Notes From Client Meeting September 20, 2024

Company located in india and the states

Shabodi connects multiple components in a network to applications to make them available for developers.

Network API's is their specialty

Their product NetAware → programmable network platform

Beliefs:

- Networks are intelligent assets
- Network-aware applications are game changers (What are going to be developing)
- Network-awareness benefits all stakeholders

Less focused on the consumer's side of things and more interested in enterprise applications.

Goals:

- Create fully functioning, viable network-aware applications
- Leveraging Shadobi's NetAware programmable network platform
- From Shadobi's Developer Sandbox
- To deliver a unique outcome or experience
- By controlling network resources

They are currently working on automated factory lines without human interaction. (AI powered)

Application → API's and Network → request. NetAware work in between them

"The most valuable asset an application developer has is time. That asset should be spent solving real world issues."

- Cloud-ready
- Demonstrable
- Uses at least 2 NetAware API's
- Controls a device
- Aligned to one of the four themes

- Key design decisions and outcomes documented

Network : the network within our sandbox, a private network (wifi and 5G)

Private networks have a bandwidth limit. (what entreprises and universities have)

Public Network is what is available at all times. Bell and Roger 5G or 4G which are subscription based with a SIM.

Q & A

What do you absolutely not want to see?

Does not want to see a zoom app, not just one API. Needs action in action out.

What are you looking for for the users?

In short, functional because UX takes a lot of time and iterations. Mainly utilitarian uses and not tons of time on fancy widgets → always import that fancy stuff later.

How long do you want these products? Short term or long term?

Get some showcase applications to display network awareness. Even if it's a snippet to show its capability, that's great. Software is never done.

Quality that stands out from past projects that you would want to see again?

Coming up with real nuggets of, solving real problems that are adaptable. Not monolithic applications → hard to maintain, to create and slow to put out. Best thing is microservices technology that you can swap out and use in other places.

Why are you willing to work with uOttawa with little experience? Why would this be a good choice?

We've done a few projects with them and they've gone well and uOttawa is a high class institution. As well, students are like a clean slate. You look at this in a different way. Engineers solve problems so you have a teaching mindset to find different ways. It is more of a search for ideas than a coding based problem.

Which of these technologies will be the most prominent in the 4 years?

SIM swap fraud is intense now. They want to get rid of OTP and use SIM swap. Lots of companies are working on it now.

Both glasses are going to be huge. Facial recognition, biometric will become a lot more prominent. Especially since the cost to send people around the world is so expensive this will be a real alternative.

Restricted zone alert is a problem today. We need an AI way to make it happen. Stop the chance for bribing, and stopping people from getting in where they're supposed to be.

What is the biggest challenge with these projects and API's?

Really understanding what an API is and how to use it. How do you create and what's the actual end problem you're trying to solve while using the network. Knowing what the network can do and what it does.

Since the code is pre existing, how much code should we have?

You are making a product. You are using a platform with a bunch of API's and we want you to think about the application of these and the experience it delivers.

Who are your intended users?

The applications intended for users are wherever it applies. A gaming company, a manufacturing company, a drone company can all be users since we are focusing on enterprise users and not single clients. We do B to B (business to business).

If a network cannot be reached, what should our project do?

It should have the same capability but the intelligence won't be present.

Is there a difference between the two HQ you have and is there a difference with your different clients abroad and the network they can use?

Most regions are generally the same but bandwidth can vary. So in the US they basically have the same as in Canada but in the US they also have a citizen band which basically is for playing around and business for their own private network. When we do

testing of our devices we need to be aware of the laws. In Europe they use different frequencies so it's the same technology but applied differently everywhere.

- Company name: Shabodi
    - Startup housed out of Mississauga
- API: application programmable interface
    - What we'll be using
- Shabodi delivers platform that makes different components accessible in a network available to application developers
    - Connects applications to network
- Our goal is to develop a network aware application
- Focused more on the enterprise side of consumers
    - Such as manufacturing, mining, sports and entertainment
- Automated Technology
- Application programmers not network programmers
- Network-aware application
- Sandbox environment
    - Develop application and utilize tools in the shabodi sandbox
- Sim fraud
    - Enterprise 5G
    - Detect and notify admin of a SIM swap
    - APIs used include SIM Swap, Location and Bandwidth
- Restricted Zone Alert
    - Detect and notify when a UE travels into a restricted zone for that UE
    - Provide ability to define restricted zones with specific areas
    - Map UEs into specific permitted and restricted zones
    - Upon detecting restricted zone provide visible and audible alerts
    - APIs used include Location, Bandwidth
- Smart Glass
    - Consumer Public 5G
    - Visually impaired person uses to assist in navigation and complete daily tasks
    - Provide visual and or audio guidance
    - Use bandwidth, jitter, latency, location and insights APIs
- Remote Mentor
    - Enterprise 5G
    - AI system to relay information to help with task
    - Gives continuous feedback during task
    - Video and audio inputs/outputs across 5G/Wifi network

    - Application should be able to control network resources allowing for multiple hi def, hi priority tasks
    - APIs used …
- Our task/goal
    - Cloud ready
    - Demonstrable
    - Uses at least 2 NetAware APIs
    - Controls a device
    - Aligned to one of four themes
    - Key design decisions and outcomes documented

Q/A

- No zoom application
- Looking more for utilitarian user experience
    - Functionally most important
- Wants applications that they can put in sandbox to demonstrate capability of network applications

Start up company from Mississauga
Multi national
API is a way for two pieces of software to connect
We will be using APIs
Shabodi makes different components and a network with those
Connect applications to networks
Giving the power of the network to the application developers to give a better experience
Network-aware application
Network-awareness benefits everyone
Non-consumer focused
Enterprise focused
Mining, manufacturing, airports, entertainment, the big industries
Automated vehicles
Create fully functioning, viable network-aware application
Developer sandbox
Deliver a unique outcome or experience
Outcome: Non-human
Experience: Human

Applicative programmers
Pro-active network applications
Middleman of Network to application to streamline experience
Create the application and utilize the sandbox

Sim - Avoid fraud and people stealing information
Develop an application that will detect a change in the device, when the application is triggered, it will shut the sim off

Restricted zone - As soon as a device is in an area, the admin is alerted

Smart glass - Help visually impaired

Remote mentor - have access to anyone or information in a moments' notice, from a far distance

Bandwidth - Amount of data that can be transferred at any given time
Jitter - Uncertainty of time and exact information quality
Latency - Lag

Example of restricted zone - Getting someone into where they should be going

Mobile mentor - Problem with a plane, they get the repair done from far away by using photos and ai.

Outcome: Build an application that is cloud-ready and uses at least network API, controls a device
Key designs documented

Q&A:
-Getting something from the network and getting to the Network
-Functional: The big utilitarian idea. Not fancy
-Showcase applications to show the power of network-aware applications. i.e. Short term value for a long term goal. Application is not the goal. Network connect is?
-Qualities of true value are coming up with simple but important solutions. Best outcomes come out of looking at the key-components. Goal is to try to write a 'hello world' API, nothing monolithic.
-Sim swap fraud is hot right now. Top goal is getting rid of financial fraud. The two smart glasses are future-huge. Costs of traveling for no reason. Zone alert, trying to get people to not get into places where they shouldn't be and keeping things where they need to stay.
-Making an actual product, integrating a platform, application is the user experience
-There are different points we have to take into account when testing, we can not have open testing as Canada does not have any open public frequencies.

Criteria:

- Location accuracy
- Detection accuracy
- Deterrence / Effective alerts
- Reliability
- Cheaper than the average security system
- Time for scanning / entrance / leaving
- Easy to implement
- Intuitive

Chosen Product: Zone restriction Alert

Client Needs

- An API capable of being put in multiple situations
- Cloud-ready
- Demonstrable
- Uses at least 2 NetAware API's
- Controls a device
- Key design decisions and outcomes documented
- Create fully functioning, viable network-aware applications
- From Shadobi's Developer Sandbox
- To deliver a unique outcome or experience
- Application controlling network resources
- Long lasting

Product Specific

- Identify personnel and UE
- Give an appropriate warning to security if bypassed
- Works on 5G
- Reduce security breaches

Needs categorized:

Network-aware application:

- From Shadobi's Developer Sandbox
- Uses at least 2 Net-Aware API's
- Create fully functioning, viable network-aware applications
- An API capable of being put in multiple situations
- Cloud-ready
- Application controlling network resources

Security:

- Identify personnel and UE
- Reduce security breaches
- Give an appropriate warning to security if bypassed

Technical Capabilities:

- Works on 5G
- Long lasting
- Replicable
- Controls a device
- Demonstrable

Documentation

- Key design decisions and outcomes documented

Needs prioritized:

1. Network aware applications
2. Security
3. Documentation
4. Technical Capabilities

Problem Statement

Create an API with Shadobi's Developer Sandbox capable of restricting access to certain personnel and devices within a given area of an enterprise giving a warning if bypassed.

Benchmarking

-Zone Safe is a safety company that offers a Restricted-zone-like alert system that is ideally used to caution factory workers by offering alerts when floor workers come into close contact with machinery such as forklifts.

-Amber alerts are uniform alerts sent over a large area to multiple different devices (mostly targeted towards cell phones) which alerts the public about a hazard.

-Many at-home security systems include automatic alerts and detections, whether it be to the owner and/or the authorities.

-Key card by-pass systems allow an NFC chipped device to allow a user to pass a terminal (usually some sort of gate). This has been implemented in bus and train terminals along with amusement parks and dining halls.

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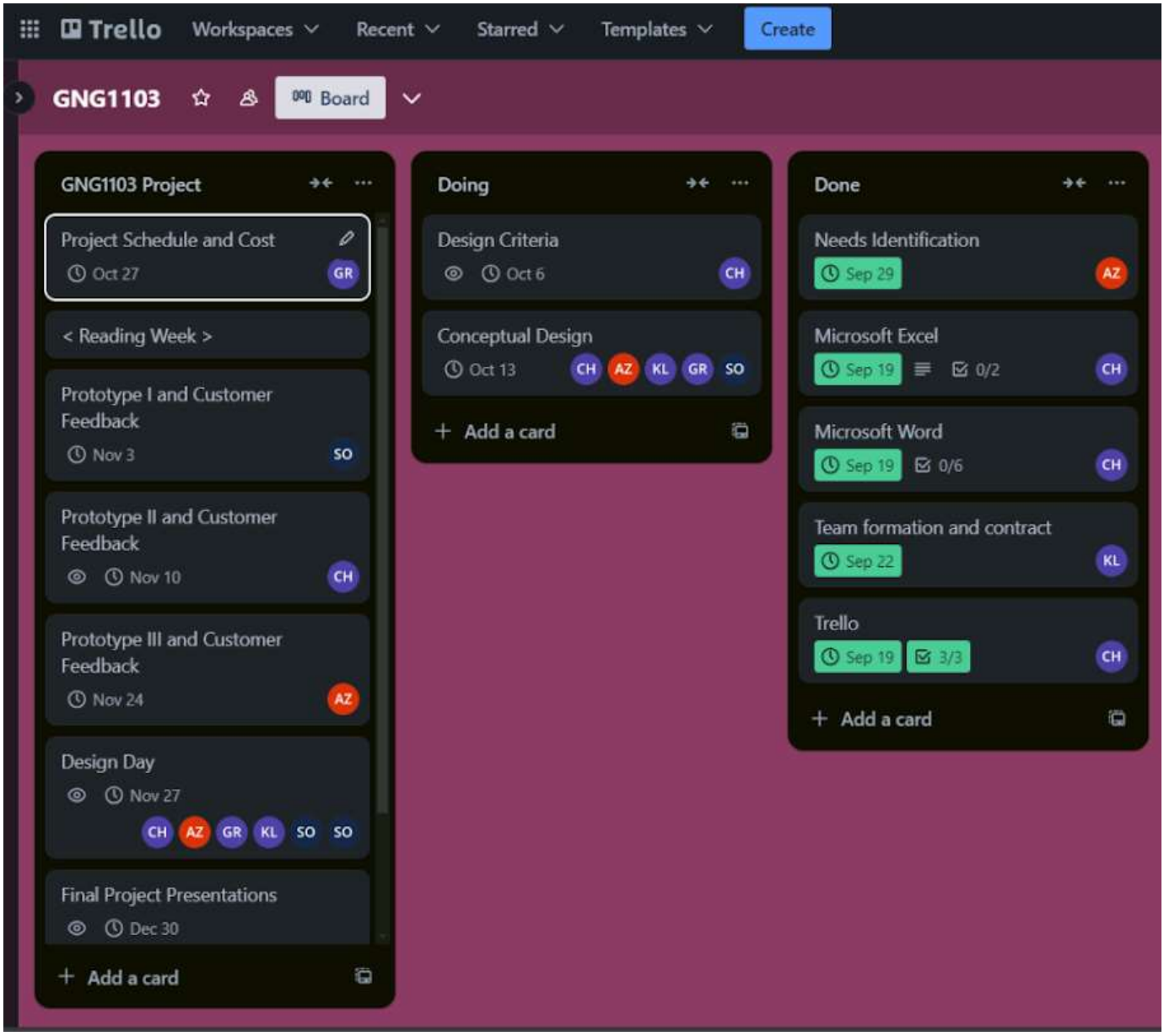
Task plan update:



Project Deliverable C

Updated needs missing from deliverable B:

- Tracking breach count and information related to them
- Data storage of authorized personnel

Criteria:

- Location accuracy measured in meters
- Detection accuracy measured in seconds
- Captivating alert system at the breach tested with sound comparison survey
- Notify administrator tested by alert comparison survey (ie. notification, call, alarm, etc)
- Reliability (how long it stays on and failure rate)
- Cheaper than the average security system
- Time needed for authorized persons to enter or exit
- Programme adaptability and expandability
- Intuitive measured in time for someone to understand how to use it and understand the documentation
- Able to recognize authorized persons measured in number of accounts stored
- Tracking breach count measured in detail given (time, location, person, etc.)
- Number of authorized persons allowed to pass is measured in the number of accounts stored.

Functional	Non-Functional
• Location accuracy measured in meters • Detection accuracy measured in seconds • Captivating alert system at the breach tested with sound comparison survey • Notify administrator tested by alert comparison survey (ie. notification, call, alarm, etc) • Able to recognize authorized persons measured in number of accounts stored • Tracking breach count measured in detail given (time, location, person, etc.)	• Reliability (how long it stays on and failure rate) • Cheaper than the average security system • Time needed for authorized persons to enter or exit • Programme adaptability and expandability • Intuitive measured in time for someone to understand how to use it and understand the documentation

• Number of authorized persons allowed to pass is measured in the number of accounts stored.	

Prioritized Criterias:
Each paragraph explains the placement for each criterion and its importance in each list starting with position one.

Non Functional:

For evaluating non-functional criteria, Shabodi has claimed that they primarily want an API that can be used for their sandbox and as an example for display rather than functionality of a final product. This means an adaptable programme which can be clearly understood is the main goal.

Shabodi discussed how the reliability of the API will be important for its use; however, it does not have to have 100% functionality and efficiency. Based on recent-previous research conducted[1], it is found that businesses usually prioritize lower costs over employee convenience.

Functional:

For evaluating functional criteria, we are basing our criteria from the values and priorities of other security companies. Detection Technologies[2] state that most security systems overlook the detection system and how without detection no alarm or other system can be triggered making location and detection the main priorities.

Shabodi has explicitly declared that the administrator needs to be notified rather than an on site alarm.

The protection service requires authorized people in as well as keep intruders out. The reliance on the accuracy of knowing when an intruder enters and an authorized person plays a role again in the importance of detection and the core of a security system.

In the list of priorities given from Shabodi's presentation, the system needs to record and keep information on each breach to be used for investigation purposes. This

[1] Gartner. (2024, May 22). Gartner CEO survey finds growth is the top business priority for 2024, reaching highest level in 10 years. Gartner. https://www.gartner.com/en/newsroom/press-releases/2024-05-22-gartner-ceo-survey-finds-growth-is-the-top-business-priority-for-2024--reaching-highest-level-in-10-years

[2] Forsyth, C. (n.d.). The four elements which form an effective security system. Blog.detection-Technologies.com. https://blog.detection-technologies.com/the-four-elements-which-form-an-effective-security-system

criterion has priority over an on site alarm as they stated that it “can trigger audible alarms if necessary”[3] and is an optional feature for this specific system.

Based on all the other criteria we can see that running the number of accounts stored is less important than all the others due to its low standing in terms of protection, detection and alarm.

Functional	Non-Functional
1. Location accuracy measured in meters 2. Detection accuracy measured in seconds 3. Notify administrator tested by alert comparison survey (ie. notification, call, alarm, etc) 4. Able to recognize authorized persons measured in rate of success. 5. Tracking breach count measured in detail given (time, location, person, etc.) 6. Captivating alert system at the breach tested with sound comparison survey 7. Number of authorized persons allowed to pass is measured in the number of accounts stored.	1. Programme adaptability and expandability. 2. Intuitive measured in time for someone to understand how to use it and understand the documentation. 3. Reliability (how long it stays on and failure rate) 4. Cheaper than the average security system. 5. Time needed for authorized persons to enter or exit.

[3] *Advanced Network Applications* | *MakerRepo*. (2024). Makerepo.com. https://makerepo.com/project_proposals/472.advanced-network-applications

Conceptual Design

Gustin Rickards, Annie Zhao, Salem Osawere, Cedric Hoedl & Keaton Luttrell

October 13, 2024

Abstract

This is an analysis and ranking of design concepts for the zone restriction alert based on our problem statement, user and technical benchmarking, and a list of prioritized design criteria.

Table of Contents

1 Introduction

This technical report elaborates the concept designs generated from our team, GASCK, for our client Shabodi regarding the creation of a restriction zone alert system. An API will be designed with Shadobi's Developer Sandbox capable of restricting access to certain user's equipment (UE) within a given area of an enterprise emitting a warning if bypassed. Additionally, it needs to track the location, time and notify an administrator when breached storing this information for future investigations.

1.1 Client's Central Message

Shabodi stands by producing net-aware applications using API to help innovate the network industry on all levels. They highlight their Developer Sandbox which allows others to easily create new applications. This reduces developpement time and allows a more widespread availability for net-aware applications used in businesses.

2 Conceptual Designs

2.1 Area Determination Method

This describes the general form of the restriction zone and how precise it will be able to capture information within its zone.

2.2 Passability

This determines the simplicity for authorized persons and UE to enter and leave the zone safely as well as the likelihood of the system getting breached. (ie. how secure it is.)

2.3 Reaction

The reaction that takes place after the software is triggered by someone or something passing through the system without authorization as well as the knowledge on the whereabouts of the UE currently within the zone.

3 Generated Concepts

3.1 Isolated Entry Point(s) (Cedric)

The isolated entry point consists of a gate using biometric features to scan and validate the authorization of users entering the premises tracking who has entered, when they have entered, and when they have left. The doors will open if the scans are within the programs database otherwise it will deny access informing the user that their information is not currently stored. To counteract breaches, sensors line above the retractable doors sensing if someone hops over them emitting an alarm and informing the administrator as well as tracking the time and which entrance branched.

3.1.1 - Area Determination Method:

This concept is to be put in every possible entrance way to assure the zone is restricted. It acts like a checkpoint needing to be bypassed to enter the restricted zone. If multiple entrances exist, the system will be able to detect who has entered from which gate at a specific time as well as when they have left and from which gate.

3.1.2 - Passability:

This gate system forces single file lines to be created and time required to scan and analyze data before entering and leaving in order to keep track of persons within the restrictive zone. This will take similar time to scanning a keycard or a security guard letting you in. In terms of breach, the alarm system is only made for the gates meaning an individual accessing the area from around the gates, for example, a window or non secured back door, will not launch any alarm or system warning. A more thoughtful implementation is required in order to guarantee that every entrance is secure and only accessible via the gate system. It must also be considered that once the door is activated it may be possible for someone else to quickly follow the first person and infiltrate the system.

3.1.3 - Reaction:

As previously mentioned, the triggering system activates when someone crosses the gate when an approval has not been matched. It will detonate an alarm at the gates, the time it was breached as well as inform an administrator. This system will not be able to give a constant update on the breach but by needing to scan your biometric to exit, the alarm will also trigger if they attempt to flee, tracking their exit location and the time of extraction. This is useful information for future investigation but may lack in detail as to where the perpetrator was within the restrictive zone.

3.2 Carpet Scanner (Gustin & Keaton)

The carpet scanner is an installed physical flooring that acts as a tracking device across its entire surface. Its main design would be for both floor workers and machinery. This would allow free movement without any gates and perimeter checks. However, if a person or machine is detected either within too close of range of each other or without authorization, the system

would trip. This causes both an alarm to trigger and mobile machinery to become stationary until deactivated.

3.2.1 - Area Determination Method:

The carpet is a fully electro-mechanical unit which can be as large or as small as needed. This allows size and spacing to be fully customizable, including material type to suit whatever environment it is required in. The carpet is then connected to the software hub which can track whomever is inside and what they are doing.

3.2.2 - Passability:

The basic idea for passability on the carpet is so that anyone can freely walk on and off it without entry or exit points. It has uniform sensors detecting motion utilizing the change in weight that it experiences when traveled upon. The system will only be triggered when someone is crossing during unauthorized times, or if mobile-machinery gets in close contact with floor personnel in order to prevent an incident. The safety of this design may be expanded upon by the co-utilization of an authorization system, ensuring that specific personnel and machinery on the floor is allowed to operate there at that time.

3.2.3 - Reaction:

The carpet scanner will have two main reactions when tripped. The primary reaction will be an alarm that gets set off, warning that others are on the floor at that moment: this can be deactivated by walking off the floor. The secondary reaction is that all mobile-machinery (such as forklifts) will be automatically turned off. This ensures the safety of personnel on the floor as well as operators. The deactivated machinery will be able to be reactivated either when the personnel is once again at safe distance, or when the unauthorized person(s) is off the carpet.

3.3 Entry Perimeter Line (Salem & Annie)

The Entry Perimeter Line consists of a line sensor around a certain area. It tracks people around the points of the perimeter. It allows for free entry in and out of the perimeter, detects persons/machinery passing over it and declares an alarm if an intruder crosses the perimeter line alerting the administrator for rapid response.

3.3.1 - Area Determination Method:

It serves as the boundary around a restricted area, using a customizable line sensor to define the perimeter. When crossed, the sensor detects the IDs of individuals, enabling precise tracking of entry and exit points. This system provides seamless monitoring of movement, ensuring security while allowing flexibility in the area's configuration.

3.3.2 - Passability:

The goal is to achieve optimal passability without requiring any manual scans. The system detects unique signals or waves emitted by authorized identification devices like biometric markers, allowing seamless passage through the perimeter. Authorized individuals can move freely without delay, while unauthorized persons are immediately detected and addressed, ensuring both security and efficient movement.

