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Team Name: apple.py 🍎

Project Title: AWARE (Apple Watch Alcohol Risk Estimator)

Intro:

Users tend to drink more than they are physically capable of as it's hard to know your limitations when drinking, but our watch will be able to do the work for you so that you can enjoy your night out stress free. We will use biometrics which are already constantly being collected by the Apple Watch (including heart rate (stress detection), breathing steadiness, walking steadiness which when combined will give an accurate measure of a user's level of intoxication and alertness. The user will be able to manually toggle the alcohol detection feature from their Apple watch on and off, which allows them to enable the alert system before their night out. When enabled, if the app detects that all tests for intoxication/impairment are met or exceeded it will give the user several options including:

1. Calling an Uber
2. Texting close friends / family members + sending your location
3. Prompting them to eat / drink
4. And (in extreme cases) - Call Emergency Services

 Gives prompts "Your blood alcohol content is dangerously high. Alert EMS?" And big red YES and big green NO comes up with constant vibration for 30 seconds and sound and if the person doesn't respond within 30 seconds then emergency services are automatically called.

The phone app will include an interface which shows graphs of biometric data collected from the watch as well as useful insights and conclusions about the user's health and drinking habits.

Background/Significance:

Over 1.5k college student deaths from alcohol-related accidents per year (including drunk driving). Over 22k college students per year are hospitalized from alcohol overdose, and nearly 600k college students per year are unintentionally injured while under the influence of alcohol. Apps for alcohol and drug safety are limited and not widespread enough to prevent deaths and illnesses. Additionally, an estimated 15 million people struggle with an alcohol use disorder in

the United States, but less than 10% of them receive treatment. Our solution expands on existing solutions with the autonomous nature of the application, which checks on user's biometric information constantly without requiring user input, allowing them to not need to be hyper aware of their toxicology during social interactions

Existing Solutions:

- BACTrack Skyn: wearable alcohol biosensor that measures transdermal alcohol content (TAC) from skin to estimate BAC range; our app will not require Apple Watch users to purchase an additional biosensor but rather use its provided biometric tracking
- DrinkControl: app that helps manage and keep track of drinks, motivates users to not drink beyond the legal limits
 - Mark sober history / drunk history and motivate with keeping up streaks
 - Users have to manually input drinks, we aim to provide automatic tracking of intoxication levels from biometric data
- AlcoWear: infers the drinker's BAC level by classifying accelerometer and gyroscope sensor features gathered from their smartphone and smartwatch simultaneously using a machine learning approach; we aim to use a similar approach (possibly with a different machine learning architecture) but with additional biometric data including heart rate and breathing rate.

Project Outcome:

- Our goal is to provide a smartphone platform with easy to access information about alcohol safety and make it easier to manage alcohol intake to reduce risk of overdose
- Help reduce the number of accidents that result from unsupervised drinking and help people get crucial medical help faster in certain situations
- Users automatically given notifications based on passive collection of biometric data with regards to their level of intoxication "sober" / "mildly intoxicated" / "impaired - unable to drive" / "critical danger - overdose risk"
- Enhance the "buddy system" and serve as a tool for people to look out for each other more effectively in social situations involving alcohol
- Integrate a button on the Apple Watch to immediately call friends, family, or emergency services when at risk of alcohol abuse or in other unsafe situations involving alcohol

Milestones

Sprint 2:

- Start writing code for the application to receive health data from Apple watch.
- Start setting up frameworks and setting up mobile application components
- Start on a simple watch app

Sprint 3:

- Select a simple ML model (may be untrained) and work on integrating biometrics with it
- Expanding other features (possibly in winter quarter) such as: sending alerts to selected contacts in case of needing assistance returning home and/or emergency attention, prompting users to take an Uber or have a snack at regular intervals, etc.

Team Goals:

- Watch and phone app is easy to use and navigate for all users.
- Using the application should be more convenient than simply calling contacts through the phone.

