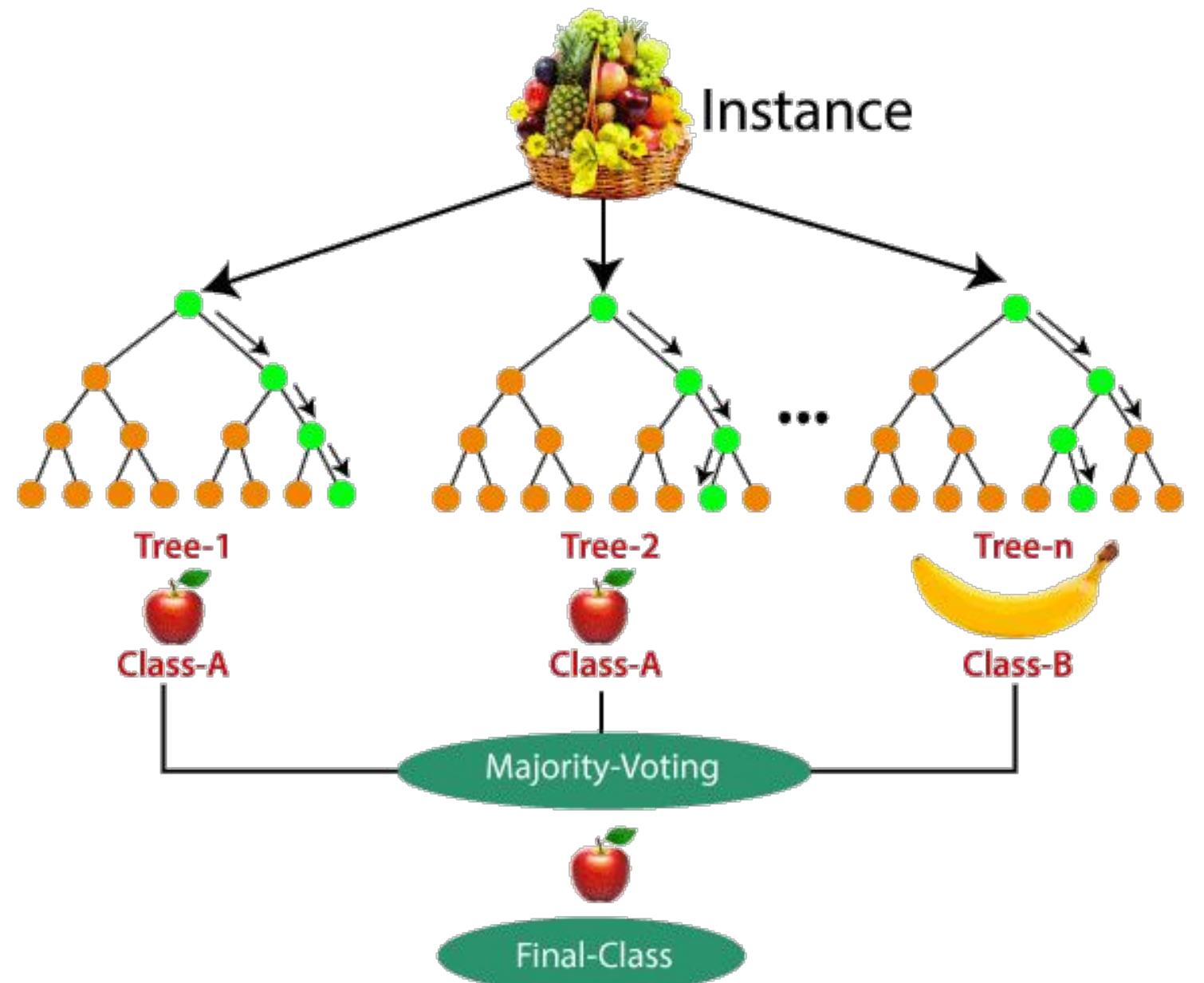
Advantage

- No Privacy Concern
- Ability to generate large amounts of data.
- Flexibility in controlling the dataset