3.3.3 - Reaction:

When the security system is triggered the main reaction is the noise from the alarm which warns the assailant that they have crossed a restricted zone line, the second action is to record and report the breach when they enter or exit to the proper authorities. This allows for a smoother investigation process. If any autonomous vehicles are present within the perimeter, they will also temporarily shut down to negate the risk of potential accidents.

3.4 Area Alert and Entry Points (GASCK idea)

The Area Alert and Entry Points uses a combination of the Carpet Scanner and Isolated Entry Points. A physical flooring, installed in the designated area, along with a gate or gates, installed at the perimeter, will be used to detect any unauthorized personnel or machinery. This design's goal is to create the highest level of security. It is made to minimize the possibility of any breaches and maximize tracking of the intruder if it occurs.

3.4.1 - Area Determination Method:

The area is determined mainly through the use of the physical carpet similar to concept 3.2. The entry points or gates are installed afterwards along the perimeter of the area, wherever it is needed. This funnels the entrance and exits to more precise areas and eases the tracking for the direction of an intruder.

3.4.2 - Passability:

The downside for passability for this design, like the entry points, is that it is time consuming compared to the perimeter line and carpet scanner, since each individual entering the area will need to manually "check-in" before they can enter. This may create delays since personnel and

machinery cannot freely enter and exit. However, the advantages for this design is that it is very difficult for unauthorized personnel to enter the area. If they manage to bypass the physical gate undetected, they will immediately be detected afterwards by the carpet scanner.

3.4.3 - Reaction:

If an unauthorized individual breaches the area, first the gate they entered through will trigger an alarm providing the location and time of entry. Afterwards, the carpet scanner will also trigger and provide updated information about the current location of the person(s) who entered.

4 Evaluating the Concepts

Poor	Okay	Great
1	2	3

4.1 Area Determination Method:

Criteria	Isolated Entry Point(s)	Carpet Scanner	Entry Perimeter Line	Area Alert Zone and Entry Point
Cost	**3**	**1**	**2**	**1**
Easy to Implement	**3**	**2**	**2**	**2**
Ability to track location	**1**	**3**	**2**	**3**
Detection accuracy	**1**	**3**	**2**	**3**
Total	**8**	**9**	**8**	**9**

4.2 Passability:

Criteria	Isolated Entry Point(s)	Carpet Scanner	Entry Perimeter Line	Area Alert Zone and Entry Point
Cost	**2**	**1**	**3**	**1**

Time to enter / leave	**2**	**3**	**3**	**2**
Ease of breach	**1**	**1**	**2**	**2**
Proper UE detected	**2**	**3**	**2**	**3**
Total	**7**	**8**	**10**	**8**

4.3 Reaction:

Criteria	Isolated Entry Point(s)	Carpet Scanner	Entry Perimeter Line	Area Alert Zone and Entry Point
Cost	**2**	**1**	**2**	**1**
Speed of action	**3**	**3**	**3**	**3**
# Information stored	**1**	**3**	**1**	**3**
Effectiveness	**2**	**2**	**2**	**2**
Deactivation method	**Not applicable**	**3**	**2**	**1**
Total	**8**	**12**	**10**	**10**

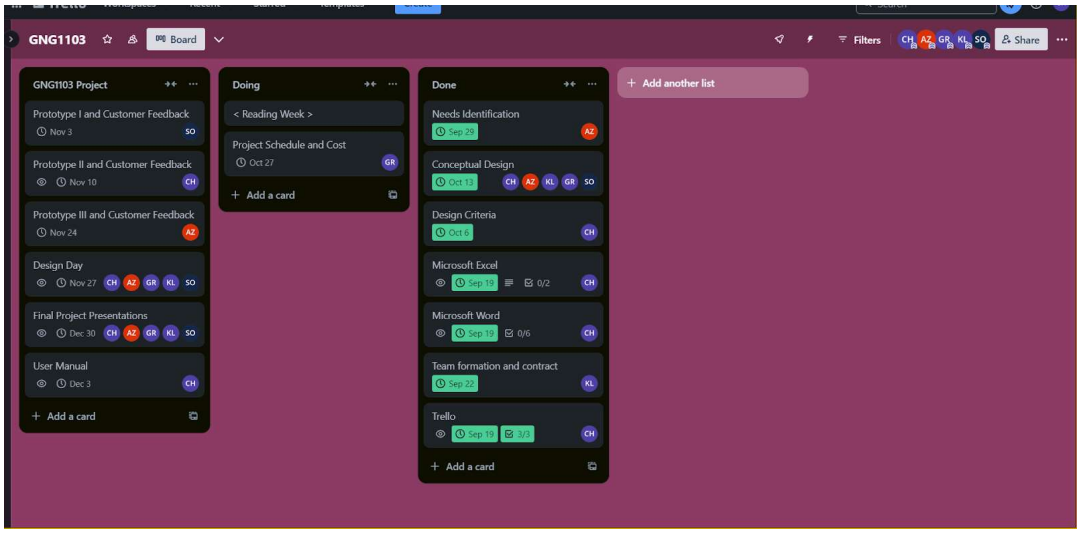
4.4 Final results:

	Isolated Entry Point(s)	Carpet Scanner	Entry Perimeter Line	Area Alert Zone and Entry Point
Area Determination Method	**8**	**9**	**8**	**9**
Passability	**7**	**8**	**10**	**8**
Reaction	**9**	**12**	**10**	**10**
Total	**24**	**29**	**28**	**27**

5 Conclusions and Recommendations

To conclude, after evaluating our concepts and evaluating them based on their subsystems which are then re-evaluated on different criteria, the highest scoring concept is the carpet scanner. This will be the idea used during the creation of the zone restriction alert API using Shabodi's designer sandbox.

6 Trello Update

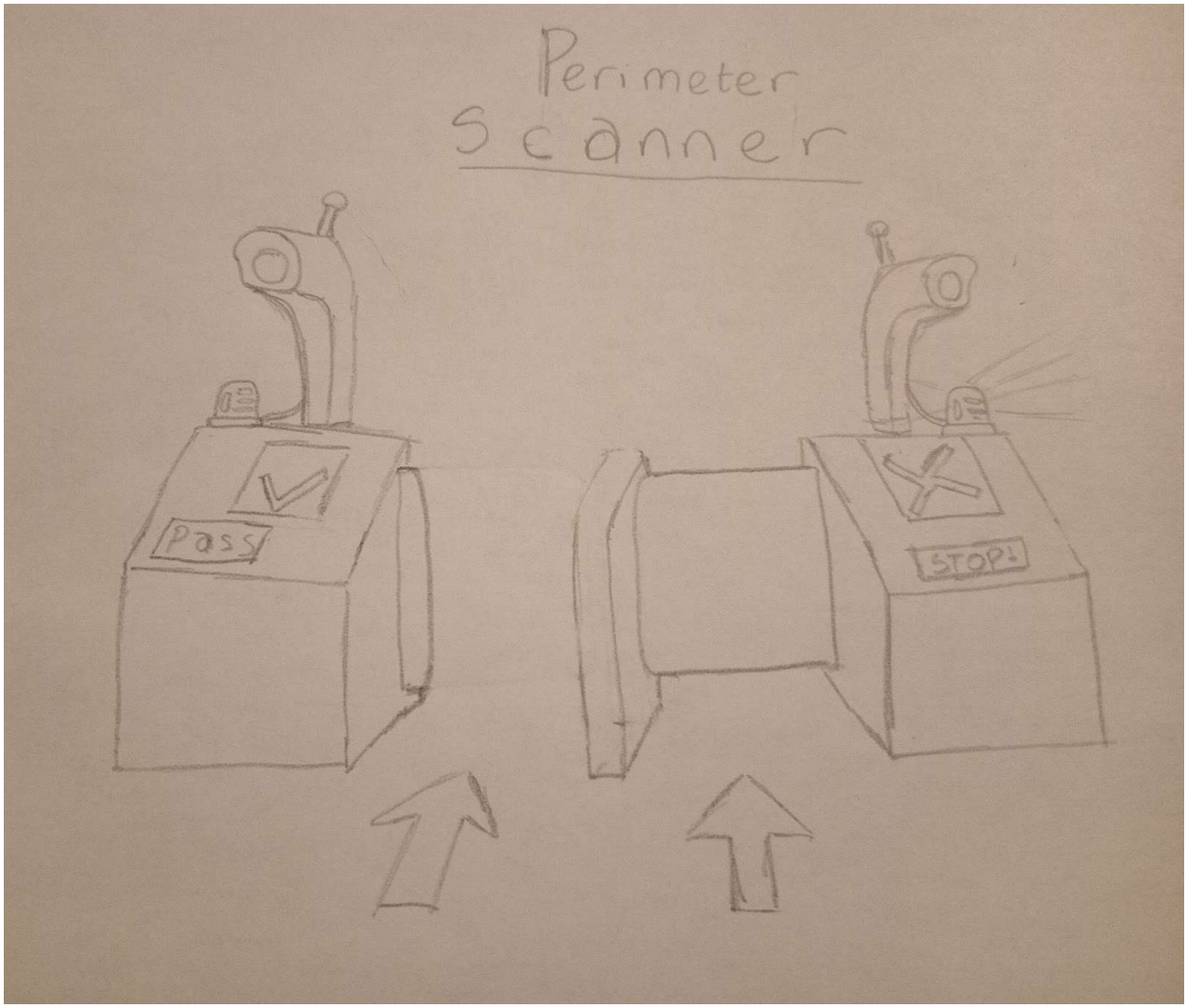


- [ ] Detailed design drawing
- [ ] Outline a plan
    - [ ] List of all tasks that need to be completed (include estimated duration and who is responsible)
    - [ ] List of significant risks and contingency plans
- [ ] Schedule for prototyping/testing solution to client needs
- [ ] BOM
- [ ] List of equipment
- [ ] Prototyping test plan
    - [ ] Include typical objectives
    - [ ] Define stopping criteria
    - [ ] Clear about what we are trying to measure; define acceptable fidelity

Project Deliverable E: Project Schedule and Cost

Introduction:
This report introduces the chosen concept that we will be using as well as three prototypes that will be created throughout the following weeks. Each one has its own respective bill of material (BOM). It will also consider potential project risks and an elaborate scheduling for each task.

Chosen Concept:
After receiving feedback from our client, we have decided to use our perimeter line alert system but with a few tweaks. Employees will use a face recognition system which will send a message to open the gates allowing entrance to the user. They will be tracked via a location API using a SIM card on their person. A message to the administrator will be sent out and an alarm will ring if a camera detects someone entering the zone without verification.



Bill of Materials (BOM):

Item #	Item Description	Quantity	Unit Price	Amount
1	Bandwidth API	1	$0	$0
2	Location API	1	$0	$0
3	Visual Code Studio	1	$0	$0
			Total	**$0**

Prototyping:

Test ID	Test Objective	Description of prototype used and a basic test method	Description of results to be recorded and how these results will be used	Estimated test duration and planned start date
1	Assuring the program can sort who to let in.	With code, a simulation of people will attempt to enter the zone and the code will return true or false if they are allowed to enter.	Every answer needs to be correct to assure that the program can follow the correct course of action following a scan.	Each test will take less than a second to do and will begin on November 1st until November 3rd.
2	Assure the code sends a signal to the administrator if breached or sends a message to the door if accepted.	An unauthorized person will enter the area and the code will detect a person entering without authorization and send a signal to the administrator.	The code needs to notify the administrator after each unauthorized entry.	Creation/testing period will be from the 28th to the 10th or until an accurate true/false reading can be given and send out a corresponding output (alarm/alert or green light representing a gate.)
3	Make sure the SIM card can be detected within the zone. (+/- 10cm)	A piece of code that detects the location of the SIM cards and identifies the card's unique ID.	The location needs to be exact within +/- 10 cm otherwise the test has failed. It will also need to make sure to identify the SIM ID so we can then combine our prototypes together to make the final product.	Testing should take 1 minute to do and it should take from the 10th to 28th.

