Milestone 2 – Requirements Document

COEN/ELEC 390

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"We certify that this submission is the original work of members of the group and meets the Faculty's Expectations of Originality"

A. STAKEHOLDERS INFORMATION

Stakeholder #1: Graduate University Student

Alias: Momo
Interview Details: Sunday, February 9th, at 11:00 AM on Google Meet.

Background: Momo is a first-year full-time medical student who enjoys socializing and drinking with his friends. He is outgoing, loves bar hopping, and relies on his car as his main mode of transportation. His favorite drink is gin and tonic.

Key Notes from Interview:
- Safety is a concern for him, so he suggested features like BAC estimation, discreet vibration alerts (instead of readable notifications), and safe transportation options (e.g., ride-sharing integrations).
-Discretion was also a concern for him, therefore, a device that can easily be hidden or stored in a bag/pocket is more appealing.
- He expressed interest, as a future health professional, in the app having long term data logs. Momo suggested that users could use this to give their health care providers accurate insight on their drinking patterns.
- Momo emphasized the importance of finding bars with good ambiance, vibes, and drink specials.
- He expressed interest in features like randomized bar recommendations based on user preferences (music, size, vibe, distance) and predictions of wait times/crowd levels.
- He also highlighted the need for a bar review system to help users make informed decisions.

Stakeholder #2 - Undergraduate University Student

Alias: Josh
Interview Details: Sunday, February 9th, at 1:00 PM on Google Meet.

Background: Josh is a second-year full-time aerospace engineering student who prefers drinking at home due to cost considerations. He values music as an important part of his drinking experience and uses primarily public transit for transportation. He favours beer as his drink of choice.

Key Notes from Interview:

- Josh stressed the importance of reliability, incorrect measurements of alcohol levels by the device could lead to risky decisions, like driving under the influence.
- For legal reasons, he suggested that a disclaimer should be included, stating that our app is not an official alcohol test.
- He believes the health aspect of tracking alcohol levels should be the app's selling point, as it is the most unique and usable feature.
- Josh suggested non-intrusive notifications, as overly personal or aggressive alerts could lead to users deleting the app.
- He proposed dynamic keyboard sizing that increases with drunkenness levels to improve usability.
- Josh also recommended the app as a tool for those trying to quit alcohol, potentially endorsed by health professionals.

B. CONSENT TO PARTICIPATE IN SAFE ALCOHOL CONSUMPTION APP INTERVIEW

I understand that I have been asked to participate in a research project being conducted by Mik, Liyan, Sem Axil, Hawa, Vincent, and Nadir of Gina Cody School of Engineering of Concordia University (514-848-2424, ext. 3109; reception.ginacody@concordia.ca). Under the supervision of Dr. William E. Lynch of Electrical and Computer Engineering of Concordia University (william.lynch@concordia.ca).

A. PURPOSE

I have been informed that the purpose of the research is to collect information in relation to our safe alcohol consumption app. The team hopes to use the information to refine the app's features.

B. PROCEDURES

- I understand that the interviews will be conducted remotely through zoom and that the interviews will last 1 hour.
- I understand that during a zoom call, I will be asked questions related to my alcohol consumption and typical actions whilst drinking. I will be asked about problems I face, how I solve them, how I wish I could solve them,..etc.
- I have access to the necessary resources regarding mental wellbeing should I need them.

C. RISKS AND BENEFITS

- I understand that participating in this interview may lead to disclosing personal information about myself and may help the interviewers to develop their project based on the answers I provided.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.

- I understand that my participation in this study is:

CONFIDENTIAL (i.e., the researcher will know, but will not disclose my identity)

- I understand that the data from this study may be published.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____

SIGNATURE _____

If at any time you have questions about the proposed research, please contact the study's Principal Investigator Liyan Al-mosaria, Gina Cody Computer Engineering student, at liyana@softsim.ca. Under the supervision of Dr. William E. Lynch of Electrical and Computer Engineering of Concordia University (william.lynch@concordia.ca).

If at any time you have questions about your rights as a research participant, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 oor.ethics@concordia.ca

C. Interview Script

Part 0: Set interviewee at ease

*To help the interviewee relax, open the interviewee with some **"small talk"** (weather, any trouble getting here, etc.).*
Thank the interviewee.

- Thank you for meeting with us today! We appreciate you giving your time.
- How's your day going so far?
- Have you been enjoying the cold?