Limitations

- Potential for synthetic data but not fully capturing real world complexity
- Need of validation to ensure it's representative of actual scenario

Random Forest Algorithm Model



```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score

# Generate synthetic dataset
data = {
    'Age': np.random.randint(18, 90, size=1000),
    'Gender': np.random.choice(['Male', 'Female'], size=1000, p=[0.49, 0.51]),
    'Chronic_Disease': np.random.choice([
        'Arthrosis', 'Arthritis', 'Myocardial infarction', 'Diabetes', 'Cancer', 'Fibromyalgia', 'Chronic kidney disease', 'Hypertension', 'Stroke', 'Osteoporosis', 'Obesity', 'HIV/AIDS', 'Hepatitis C', 'Hepatitis B', 'COPD', 'Emphysema', 'Pneumonia', 'Bronchitis', 'Diabetic retinopathy', 'Macular degeneration', 'Glaucoma', 'Hypertension', 'Stroke', 'Osteoporosis', 'Obesity', 'HIV/AIDS', 'Hepatitis C', 'Hepatitis B', 'COPD', 'Emphysema', 'Pneumonia', 'Bronchitis', 'Diabetic retinopathy', 'Macular degeneration', 'Glaucoma'
    ], size=1000, p=[
        0.1, 0.05, 0.1, 0.5, 0.2, 0.03, 0.02
    ]),
    'City': ['San Diego'] * 1000 # Adding this just as an example, but we will drop it