Prototype I:

BOM:

Item #	Item Description	Quantity	Unit Price	Amount
1	Python random library	1	$0	0
2	Visual Code Studio Free Version	1	$0	0
			Total	**$0**

Prototype II:

BOM:

Item #	Item Description	Quantity	Unit Price	Amount
1	Free sound effect studio	1	$0	$0
2	Arduino	1	*$14	$14
3	Bread board	1	*$5	$5
4	Wires	5	*$1.44	$7.20
5	Lights	1	*$0.6	$1.2
6	Camera (phone)	1	$0	$0
			Total	**$27.4**

**** These materials can be used for free at the MakersLab***

Prototype III:

BOM:

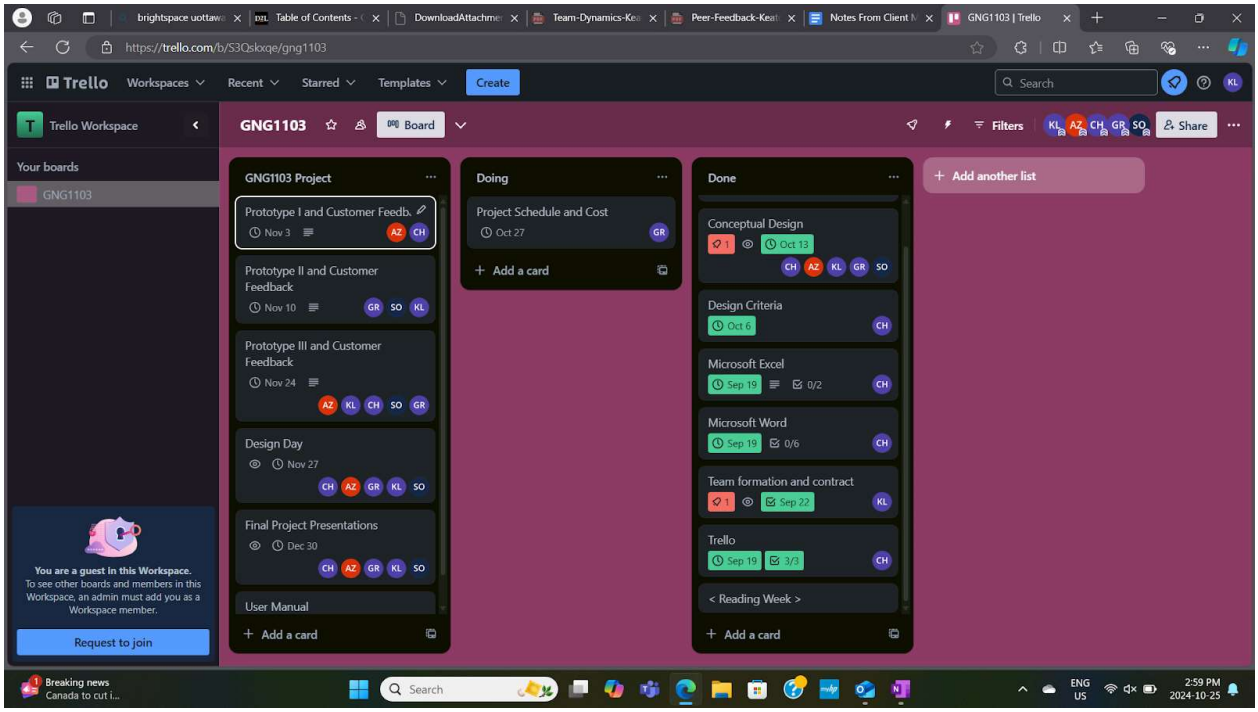
Item #	Item Description	Quantity	Unit Price	Amount
1	SIM card (cell phone)	2	*$0	$0
2	Bandwidth API	1	$0	$0
3	Location API	1	$0	$0
			Total	**$0**

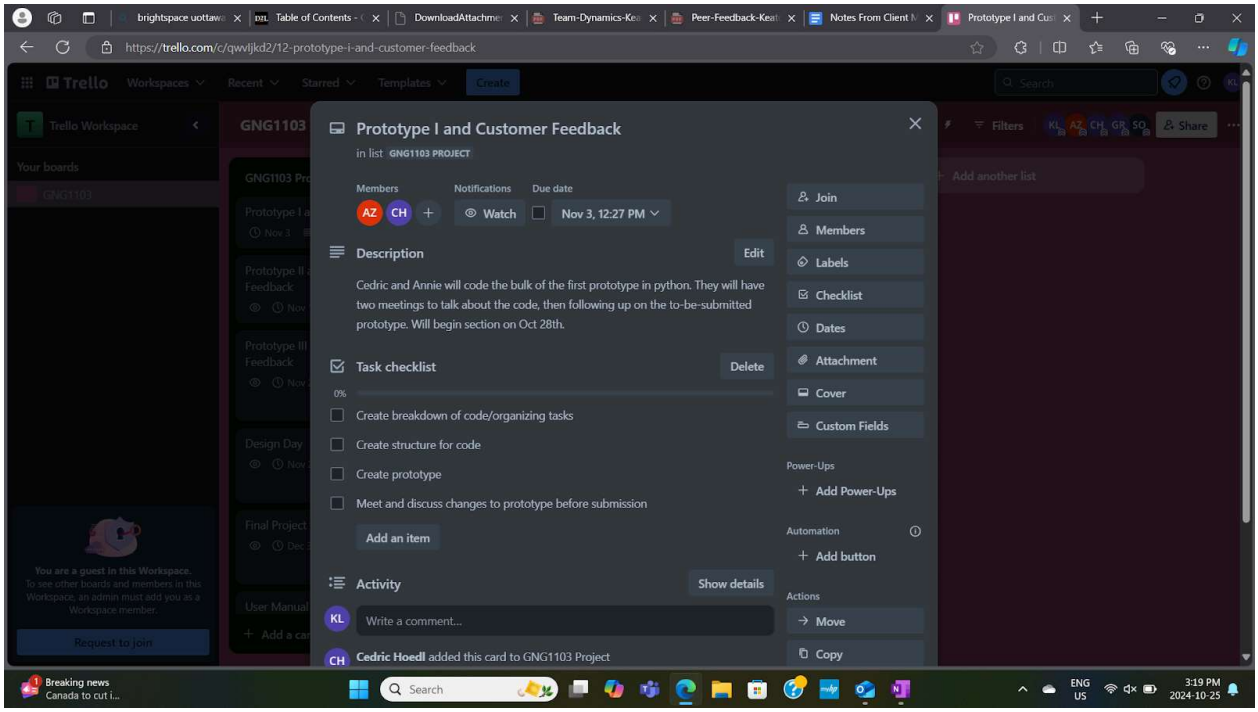
**** The SIM will be ones we already own (ie from our phones)***

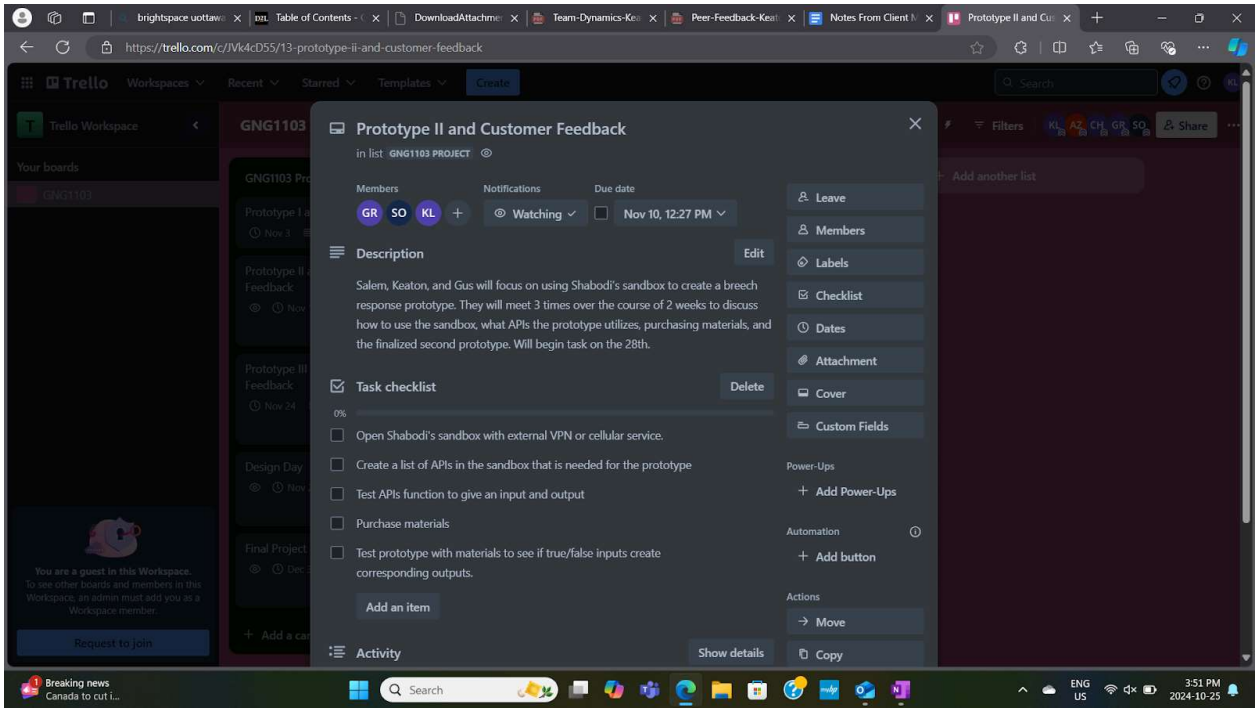
Potential Risk & Contingency Plans:

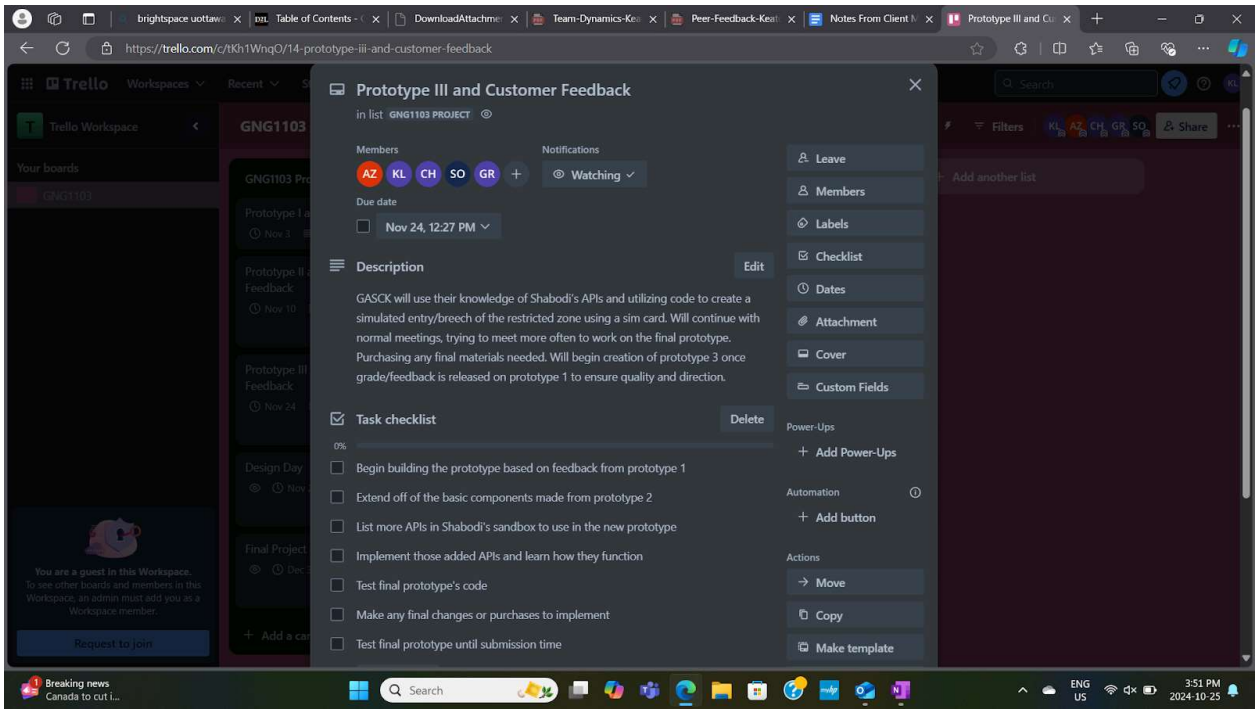
Potential Risks	Contingency Plans
System cannot connect to SIM card	Check for errors in API or code
Distance or location detection is inaccurate	Troubleshoot API, check for errors in API or code, contact Shabodi support team
Bandwidth is not enough to transport amount of information required by API for proper identification	Search for areas in the software that can be altered to increase bandwidth
API software issues	Contact Shabodi support team including details about specific issues, work ahead on other projects (ex. Presentations, deliverables, prototyping plans, etc.)
Errors with combining subsystems or APIs	Simplify APIs for easier incorporation
Cannot identify zone boundaries or inconsistent definition	Troubleshoot API, check for errors in API or code, contact Shabodi support team
Incorrectly identifies SIM card (ex. Allows prohibited SIMs and blocks allowed SIMs)	Troubleshoot API, check for errors in API or code, contact Shabodi support team, increase bandwidth

Trello Task Update & Scheduling of Prototypes:


https://trello.com/b/S3Qskxqe/gng1103
Trello
Workspaces
Recent
Starred
Templates
Create
Search
Trello Workspace
GNG1103
Board
Filters
Share
Your boards
GNG1103
GNG1103 Project
Prototype I and Customer Feedb
Nov 3
Prototype II and Customer Feedback
Nov 10
Prototype III and Customer Feedback
Nov 24
Design Day
Nov 27
Final Project Presentations
Dec 30
User Manual
Add a card
Doing
Project Schedule and Cost
Oct 27
Add a card
Done
Conceptual Design
Oct 13
Design Criteria
Oct 6
Microsoft Excel
Sep 19
0/2
Microsoft Word
Sep 19
0/6
Team formation and contract
Sep 22
Trello
Sep 19
3/3
< Reading Week >
Add a card
Add another list
You are a guest in this Workspace.
To see other boards and members in this Workspace, an admin must add you as a Workspace member.
Request to join
Breaking news
Canada to cut i...
Search
ENG
US
2:59 PM
2024-10-25


https://trello.com/c/qwvljkd2/12-prototype-i-and-customer-feedback
Prototype I and Customer Feedback
in list GNG1103 PROJECT
Members
Notifications
Due date
Watch
Nov 3, 12:27 PM
Description
Edit
Cedric and Annie will code the bulk of the first prototype in python. They will have two meetings to talk about the code, then following up on the to-be-submitted prototype. Will begin section on Oct 28th.
Task checklist
Delete
0%
Create breakdown of code/organizing tasks
Create structure for code
Create prototype
Meet and discuss changes to prototype before submission
Add an item
Activity
Show details
Write a comment...
Cedric Hoedl added this card to GNG1103 Project
Join
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy
Breaking news
Canada to cut i...
Search
ENG
US
3:19 PM
2024-10-25





Conclusion:

As discussed, our adaptation of our perimeter line idea will be used as well as three prototypes to test the functionality of our product as we go. The list of materials and plans allows us to know what we need and for when keeping our team organized and efficient.

Client Meeting 2
Main functional requirements on point
Assumption of everyone has 5G or SIM card

1. Either use device to track
2. Set up camera at gate (not fingerprints) (facial recognition)
3. Ensure there is enough bandwidth
    a. Not enough data in video, hard to identify
4. Ensure 5G pipe is as large as possible

Would we have access to the employees' SIM cards?

- Assume phone is IOT badge
- Trackable app
- Assumed that every device has a 5G SIM card

- Radios will know location

Think of restricted zone is box, in or out of box (simple)
Do not over complicate

Do not need to worry about specific ID or apps, but can be costly; use a camera for identification
Use cooperative detection

- Object is in clear view
  Ex. I present my face

Uncooperative
Ex. cameras are watching a general area
Send SMS to gate to automatically open

- Recognize: open
- Not recognized: does not open

Do something based on SIM card & biometrics (facescanner)

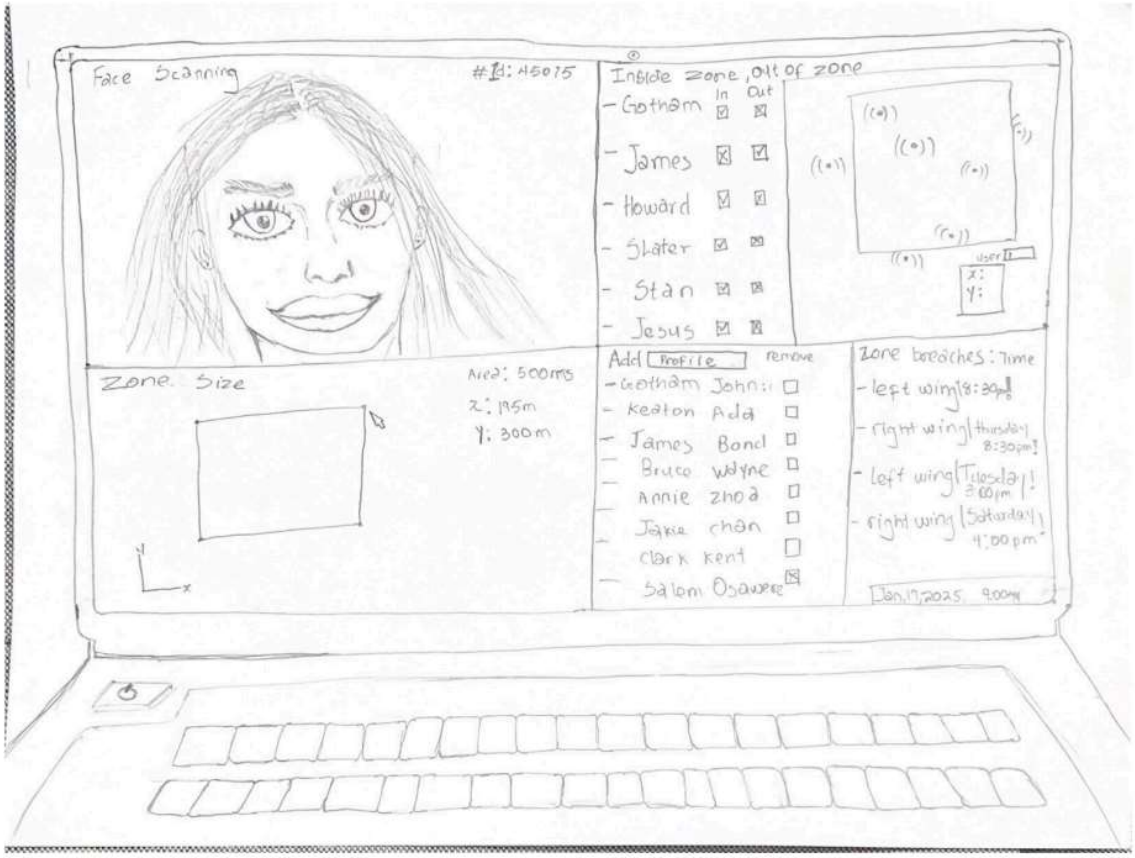
1. Are our concepts focused too much on the physical aspect and not as much on the API side?
    - Ideally, final product, video of it working, if your project meets certain requirements, host on sandbox, create the application, not focus on physical box, get rid of physical phones, pretend there is a SIM card in code, take video of face and plug into API/code, get rid of all expensive aspects, do not go physical route, 2 5 second clips of approved face and non approved face, see how API reacts, sub in SIM card.

2. Are you expecting a physical demonstration of the product, the functioning API or both?
- SIM card could be the machine
- Person carrying SIM card
- Person uses SIM card to get in (maybe distance detection)
- Aim for one idea, not combination

3. Should the restriction zone be more centered towards employees or autonomous machines?

4. Who do you foresee the clients for this product to be?

5. What is your favorite idea?
- Perimeter, Geofence area in software, pretend there is a box, object going into or out of box, GPS (long range), SIM card (short range)
- Just show basic capabilities, no fancy shiny twinkly stuff
- Can you see if item is in or out of box, how far away, notify about breach someone through email
- Level 1 SIM card; Level 2 Person detection/facial detection
- Keep it virtual
    - Code for phone is inside box:
        - Steps of what happens
6. How easy is the API to use?
- Easy peasy; support@shabodi.com



Test ID	Test Objective	Description of prototype used and a basic test method	Description of results to be recorded and how these results will be used	Estimated test duration and planned start date
1	Assuring the program can sort who to let in and keep track of them.	With code, a simulation of people will attempt to enter the zone and the code will return true or false if they are allowed to enter.	Every answer needs to be correct to assure that the program can follow the correct course of action following a scan.	Each test will take less than a second to do and will begin on November 1st until November 3rd.

Deliverable F

Introduction:

This is a report on the result of the first prototype. There were no changes to the bill of materials and the documented Python code used can be found within a separate .txt file. The testing took place on November 1st and multiple iterations of the simulation were run in order to measure the reliability of the code.

Prototype explanation (Test plan, analysis, and results):

- **Goal**

This prototype is designed to test the logic of our program, the procedure it should take, as well as storing each user's information.

- **How it works**

A simulation was created in python to emulate different users accessing the gate. It compares their randomly generated ID codes to that of the ones accepted by the gate to decide whether entry is allowed or not. It also adds them as being within the zone and at what time they accessed the system. Furthermore, it updates the location and the time for each user separately until they leave the zone.

- **Component Analysis**

This will evaluate the need for identification of SIM numbers as well as location and time tracking. Even though fictional values will be used, the placeholder values should demonstrate that the core concept and logic of the program are valid and solely require the adaptation of the API to finalize the product.

Results:

This is a sample result of running the simulation. It is able to detect an input (the user's SIM id) and tell whether or not this user is allowed within the zone or not. As well, it tracks the time of entry, and its location during the travel.

The given results have all been accurate and permits us to move forward with the implementation of API since our base code and functionality is effective.