Part I: Establishing the Customer or User Profile

*Adopt to your area. If you are making something that will be sold to a company you will want **details on the person**'s position in the organization, what they do in their work. If you are making something for consumers you may want to identify their interests, where and under what conditions they might use your product.*

GETTING TO KNOW THE PERSON!

- What are you studying? *Are you a part-time student?*
- What year are you in?
- Are you an international student? (If yes, where are you originally from?)
- What languages do you speak?
- What are some of your favourite things to do in your free time? (Why, How, When…etc)
- Do you have a group of friends you like to do this activity with? Are you looking to expand it? How often do you guys see each other?
- Do you currently work? If so, what do you do? Do you work full-time?
- What is your main form of transportation?

Part II: Assessing the Problem – Context Free questions

*This part is the "blue sky", context free part of the interview. Mention only the **general domain**, not what you think are problems for this domain, or what you see as solutions for the problems you have.*

What problems do they have!

- What do you like about drinking alcohol?
- What is the best part of a night out for you?
- What annoys you the most when drinking alcohol?

- Can you elaborate?
- Why does this problem exist?
- How do you solve it now?
- Anything else?
- Anything else?

- How drunk do you typically get? Are you light-weight?
- Do you ever have concerns about drinking too much?
- How do you decide how much to drink on a night out?
- Does your mode of transportation change when you're drinking?

Potentially Relevant Questions:

- ➢ On a night out do you prefer to stay at one place or move around?
- ➢ Do you like to go out or stay in?
- ➢ What's your favorite drink?
- ➢ What music do you like listening to?

<u>Part III: Understanding the User Environment</u>

Who are the users?

Which platforms are in use?

Where will they use the app?

Are additional applications in use that are relevant to this application?

WOULD THEY BE INTERESTED IN AN APP!

- Are there any apps you use in relation to drinking?
- How comfortable are you with using an app while drinking?
- What devices do you own? Do you always have them with you? …etc.

Part IV: Recap for Understanding

TO SUMMARIZE THEIR PROBLEMS

- You have told me: ...(List customer-described problems in your own words.)
- Does this summarize your problems and existing solutions?
- Are there any other problems you are experiencing?

Part V: The Analyst's Inputs on the Customer's Problem – Problem

context questions

Now start to tell the interviewee about some of the *problems that you have thought about for this domain*. Don't tell them your proposed solutions. If they already mentioned in Part II one of the problems you had pre-identified, you don't need to repeat it here. List any needs or additional problems you think should concern the customer or user.)

Some **PROBLEMS WE IDENTIFIED** related to drinking are…:

- Difficulty meeting new people with same interest
- Are there any scheduling conflicts with your friends?
- After drinking, do you often feel hungover the next day?
- Do you have trouble keeping track of your alcohol intake when drinking? (Not knowing how much alcohol is actually in your drink, so it helps you track your alcohol level)
- Do you have a hard time finding affordable locations that you enjoy? (What locations do you frequent)
- Do you feel forced to stay at one location due to no transportation or lack of info on nearby locations?

For each suggested problem, ask the following questions (depending…):

- Do you think this is a real problem?
- Do you personally experience this?
- How do you currently solve the problem?
- How would you like to solve the problem?
- How would you solve this issue?
- On a scale of 1 to 5, how would you rate this issue?

- What is the most important issue discussed?
- Do you think solving this issue is more important than…*other issues they had.*

Part VI: Assessing Your Solution – Solution Context Questions

Now tell the interviewee **what your product will do for them**, how it will solve the problems identified before.

(Summarize the key capabilities of your proposed solution.)

What if you could:

- What if you could find local drinkers with the same interest?
- What if you had a tool to quickly find common time slots for **activities** with friends?
- What if you could receive recovery tips the next day?
- What if you received reminders to drink water throughout the night?
- What if you received alerts that deterred you from consuming certain drinks based on previously logged data?
- What if you got recommendations on nearby locations based on interests and price range?
- How would you feel about a Bar Hop Feature that would plan a route for you with nearby locations that would take into account your music interests, alcohol levels, transportation preferences, weather..etc)

- What if you could assess someone's alcohol level to evaluate their cognitive state?
- What if the app sends you an alert that you've reached your safe limit and recommends you a car service?
- How do you feel about a person being contacted after certain events occur. For example: you don't return home after a certain time, you've reached a dangerous level of BAC, you choose to alert them for any reason (you feel unsafe and need help),..etc.