Team Assumptions:

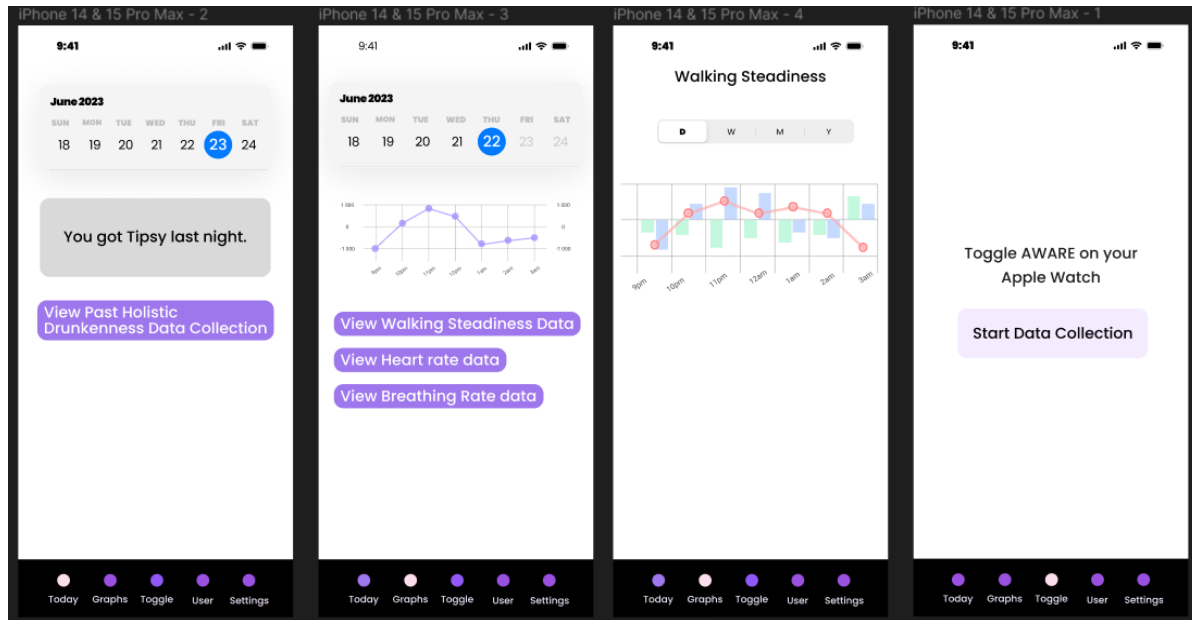
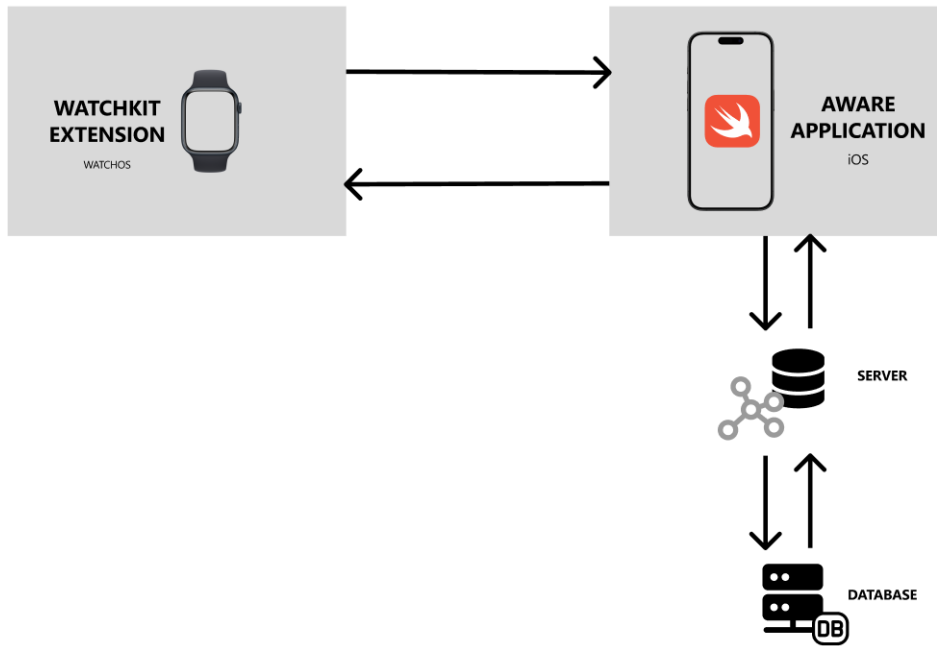
- The user is looking for a new method to control their alcohol consumption
- User owns an Apple Watch/iPhone