Feedback/Comments:
Further comments and feedback will be received at the client meeting on November 4. As of yet, feedback from David Knox stated when we mentioned our simulation was that it was “very good” but that we need to make sure that we know exactly what we are testing and the fidelity of our simulation towards a real life system.

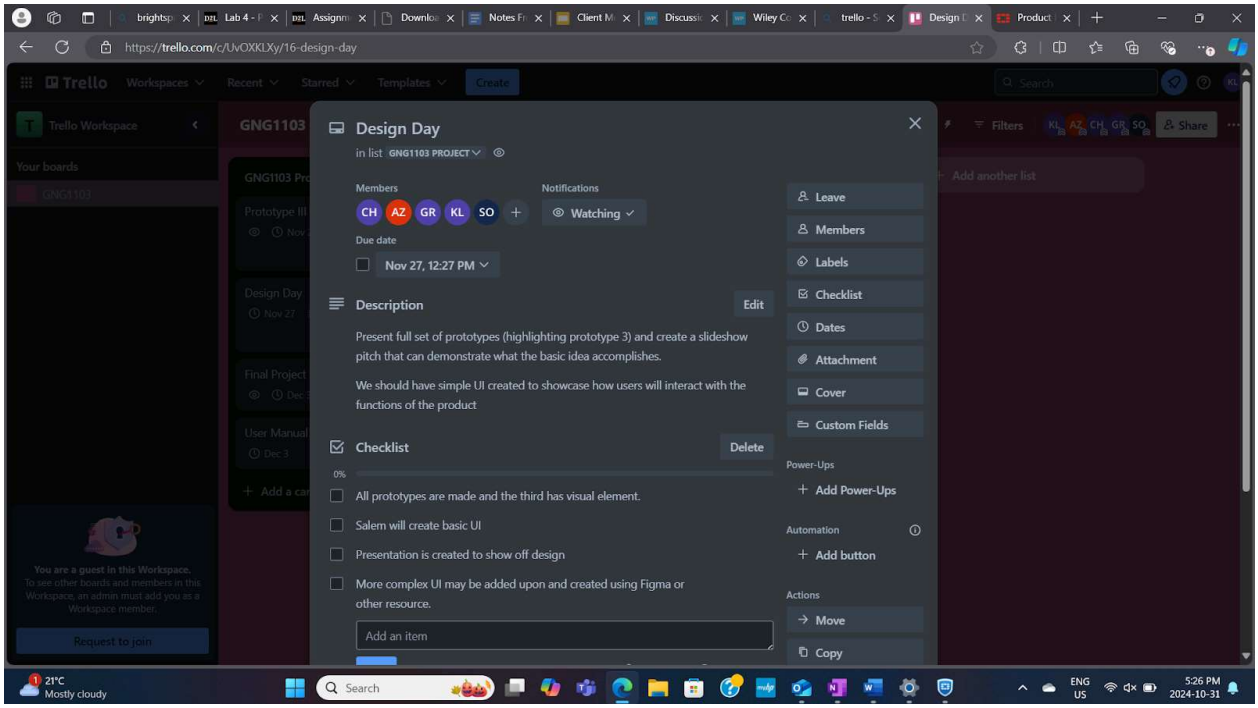
Prototyping 2 Test Plan:

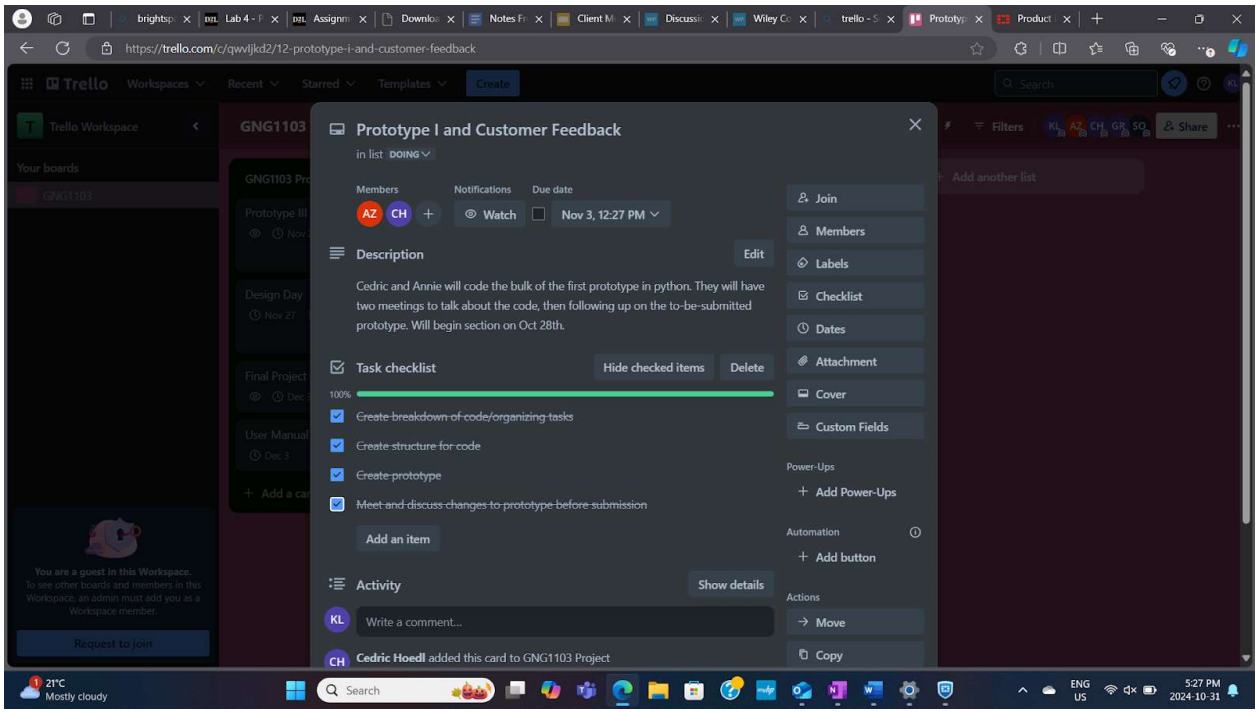
The objective of this test is to determine if the program sends a signal to an administrator and emit an alarm if the perimeter is breached or if an authorized ID enters. It is a test of subsystem detection and alarming. Testing will take place on the 5th to the 10th.
Group member Gustin will be responsible for selecting an efficient alarm noise, while Salem and Cedric work on implementing in code the alarm and a message to the administrator. Annie and Keaton will work on the hardware component of the prototype.

A brief outline and general explanation of plans moving forward will be communicated at the client meeting on November 4, where feedback will be received and needed changes will be made.
The main stopping criterion is if a message is sent to an administrator and an alarm is emitted.

Conclusion:
The first prototype’s goal was testing the logic of the program and storing user information. As stated, the results from the testing of the first prototype were successful. The second prototyping test plan is outlined above.

Trello:


https://trello.com/c/UvOXKLXy/16-design-day
Design Day
in list GNG1103 PROJECT
Members
Notifications
Watching
Due date
Nov 27, 12:27 PM
Description
Edit
Present full set of prototypes (highlighting prototype 3) and create a slideshow pitch that can demonstrate what the basic idea accomplishes.
We should have simple UI created to showcase how users will interact with the functions of the product
Checklist
Delete
All prototypes are made and the third has visual element.
Salem will create basic UI
Presentation is created to show off design
More complex UI may be added upon and created using Figma or other resource.
Add an item
Leave
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy


https://trello.com/c/qwvljkd2/12-prototype-i-and-customer-feedback
Prototype I and Customer Feedback
in list DOING
Members
Notifications
Watch
Due date
Nov 3, 12:27 PM
Description
Edit
Cedric and Annie will code the bulk of the first prototype in python. They will have two meetings to talk about the code, then following up on the to-be-submitted prototype. Will begin section on Oct 28th.
Task checklist
Hide checked items
Delete
Create breakdown of code/organizing tasks
Create structure for code
Create prototype
Meet and discuss changes to prototype before submission
Add an item
Activity
Show details
Write a comment...
Cedric Hoedl added this card to GNG1103 Project
Join
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy

Deliverable G

- ☐ Develop prototype to achieve plan from last prototype
    - ☐ Why, what, when
- ☐ Include analytical, numerical or experimental model
- ☐ Document test plan, analysis and results (with images)
- ☐ Gather feedback and comments
- ☑ ~~Update target specs, detailed design and BOM after tests~~
- ☐ Outline prototype 3

Deliverable G

Introduction:
This is a report on the result of the second prototype.There were no changes to the bill of materials and the documented Python code used can be found within a separate .txt file.The testing took place on November 6th and multiple iterations of detection and the alarming system.

Prototype explanation (Test plan, analysis, and results):

- **Goal**

The goal is to develop a critical subsystem of the Zone Restriction Alert system. This subsystem will focus on accurately detecting breaches and sending alerts testing will involve ensuring the reliability of notifications.

- **How it works**

It works by using the program in prototype on the detection software and using the detection to send an sms message to an administrator if the perimeter is breached.

- **Component Analysis:**

Detection System:The detection software uses data from simulated inputs, such as SIM card identification, to identify unauthorized people. Detection accuracy and response time are the metrics that were analyzed for high reliability. The alarming subsystem was tested to verify it sends SMS messages without failure.

Results: The results is that we the detection software sending an sms message when the perimeter is breached by authorized

Feedback/Comments: Shibodi approved of our project in the most recent client meeting

Prototyping 3 Test Plan:

The third prototype aims to test the fully integrated Zone Restriction Alert system in real-world scenarios. This includes validating the detection of unauthorized entries and ensuring reliable and fast alert notifications under varying conditions.

***Note Addition to BOM**

- A phone will be used with a sim card to utilize SMS features. This will be free as we will use one of our own.

Conclusion:

Objective and Purpose(Prototype 2)

- **Why**: The goal is to develop a critical subsystem of the Zone Restriction Alert system. This subsystem will focus on accurately detecting breaches and sending alerts testing will involve ensuring the reliability of notifications.

- **What**: The prototype will test the integration of key elements such as tracking with a focus on accuracy, alert mechanisms, and the overall response time.

- **When**: This prototype should be ready for initial testing within weeks, with adjustments and improvements made based on initial feedback.

Analytical, Numerical, or Experimental Model

  - Develop an experimental model in Python to simulate various scenarios, including authorized and unauthorized access events.
  - Use numerical analysis to determine the accuracy of location tracking and detection times.

Prototype Description and Images

  - Create a physical representation using hardware components like an Arduino and breadboard, if needed, to test physical breach detection.
  - Use software-based simulations for facial recognition and SIM card detection, where possible.
  - Include detailed images of the hardware setup, code snippets, and screenshots from simulation tests.

Methodology

- Simulate multiple breach scenarios to evaluate system responsiveness and notification efficiency.

- Perform stress tests to see how the system handles high traffic or network delays.