Follow up Questions:

- Is this of interest to you or your friends?
- How often would you utilize this feature?
- What else would you want it to do?
- Is this more important than the previous solution?
- *Ask them to explain.*

Part VII: Assessing the Opportunity

HOW INTERESTED ARE THEY IN OUR APP

- Who in your friend group needs this application?
- How valuable would a successful solution be to you guys?
- Outside of ___*their main use*_____ is there somewhere you could use this application?
- What price would you pay for a product that had this capability? If the app was free what would pay for the device containing the sensor?
- If you didn't have the ethanol tracking sensor would you still use the app?
- How do you feel about wearing the sensor as a wristband? Would you prefer a phone charm or bag attachment?

Part VIII: Assessing the Reliability, Performance, and Support Needs

- What are your expectations for reliability for the application? What about the sensor?
- Would this affect how and when you use the app?
- What are your expectations for performance?
- Is there a certain layout that you would prefer?
- Do you find certain interfaces easier to use at night? (Dark mode, Large text, ...etc.)

Part IX: Other Requirements

*Are there any **legal, regulatory, or environmental requirements** or other standards that must be supported?*

- What is your opinion on us collecting your data? How would you want your privacy to be respected? Do you have any thoughts on what data should/should not be collected?
- How do you feel about sharing the data collected? With whom would you want/not want this information to be known to?
- Can you think of any laws or regulations we need to be aware of related to alcohol monitoring?
- Do you think there are any legal concerns with recommending transportation services?
- Can you think of any other requirements or standards you want us to be aware of?

- Are there any aspects to the device containing the sensor you would like to share with us? Do you have any thoughts or preferences on the type of device?

- Do you expect the app to work without wifi? What features should always be available, no matter your wifi connection?

Part X: Wrap-up

- Is there anything you can think of that would prevent you from using the app?
- Are there any other questions I should be asking you?
- If we have more questions, how can we contact you?
- Would you be willing to do another call in a few weeks to see the progress we made and give more recommendations?
- Thank you for your time!

Part XI - The Analyst's Summary – after the interviewee has left

*Each person doing the interview should write down the **three most important needs/problems** that they got from the interview that just ended.*
*After all have written down the 3 most important ideas, **search for common needs***
Ten interviews will often create 10-15 different needs.
This is the start of your requirements repository.

D. TAKEAWAYS FROM INTERVIEWS

INTERVIEW #1 - MOMO

MIK DRIVER

1. Monthly drinking summaries to give to doctors
2. Randomized drinking spots → User gives info on music, size, vibe, transportation, distance…etc
3. Predictions of wait times/number of people at what hour based on previous data.
4. Vibrations to signal events instead of readable alerts (After a certain number of drink)
5. Review bar feature

LIYAN AL-MOSARIA

1. A wristband could be bothersome, therefore, a device that can easily be hidden or stored in a pocket/bag would be more appealing.
2. The app would keep track of drinking logs for an extended period of time (year or more).
3. The feature that helps users find local drinkers could potentially raise safety concerns. While requiring users to create a profile could address some of these issues, it may make the app feel overly formal, like a dating app.

SEM AXIL RAIS

1. Concern for privacy: Wouldn't like other people to know the user's alcohol consumption and would prefer a discreet sensor that isn't seen by other people.
2. Interest in the ability to log all alcohol consumption information either manually or automatically from the sensor.
3. Interest for a potential social aspect of the app: Implementing time-slots to meet with friends, bar hop feature allowing one to see nearby bars and a feature that connects drinkers with similar interests.

NADIR CHETOUANI

1. The app should be able to register multiple users on a single device. Each user can have a dedicated profile where their breathalyzer readings and history are stored separately. In group scenarios, having separate profiles makes sure that the correct test results are attributed to the right person. This helps reduce confusion.
2. There should be a history associated with past drinking. This history could analyze the data and provide useful information for the user, such as graphs or helpful tips.

3. The app's setup needs to be discrete, as some users may want the use of such an app to be private.

HAWA DIALLO

1. The app could provide an insight into consumption habits of the user and provide them with information about this.
2. Users' information must be confidential and secure. Third parties should not have access to it. They wouldn't want to be targeted with personalized ads/products.
3. App needs to be as discreet as possible because some users may feel stigmatized when using it in front of other people.