}
df = pd.DataFrame(data)

# Convert categorical variables (Gender, Chronic_Disease) into numerical values
df = pd.get_dummies(df, columns=['Gender', 'Chronic_Disease'], drop_first=True)

# Drop the 'City' column, since it is not relevant for the prediction
df.drop('City', axis=1, inplace=True)

# Save to a CSV file.
df.to_csv('new_synthetic_dataset.csv', index=False)

# Split the data into features (X) and target (y)
# Create a binary target variable indicating if any chronic disease is present
y = df.filter(like='Chronic_Disease_').sum(axis=1).apply(lambda x: 1 if x > 0 else 0) # Binary target variable
X = df.drop(columns=df.filter(like='Chronic_Disease_').columns)

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)

# Initialize and train the Random Forest classifier
model = RandomForestClassifier(random_state=42)
model = RandomForestClassifier(n_estimators=10, random_state=42)
model.fit(X_train, y_train)

# Make predictions
y_pred = model.predict(X_test)

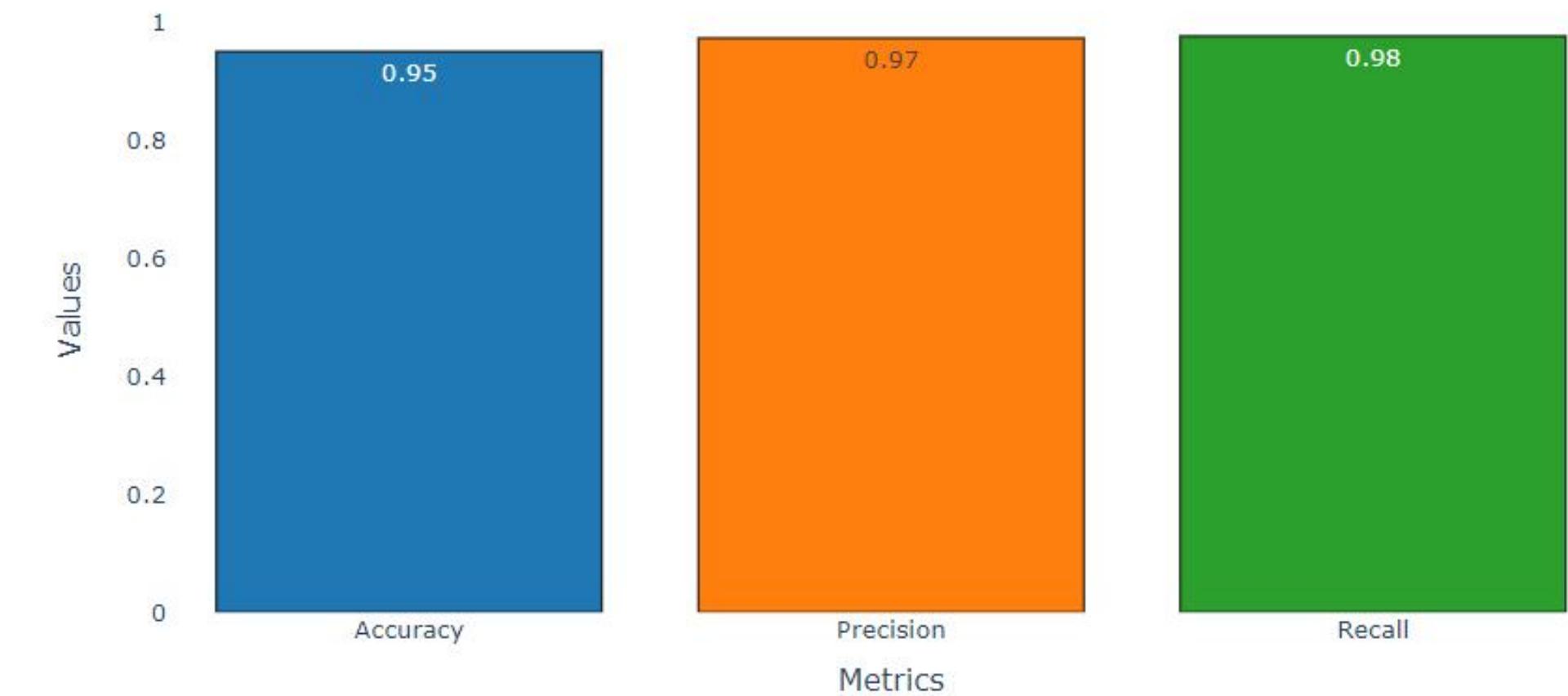
# Evaluate the accuracy
accuracy = accuracy_score(y_test, y_pred)
print(f"Model Accuracy: {accuracy * 100:.2f}%")
```