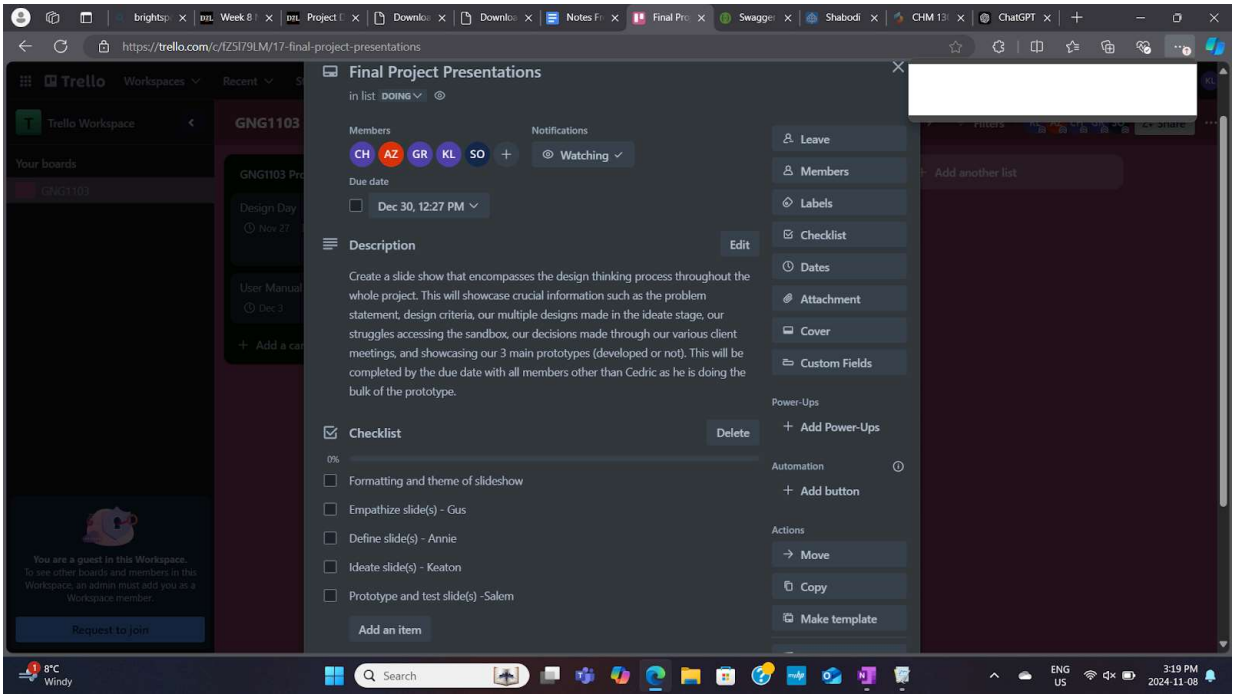
Stopping Criteria

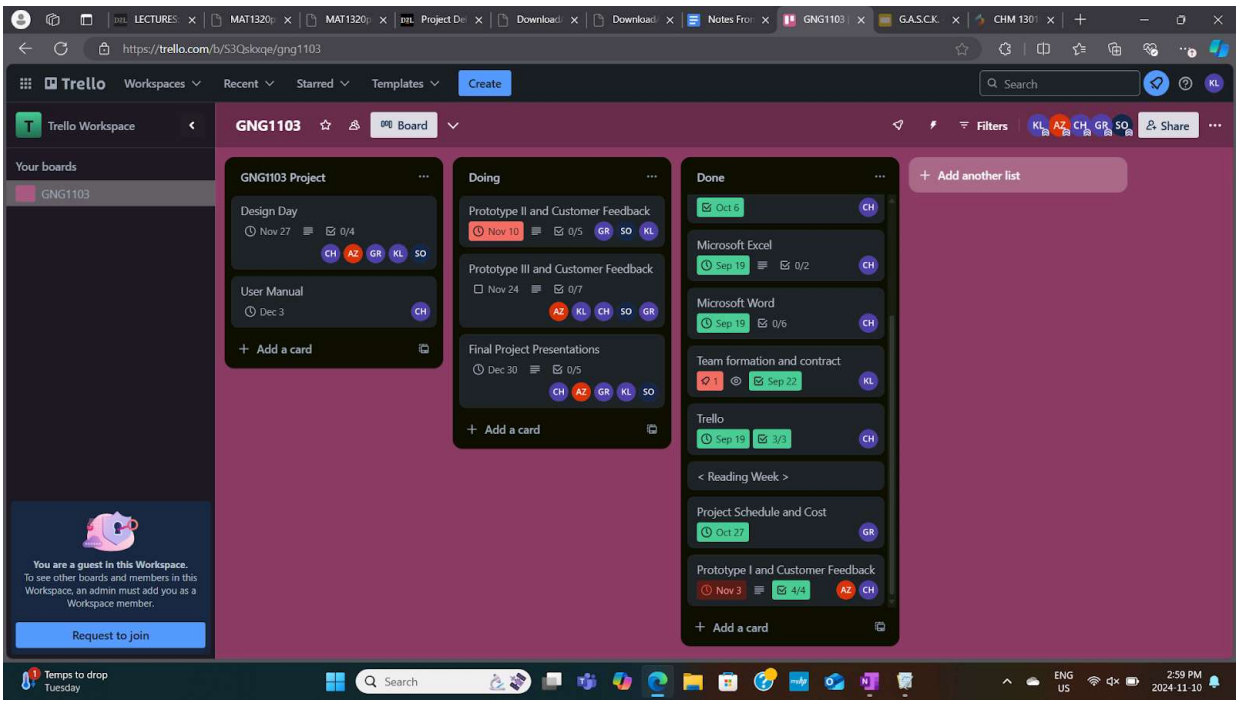
- The test will end once the system achieves a consistent 95% detection success rate and demonstrates reliable alert performance.

Addendum to Prototype 2's creation:

After technical issues arose while utilizing Shabodi's sandbox, it has become clear that the second prototype will not be complete as of November 10th 2024, but will rather be complete at a later date once Netaware is properly functioning. This includes having the location API working and being able to connect to an SMS API as per Shabodi's request. The given analysis above still remains as our plan, however, the timeline has been changed. We hope to have both prototype 2 and 3 fully complete by Sunday the 17th.

Trello:


https://trello.com/c/fZ5I79LM/17-final-project-presentations
Trello
Workspaces
Recent
Trello Workspace
Your boards
GNG1103
Final Project Presentations
in list DOING
Members
CH AZ GR KL SO
Notifications
Watching
Due date
Dec 30, 12:27 PM
Description
Edit
Create a slide show that encompasses the design thinking process throughout the whole project. This will showcase crucial information such as the problem statement, design criteria, our multiple designs made in the ideate stage, our struggles accessing the sandbox, our decisions made through our various client meetings, and showcasing our 3 main prototypes (developed or not). This will be completed by the due date with all members other than Cedric as he is doing the bulk of the prototype.
Checklist
Delete
0%
Formatting and theme of slideshow
Empathize slide(s) - Gus
Define slide(s) - Annie
Ideate slide(s) - Keaton
Prototype and test slide(s) -Salem
Add an item
Leave
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy
Make template
You are a guest in this Workspace.
To see other boards and members in this Workspace, an admin must add you as a Workspace member.
Request to join
Add another list
8°C
Windy
Search
ENG
US
3:19 PM
2024-11-08


https://trello.com/b/S3Qsloxqe/gng1103
Trello
Workspaces
Recent
Starred
Templates
Create
Search
Trello Workspace
Your boards
GNG1103
GNG1103
Board
Filters
Share
GNG1103 Project
Design Day
Nov 27
0/4
User Manual
Dec 3
Add a card
Doing
Prototype II and Customer Feedback
Nov 10
0/5
Prototype III and Customer Feedback
Nov 24
0/7
Final Project Presentations
Dec 30
0/5
Add a card
Done
Oct 6
Microsoft Excel
Sep 19
0/2
Microsoft Word
Sep 19
0/6
Team formation and contract
Sep 22
Trello
Sep 19
3/3
< Reading Week >
Project Schedule and Cost
Oct 27
Prototype I and Customer Feedback
Nov 3
4/4
Add a card
Add another list
You are a guest in this Workspace.
To see other boards and members in this Workspace, an admin must add you as a Workspace member.
Request to join
Temps to drop
Tuesday
Search
ENG
US
2:59 PM
2024-11-10

Project deliverable H:

Introduction:
This is a report on the result of the third prototype. There were no changes to the bill of materials and the documented Python code used can be found within a separate .txt file. Prototype III ensures the system works as intended and integrates all features detection, alerting, and tracking. It also addresses the limitations identified in Prototypes I and II.

Feedback/Comments: From our last in class presentation we got a treasure trove of feedback and questioning on our project, one piece of question we received is how we will present the project on design day which is something we haven't really thought about and is something we are looking at as of now.

What:

- A complete system integrating:
    - Location detection using SIM cards.
    - Real-time alerts via SMS notifications to administrators.
    - Breach detection and logging.
- Functional validation in simulated and practical scenarios.

When:

- Development: November 17–23, 2024.
- Testing: November 24–28, 2024.
- Feedback collection: November 29, 2024.

Prototyping Test Plan

Objective:
To evaluate the system's ability to accurately detect breaches, send real-time alerts, and log necessary data under various conditions with the help of a comprehensive prototype.

Test Scenarios:

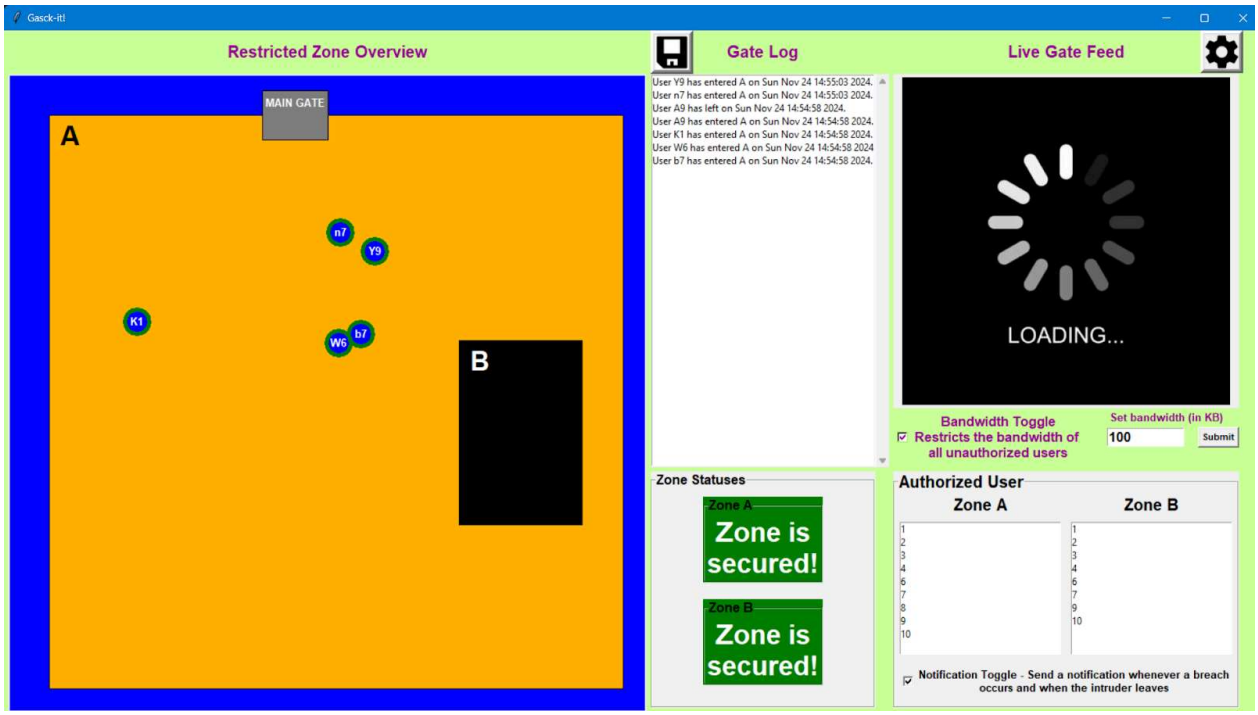
1. **Authorized Entry:**
    - Simulate authorized personnel entering the zone using a recognized SIM card.
    - Verify correct logging of entry time and location.
2. **Unauthorized Entry:**
    - Simulate unauthorized personnel attempting entry.