VINCENT NGUYEN

1. The application won't be completely trusted and will mostly depends on the person judgment
2. An obvious sensor product could be a concern for privacy, since it could reveal people drinkings habits
3. A social feature seemed like a well receive suggestions, since it would allows to meet people

<u>INTERVIEW #2 - JOSH</u>

MIK DRIVER

1. Sensors must be 100% accurate in the case that people are checking if they can legally drive
2. Would delete if notifications are too personal or aggressive. But he would listen to them otherwise.
3. Health aspect/tracking alcohol levels is the most unique point. Should be the selling point in his opinion. Most usable feature.
4. Keyboard size should increase with drunkenness levels
5. Could be applied to situations where someone is trying to quit alcohol. Recommended by health professionals even.

SEM AXIL RAIS

1. The sensor must be accurate within narrow margin error
2. Dark mode seems to be a feature that is enjoyed and good for the user experience
3. Interest in integrating features that enhance the drinking experience like giving recommendations for local bars and having friends on the app

LIYAN AL-MOSARIA

1. Since manually logging drinks while consuming them is likely to be forgotten, a sensor is crucial for ensuring accurate and reliable tracking.
2. For reliability, the device must provide accurate readings, as incorrect measurements such as displaying an alcohol level of 0.02 for example could lead to risky decisions, like driving under the influence. A disclaimer should be included, stating that this is not an official alcohol test and that individuals should always avoid driving after consuming alcohol.
3. Integrating Google Maps would enhance the experience by providing reviews and photos of bars, offering users valuable insights before visiting.
4. If the app is too intrusive, such as sending excessive notifications, it may discourage continued use. Additionally, if it lacks accuracy, users are likely to lose trust and eventually stop using the app.

NADIR CHETOUANI

1. It is imperative that the user's data remain confidential. The app should be 100% concerning data privacy and sharing. The user should know when, where and how this data is used or shared in the case it has to be handled.
2. Users should be able to disable the current drinking activity recording, in the case the app is being too intrusive or annoying.
3. It is important for the app to be intuitive for users. Information should be clear and easy to access. There shouldn't be any cluttering and the user should be able to personalize the UI.

HAWA DIALLO

1. Users should always be asked to give consent whenever the app wants to send data to an emergency contact. This feature should also be deactivated if the user wishes so.
2. User's info must remain well secured and must never be shared with any third parties.
3. The app should be easy to use, with the different features well organized. Difficult navigation within the app would discourage users from using it.

VINCENT NGUYEN

1. Doesn't want an application that is too invading his privacy
2. The User design should take into account the state and the environment usually sets when the users use the app.
3. The app should provide an accurate measurement with the sensors because even a small margin of error can have serious consequences

E. PRODUCT BACKLOG

Story ID	Story Title	Card	Story Points	Sprint	Status	Conversation	Confirmation
UI-1	Connect Sensor	Connect alcohol sensor to android application	13	Sprint 1 (Core Functionalities and Immediate User Needs)	Planned	The sensor must accurately measure alcohol levels and transmit data to the app in real-time.	Sensor is connected and can read alcohol levels within 5% accuracy. Data is transmitted to the phone successfully.
UI-2	Computer Simulation	Model and simulate MQ3 sensor behavior in different conditions	13	Sprint 1	Planned	Simulate how temperature, humidity, and noise affect the MQ3 alcohol sensor's accuracy. Use sensor datasheet or standard conditions, apply mathematical models, and validate results using theoretical or lab-based data. Use Python or MATLAB for implementation.	Model includes temperature/humidity response curves and noise variations. Simulation generates outputs for multiple conditions. Error analysis calculates deviations and presents visual reports. Final report determines if the sensor meets the ±10% accuracy threshold.
UI-3	Display Alcohol Data	Show real-time alcohol readings on the app	8	Sprint 1	Planned	Users wanted to see their current alcohol level and trends in real-time.	Alcohol level appears on the app with less than 2-second latency. Historical data is stored.
UI-4	Manual & Automatic Logging	Allow users to log alcohol consumption manually	13	Sprint 1	Planned	Users wanted the flexibility to track drinks both manually.	Users can log drinks manually, and the sensor logs data automatically.