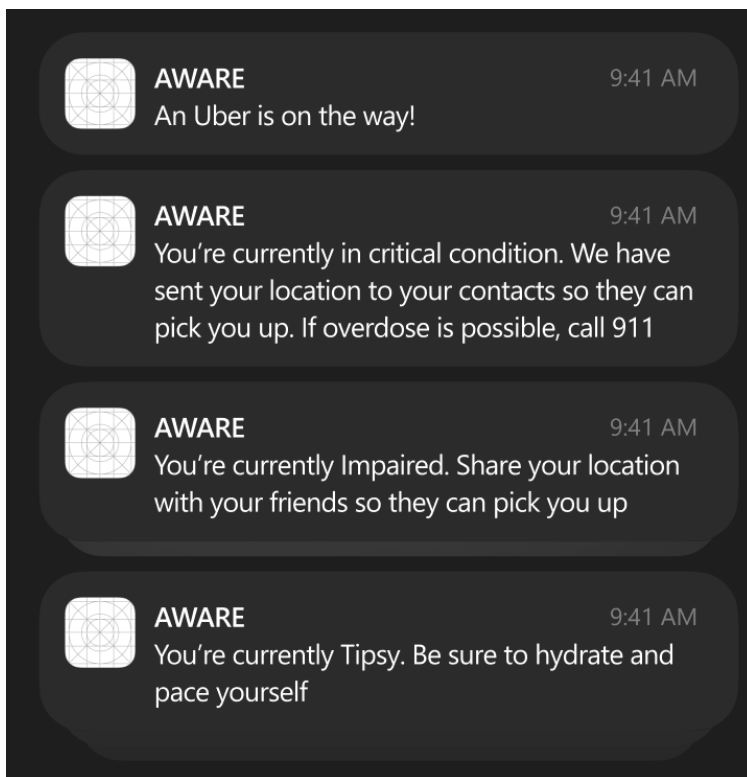
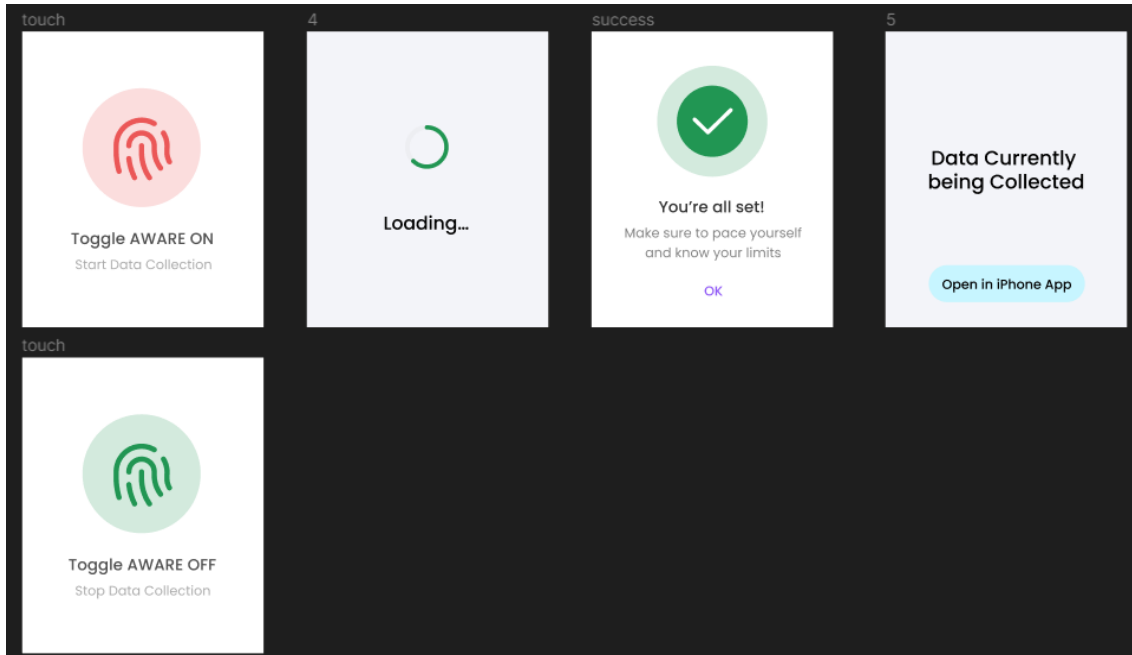
Requirements (functional and nonfunctional):