Algorithm

Implementation

Source: www.javatpoint.com

Model Performance Metrics



Results

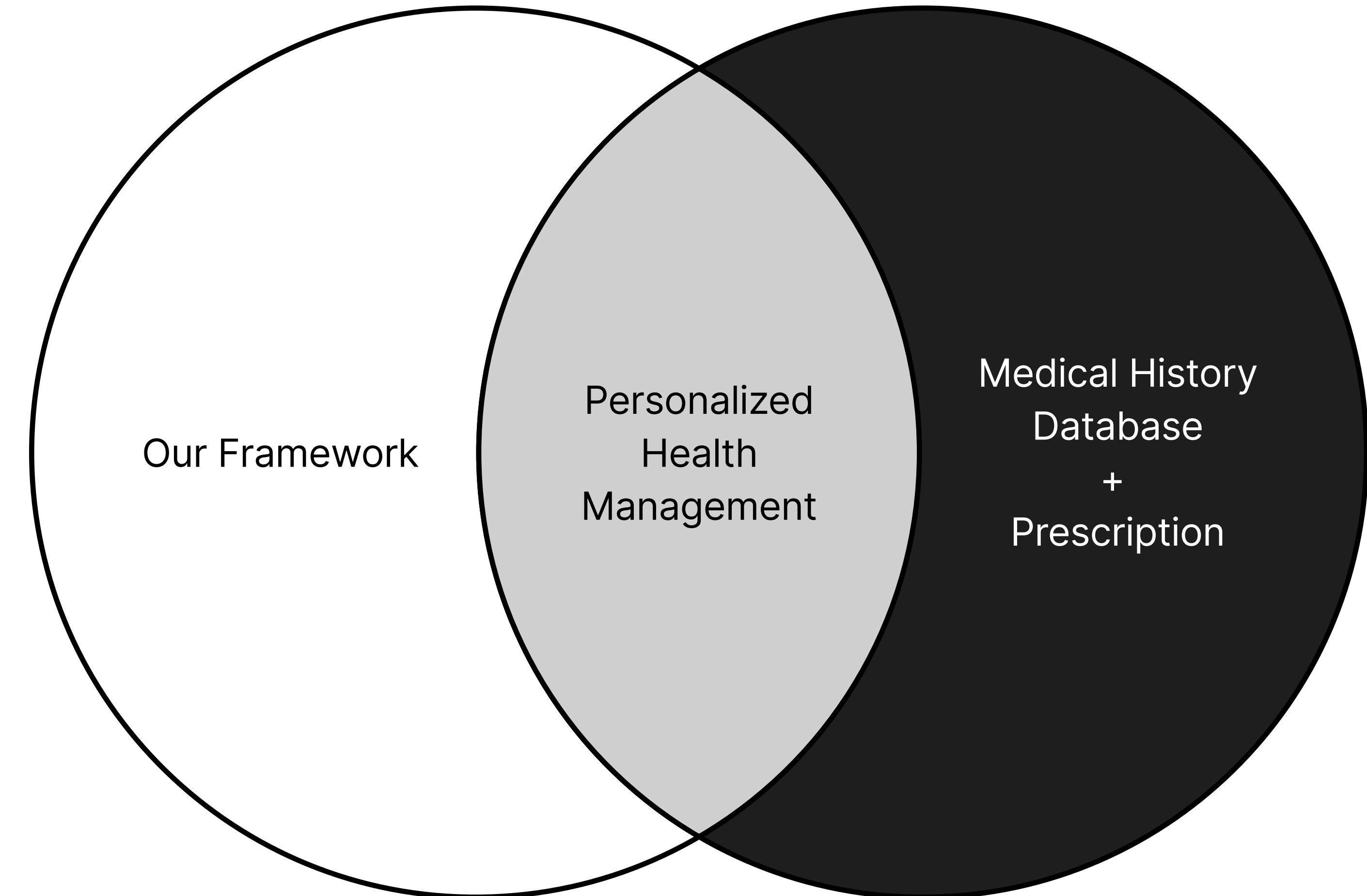
Backend Pictures

The screenshot shows the MongoDB Compass interface. At the top, there's a navigation bar with tabs: Home, Metrics, Collections (which is selected), Atlas Search, Performance Advisor, Backup, Online Archive, and Cmd Line Tools. Below the navigation bar, the title "chatter.training_data" is displayed. Underneath the title, it says "STORAGE SIZE: 216KB LOGICAL DATA SIZE: 20.47KB TOTAL DOCUMENTS: 1 INDEXES TOTAL SIZE: 36KB". There are several buttons: Find, Indexes, Schema Anti-Patterns (0), Aggregation, and Search Indexes. A note below the buttons says "Generate queries from natural language in Compass". Below these, there's a "Filter" button and a text input field containing "Type a query: { field: 'value' }". The main area is titled "QUERY RESULTS: 1-1 OF 1" and contains a single document:

```
_id: ObjectId('6712f564f40b0255ec0db9e2')
text: "Doctor: Jaime Smith, MD
General Doctor
1234 Health Dr.
San, Diego, ..."
▶ text_embedding : Array (1536)
```

 At the bottom right of the main area, there's a "Screenshot" button.

The screenshot shows the AWS CloudSearch console. At the top, there are links for All Clusters, Get Help, and a user profile. Below that, it shows cluster details: VERSION 7.0.14, REGION AWS N. Virginia (us-east-1), and CLUSTER TIER M5 (General). There are tabs for Performance Advisor, Backup, Online Archive, and Cmd Line Tools. On the right, there are buttons for "VIEW COMPOUND QUERY EXAMPLE" and "+ CREATE SEARCH INDEX". The main area displays an index table with columns: Index Fields, Status, Queryable, Size, Documents, and Actions. One row is shown: "text_embedding" (Status: READY, Queryable: ✓, Size: 8.91KB, Documents: 1 (100% indexed of 1), Actions: QUERY, ...). Below the table, there are links: "Learn more about Atlas Search" and "Learn more about Atlas Vector Search". At the bottom right, there's a "Screenshot" button.



Next steps and lesson learned