UI-5	Log Alcohol History	Store and display past readings	8	Sprint 1	Planned	Users wanted to track their drinking habits over time for personal or medical purposes. Users can access a daily, weekly, and monthly view.	Historical alcohol data is accurately stored and displayed. Users can view logs by date.
UI-6	Send Alerts & Provide Recommendations	Provide advice based on alcohol levels	8	Sprint 1	Planned	Based on readings, the app suggests drinking water, waiting before driving, or contacting a friend. As well as recommendations for the next morning	Alerts are triggered when alcohol level exceeds thresholds. Recommendations are displayed based on alcohol level and context. Notifications are received reliably.
UI-7	Ensure Privacy & Discretion	Provide an option to disable logging of consumption	3	Sprint 1	Planned	Users expressed concerns about privacy and data security.	Users can toggle tracking on/off, and data remains private without third-party access.
UI-8	Dark Mode	Provide a dark mode option for better usability in dim lighting.	3	Sprint 2 (Enhanced Usability and User Experience)	Planned	Users preferred dark mode for a better experience.	Users can toggle dark mode in settings.
UI-9	Vibration-Based Alerts	Replace visual notifications with vibrations after a certain number of drinks.	5	Sprint 2	Planned	Users preferred discreet alerts to avoid drawing attention.	Vibrations trigger instead of on-screen alerts when a limit is reached.

UI-10	Customizable UI	Let users personalize the app's layout, color scheme, and feature accessibility.	5	Sprint 2	Planned	Users wanted an intuitive and personalized experience.	Users can customize the UI through settings, choosing layout, colors, and features to enhance usability.
UI-11	Dynamic Keyboard Sizing	Increase keyboard size as drunkenness levels rise.	5	Sprint 2	Planned	Users wanted better usability when intoxicated.	Keyboard size adjusts dynamically based on alcohol level readings.
UI-12	Emergency Contact Feature	Notify emergency contacts when intoxicated	8	Sprint 2	Planned	Users can add emergency contacts. If alcohol levels are too high, an SMS or app notification is sent.	Emergency contact is notified when alcohol level reaches a dangerous threshold. Confirmation message appears. Must be a feature they can turn on or off.
UI-13	Bar Review Feature	Allow users to review bars and see ratings from other users.	5	Sprint 3 (Social Features and Advanced Functionality)	Planned	Users requested a way to leave and read bar reviews.	Users can submit and view reviews on different bars.
UI-14	Randomized Bar Suggestions	Recommend bars based on user preferences (music, size, vibe, transport, etc.).	8	Sprint 3	Planned	Users wanted a feature to explore new places based on preferences.	The app suggests relevant bars based on input preferences
UI-15	Google Maps Integration	Integrate Google Maps for bar reviews, photos, and location-based recommendations	8	Sprint 3	Planned	Users wanted a more informative bar exploration experience.	Users can see Google Maps bar reviews and photos directly in the app.

UI-16	Predict Wait Times & Crowds	Use historical data to estimate wait times and crowd sizes at different hours.	8	Sprint 3	Planned	Users wanted insight into when bars are less crowded.	The app accurately displays estimated wait times and crowd levels.
UI-17	Social Interaction Features	Add social aspect to alcohol monitoring app	8	Sprint 3	Planned	Implement features that allow users to connect with friends, plan meetups, and explore nearby bars based on their drinking preferences.	Users can schedule meetups, see nearby venues, and connect with drinkers with similar interests.
UI-18	Music Integration	Integrate music features (e.g., curated playlists, Spotify links) for at-home drinkers.	5	Sprint 3	Planned	Users wanted to enhance their drinking experience with music.	Users can access curated playlists or link Spotify directly in the app.
UI-19	Price Comparison Feature	Compare alcohol prices at local stores or delivery services.	8	Future		Users wanted to save money by finding the best deals.	Users can view price comparisons for alcohol in their area.
UI-20	Morning Recovery Tips	Provide tips for the next morning based on alcohol consumption.	3	Future		Users wanted advice to recover after a night of drinking.	Tips appear the next morning based on the previous night's alcohol levels.
UI-21	Predict Wait Times & Crowds	Use historical data to estimate wait times and crowd sizes at different hours.	8	Future		Users wanted insight into when bars are less crowded.	The app accurately displays estimated wait times and crowd levels.