- User stories or use cases (links): 10 for PRDv1 prioritized
 - As a user:
 - I can receive automated watch alerts about my alcohol consumption level without manually entering any data so that I can easily receive accurate estimations of my intoxication level
 - Acceptance Criteria: When data collection is on, the user periodically receives watch alerts regarding their estimated level of intoxication and safety tips.
 - Candidate for test metric
 - [Github Link](#)
 - I can easily contact emergency contacts so that I can receive help after drinking too much
 - Acceptance Criteria: When the user requests to notify emergency contacts, the app sends the user's location via text message to all emergency contacts.
 - Candidate for test metrics
 - [Github Link](#)
 - I can view graphs / detail of my specific biometrics such as heart rate, stress levels and breathing steadiness / history on the app and be notified of unusual statistics so that I can be more aware of patterns in my health data
 - Acceptance Criteria: There will be a specific page in the app that the user can access that will display graphs of the user's data that has previously been collected by the app
 - Candidate for test metric
 - [Github Link](#)
 - I can call an Uber with ease using my smartwatch app so that I can avoid driving under the influence
 - Acceptance Criteria: When the app detects the user is at moderate levels of intoxication, indicating impaired judgment, it prompts the user to call an Uber with a button that redirects them to the Uber app.
 - Candidate for test metric

- If I am in critical danger of overdose: app can be trusted to give prompts at the correct time to call emergency services in order to get medical attention when I may be incapacitated
 - Acceptance Criteria: When the app detects the user is at dangerous levels of intoxication, it gives the alert “Your blood alcohol content is dangerously high. Alert EMS?” And big red YES and big green NO comes up with constant vibration for 30 seconds and sound and if the person doesn’t respond within 30 seconds then emergency services are automatically called.
 - Candidate for test metric
 - [Github Link](#)
- I can toggle watch data collection on and off with the press of a button on my smart watch just before I plan to go out for a night of drinking so that I only receive alerts at relevant times
 - Acceptance Criteria: When data collection is toggled on by user, user data will be stored in database until it is toggled off
 - Candidate for test metric
 - [Github Link](#)
- As a non-user emergency contact
 - When an app user has added me to their emergency contacts and has requested to contact me through the app, I will receive location alerts via text message.
 - Acceptance Criteria: Immediately receive text message when app user requests to call emergency contacts.
 - When an app user has added me to their emergency contacts and is too impaired to drive, I will be notified via text message so that I can assist them.
 - Acceptance Criteria: Even if user has not directly requested to notify emergency contacts, receive updates when user is impaired.
 - View intoxication level status of user that triggered the notification
 - Acceptance Criteria: Add basic information on the intoxication level of the user when app sends text message to emergency contact.
 - Be given updates via text message if user who has put me as an emergency contact is at risk of overdosing and be notified by text message if emergency services have been called on their behalf
 - Acceptance Criteria: If emergency services are called from user’s app, a text is sent to user’s emergency contact

System Architecture Diagram:





Technologies employed:

- Apple HealthKit UI/UX (for connecting to the Apple Watch)
- Cloudkit (backend)
- Swift (for application development)
- CoreML (for Machine Learning)
- Cocoa (for API calls / communication with the backend)