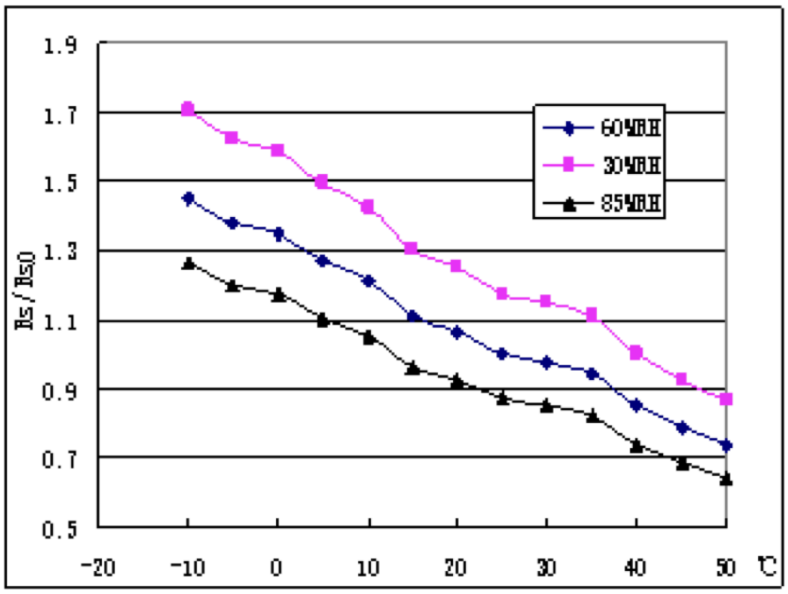
UI-22	Public Transit Integration	Provide public transit options for users relying on transportation after drinking.	5	Future		Users wanted safe and reliable transportation options.	Users can view nearby public transit options and schedules.

F. COMPUTER SIMULATION PLAN

The MQ3 - Analog Alcohol Sensor is a sensor that calculates the alcohol level in the air and thus can be used as a breathalyzer. It produces an analog output voltage when it is used that can then be converted into a mg/L alcohol concentration by first finding the Rs/R0 ratio, where Rs is the resistance value when the sensor is exposed to air that is filled with alcohol particles and R0 is the resistance value when the sensor is exposed to clean air. This sensor is difficult to work with because its output values can fluctuate a lot depending on the temperature and humidity. Another factor to take into account is the noise produced by the sensor which fluctuates the output values as well.

Thus, it would be interesting to proceed to a detailed design simulation to determine the actual accuracy of the MQ3 sensor based on the temperature, the humidity and the possible noise of the sensor and determine if this sensor will actually provide reliable alcohol concentration data to university students.

In order to do that, we will be using a mathematical model based on the temperature and humidity characteristics (how they fluctuate the Rs/R0 value) obtained from the sensor's manual. The following figure presents how the Rs/R0 value fluctuates when exposed to different temperatures and humidities:



For the noise, we will be using empirical studies on the noise a sensor can generate and add it to the mathematical model.

In order to implement and test the mathematical model, we will be using a programming language like MatLab or Python. The goal will be to determine an expected value of alcohol concentration and compare it with simulated values from the sensor. In order to do that, we will take this expected value and

apply the mathematical model on it for a set of different temperatures, humidities and noise levels. This way, we will know how the expected value fluctuates and changes based on temperature, humidity and noise factors. The result will be a simulated value from the sensor. Then, we will compare the simulated value and the expected value and determine the accuracy of the sensor and if it is reliable.

User Story

Card :

Title : Simulate MQ3 Sensor Accuracy Under Real-World Conditions (Temperature, Humidity, Noise)

As a developer/data scientist, I want to model and simulate how temperature, humidity, and sensor noise affect the MQ3's alcohol concentration readings, so that we can determine if the sensor is reliable enough for university students to use in our app.

Priority: High (Critical for MVP Validation)
Story Points: 8 (High complexity due to modeling, simulation, and analysis)
Epic: Sensor Reliability & Calibration

Conversation :

We will use the sensor's operational range from its datasheet to know which temperature and humidity ranges we should simulate. If it is unavailable, we will default to typical indoor/outdoor student environments.
We need to extract the Rs/R0 vs. temperature/humidity curves from the sensor's manual. We should use a mathematical model, like lookup tables, to approximate the relationship.
As a noise model, assume Gaussian white noise based on past studies. We will use a standard deviation derived from the sensor noise's specifications.
We will validate the simulation by comparing simulated outputs with lab data if available. If it is not, we should use theoretical alcohol concentration curves as theoretical values.
Should be done with python or MATLAB if the team has licenses.

Confirmation :

Mathematical Model:

- Model incorporates Rs/R0 vs. temperature/humidity curves from the sensor's manual.

- Noise is added as a distribution with configurable standard deviation. For example, +- 5 % of the signal.

Simulation options:

Code generates simulated sensor outputs for:

- 5+ temperature values. For example, 10°C, 20°C, 30°C, 40°C, 50°C.
- 5+ humidity values. For example, 30%, 50%, 70%, 90%.
- 3+ noise levels. For example, low, medium, high.

Accuracy Analysis:

- Error margins (experiment vs. theoretical values) are calculated as % deviation
- Results are visualized in graphs. For example, error vs. temperature or error vs. humidity.

Report:

- Conclusion explains whether the sensor meets the ±10% error threshold.
- Recommendations are provided. For example, “Sensor is unreliable above 40°C, we suggest hardware calibration”.

Reproducibility & Documentation:

- Code is version-controlled with a file explaining how to run simulations.
- Assumptions, like noise models, are documented.

G. ETHICAL DIMENSIONS

The safe alcohol consumption app raises several ethical concerns including the protection of users' data privacy, ensuring users provide informed consent before data collection, the risk of misuse by third parties and questions about the accuracy of the application which could create liability issues for developers.

Privacy and data security

The collection and storage of biometric data are an important matter and a primary concern of this application. The developers should always ensure robust data encryption as well as defining clear policies on the way data will be retained and deleted. Since the application will store blood alcohol content (BAC) levels, it is the developers' responsibility to make sure the users are protected from breaches and unauthorized access which could cause damage to users and diminish the developers reputation. Also, ensuring that users feel in control of their personal data is essential for us because as highlighted in a study by Kalckreuth & Feufel (2023): "perceived control over personal data clearly dispels privacy concerns and supports the relationship of trust between the user and the provider" [1].

Informed consent and user autonomy

Several studies have found that clear and well-communicated policies have higher user engagement and trust. [2] Therefore, users must be informed of how their data will be collected, stored and used in the scope of the application. Consent forms and procedures must be clear, transparent and straightforward. They must always allow users to opt-in or opt-out of specific features they do not wish to use. The application recommendations should never override the user's decisions.

Risk of misuse by third parties

In the case of a partnership with external services such as ride-sharing companies or with review websites, the potential risk of misuse of the user data by those companies increases significantly. In order to guarantee data safety for our users, it is necessary to enforce clear rules through strict data-sharing agreements. We must ensure that user information is only shared for the intended purpose. Users should never see any targeted ad through the app.

Accuracy and liability

The reliability of BAC readings is crucial in the development of the application. Incorrect results may lead to unnecessary restrictions or, more dangerously, to the failure of prevention of risky situations.

Liability concern could arise if users follow the application recommendation and still encounter harm. The limitation of the sensor must clearly be stated through disclaimers, to ensure that the users have the necessary information about the potential inaccuracies.

In conclusion, the safe alcohol consumption app can promote responsible drinking but it must be done with great ethical consideration. To gain user's trust, the developers must ensure privacy and data security, obtain informed consent, prevent misuse by third parties and be transparent about the inaccuracies of the application.

H. TEAM BLOG

See attached document.

I. Faculty Of Engineering And Computer Science Expectations Of Originality

This form sets out the requirements for originality for work submitted by students in the Faculty of Engineering and Computer Science. Submissions such as assignments, lab reports, project reports, computer programs and take-home exams must conform to the requirements stated on this form and to the Academic Code of Conduct. The course outline may stipulate additional requirements for the course.

1. Your submissions must be your own original work. Group submissions must be the original work of the students in the group.
2. Direct quotations must not exceed 5% of the content of a report, must be enclosed in quotation marks, and must be attributed to the source by a numerical reference citation[1]. Note that engineering reports rarely contain direct quotations.
3. Material paraphrased or taken from a source must be attributed to the source by a numerical reference citation.
4. Text that is inserted from a web site must be enclosed in quotation marks and attributed to the web site by numerical reference citation.
5. Drawings, diagrams, photos, maps or other visual material taken from a source must be attributed to that source by a numerical reference citation.
6. No part of any assignment, lab report or project report submitted for this course can be submitted for any other course.
7. In preparing your submissions, the work of other past or present students cannot be consulted, used, copied, paraphrased or relied upon in any manner whatsoever.
8. Your submissions must consist entirely of your own or your group's ideas, observations, calculations, information and conclusions, except for statements attributed to sources by numerical citation.
9. Your submissions cannot be edited or revised by any other student.
10. For lab reports, the data must be obtained from your own or your lab group's experimental work.
11. For software, the code must be composed by you or by the group submitting the work, except for code that is attributed to its sources by numerical reference.

You must write one of the following statements on each piece of work that you submit: For individual work: **"I certify that this submission is my original work and meets the Faculty's Expectations of Originality",** with your signature, I.D. #, and the date.

For group work: **"We certify that this submission is the original work of members of the group and meets the Faculty's Expectations of Originality",** with the signatures and I.D. #s of all the team members and the date.

A signed copy of this form must be submitted to the instructor at the beginning of the semester in each course.

I certify that I have read the requirements set out on this form, and that I am aware of these requirements. I certify that all the work I will submit for this course will comply with these requirements and with additional requirements stated in the course outline.

Course Number: __COEN/ELEC 390__ Instructor: __Dr. William E. Lynch__ Date: __Feb 13th, 2025__

Name: Mik Driver I.D. # 40244456 Signature: 

Name: Liyan Al-mosaria I.D. # 40251099 Signature: Liyan Al-Mosaria

Name: Sem Axil Raïs I.D. # 40113324 Signature: 

Name: Hawa Diallo I.D. # 40101524 Signature: 

Name: Vincent Nguyen I.D. # 40246406 Signature:Vincent Nguyen

Name: Nadir Chetouani I.D. # 40253921 Signature: Nadir Chetouani

J. REFERENCES

[1] Kalckreuth, N. von, & Feufel, M. A. (2023). Extending the Privacy Calculus to the mHealth Domain: Survey Study on the Intention to Use mHealth Apps in Germany. *JMIR Human Factors*, *10*(1), e45503. https://doi.org/10.2196/45503

[2] Vitak, J., & Shilton, K. (2020). Trust, Privacy and Security, and Accessibility Considerations When Conducting Mobile Technologies Research With Older Adults. In *Mobile Technology for Adaptive Aging: Proceedings of a Workshop*. National Academies Press (US). https://www.ncbi.nlm.nih.gov/books/NBK563116/

Team Members		
First Name	Last Name	Nickname (max 6 characters)
Mik	Driver	Mik
Liyan	Al-mosaria	LA
Hawa	Diallo	HD
Vincent	Nguyen	VN
Nadir	Chetouani	NC
Sem Axil	Rais	SAR

Activities Table

Date	Who						Type of Activty	Number of hourse spent	Purpose	Output	Hours spent						
	Mik	LA	HD	VN	NC	SAR					Mik	LA	HD	VN	NC	SAR	
Milestone 1																	
29-Jan-25	1	1	1	1	1	1	Virtual Meeting	1.5	Define opportunity statements, evaluation, ranking	Write opportunity statements, evaluated and ranked them	1.5	1.5	1.5	1.5	1.5	1.5	
30-Jan-25	1	1	1	1	1	1	Work at home	1	Set mission statement	Write mission statement	1	1	1	1	1	1	
1-Feb-25	1	1	1	1	0	1	Virtual Meeting	1.5	Review mission statement, ASPF, Team Blog	Completed mission statement, ASPF, Team Blog	1.5	1.5	1.5	1.5	0	1.5	
										Total hours	4	4	4	4	2.5	4	
										Total team hours	22.5						
Milestone 2																	
6-Feb-25	1	1	1	1	1	1	*Virtual Meeting*	0.5	Separate tasks for Milestone 2	Separated tasks, planned next meeting	0.5	0.5	0.5	0.5	0.5	0.5	
8-Feb-25	1	1	0	0	0	0	Virtual Call	3	Writing the interview script	Completed interview script	3	3	0	0	0	0	
9-Feb-25	1	1	1	1	1	1	*Virtual Meeting*	1	Conducting Interview 1	Completed interview 1 and wrote key takeaways	1	1	1	1	1	1	
9-Feb-25	1	1	1	1	1	1	*Virtual Meeting*	1	Conducting interview 2	Completed interview 2 and wrote key takeaways	1	1	1	1	1	1	
10-Feb-25	0	0	0	0	1	1	Work at home	3	Computer Simulation Plan	Completed Computer Simulation Plan	0	0	0	0	3	3	
11-Feb-25	0	0	1	0	0	0	Work at home	3.5	Ethical Dimensions	Completed Ethical Dimensions	0	0	3.5	0	0	0	
13-Feb-25	1	1	0	0	0	0	Work at home	0.5	Info on Stakeholders	Completed Information on stakeholders and assembled all work to submit for Milestone 2	0.5	0.5	0	0	0	0	
12-Feb-25	1	0	0	1	0	0	Work at home	2.5	Product Backlog	Completed Product Backlog	0.2	0	0	3	0	0	
										Total hours	6.2	6	6	5.5	5.5	5.5	
										Total team hours	34.7						