- Confirm breach detection and notification to the administrator.

Metrics for measurement:

- Detection Accuracy: Percent of successful detections of unauthorized users needs to be 100%.
- Alert Time: Time taken to send SMS notifications need to be when unauthorized use enters and leaves.
- Reliability: Number of failures over total tests needs to be zero.
- Clear: Need to be able to understand what the program is executing. Asking people who have never seen the program should be able to understand what they're seeing with little to no external explanations.

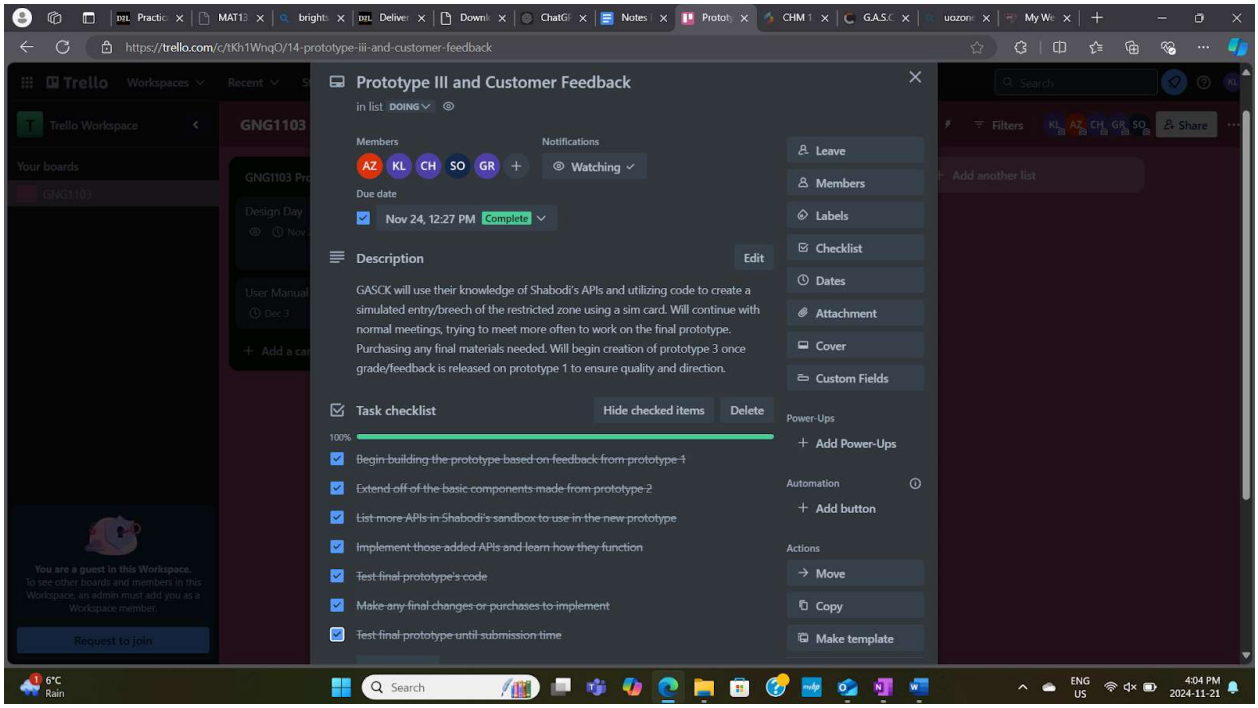
This prototype will be a visual indicator of the simulation to see what's happening in real time. Despite numerous bugs and roadblocks with the code which delayed the expected due date, our final approach satisfies our metrics and creates a presentable comprehensive prototype.

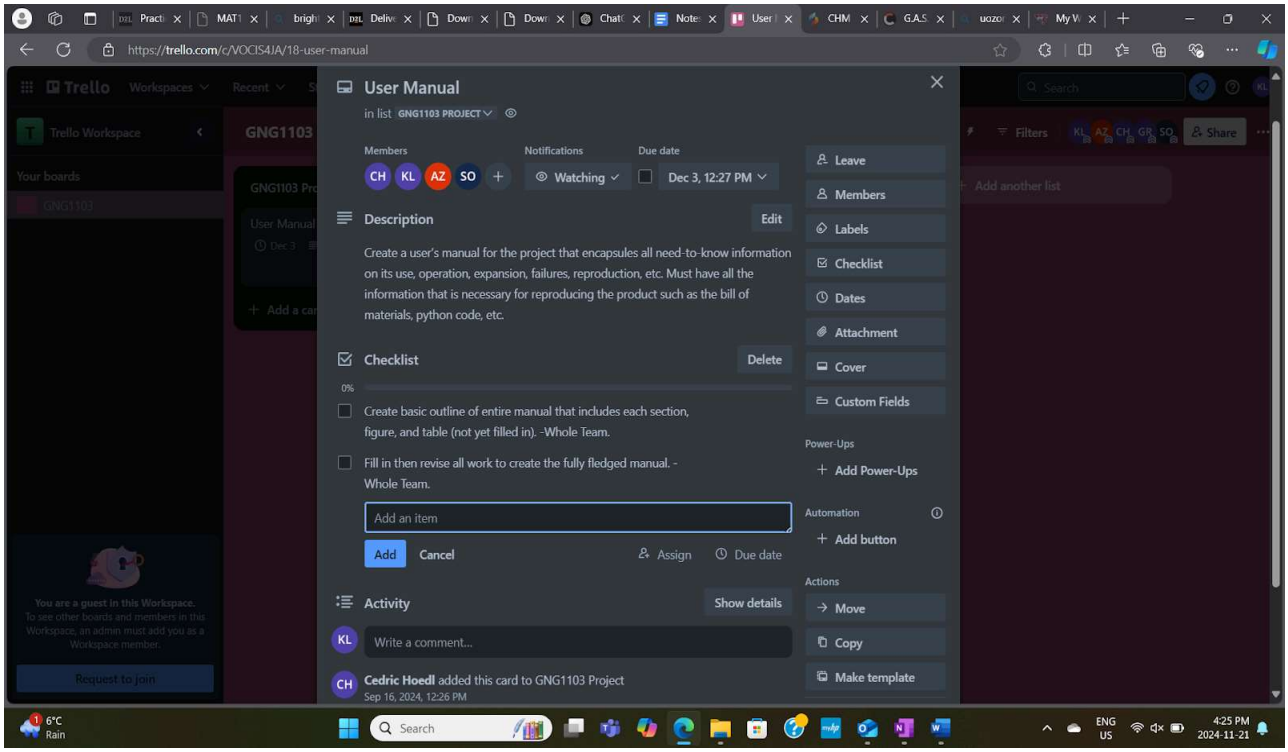


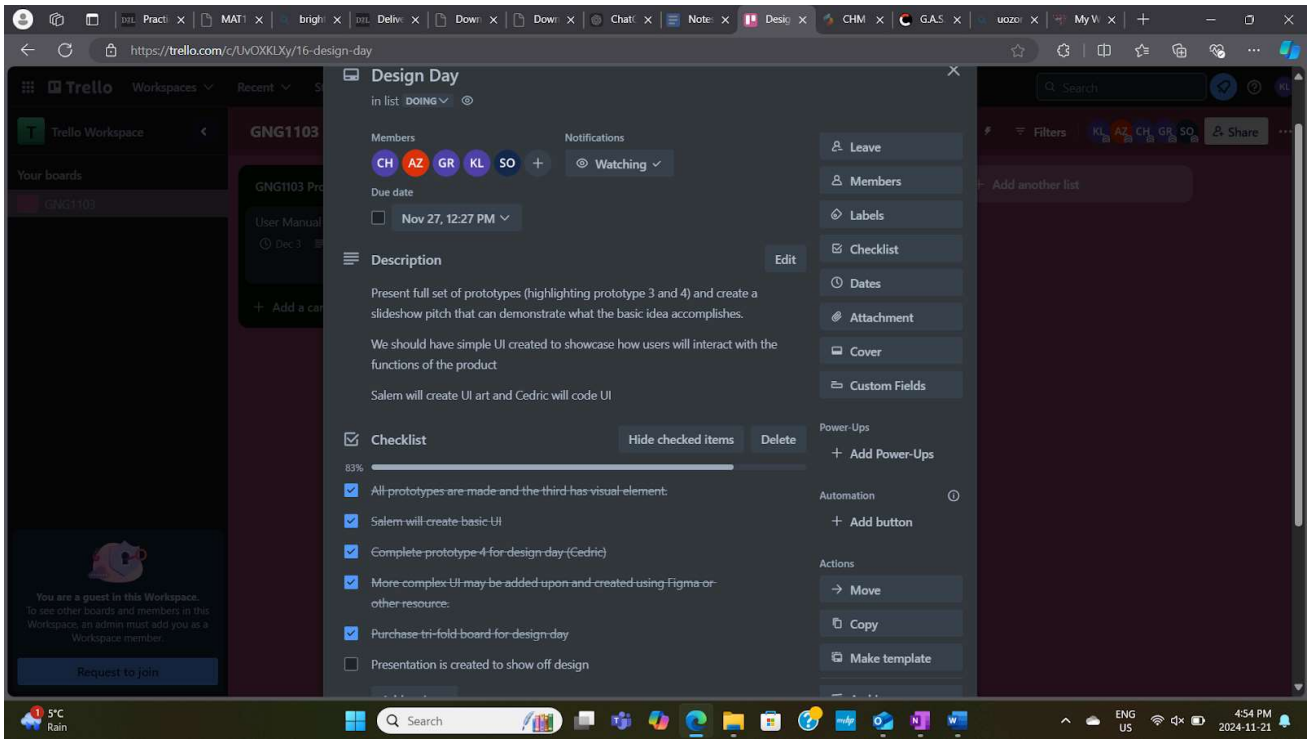
Conclusion:

Even if it took longer than expected and we missed our initial time estimate, this prototype allowed for visual demonstration of the problem and use of Shabodi's API in a way that people can more easily grasp without relying on technical explanations.

Trello:


https://trello.com/c/tKh1WnqO/14-prototype-iii-and-customer-feedback
Prototype III and Customer Feedback
in list DOING
Members
AZ KL CH SO GR
Notifications
Watching
Due date
Nov 24, 12:27 PM Complete
Description
Edit
GASCK will use their knowledge of Shabodi's APIs and utilizing code to create a simulated entry/breech of the restricted zone using a sim card. Will continue with normal meetings, trying to meet more often to work on the final prototype. Purchasing any final materials needed. Will begin creation of prototype 3 once grade/feedback is released on prototype 1 to ensure quality and direction.
Task checklist
Hide checked items
Delete
100%
Begin building the prototype based on feedback from prototype 1
Extend off of the basic components made from prototype 2
List more APIs in Shabodi's sandbox to use in the new prototype
Implement those added APIs and learn how they function
Test final prototype's code
Make any final changes or purchases to implement
Test final prototype until submission time
Leave
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy
Make template
Trello
Workspaces
Recent
Trello Workspace
GNG1103
Your boards
Filters
Share
Add another list
You are a guest in this Workspace.
Request to join
6°C
Rain
Search
ENG
US
4:04 PM
2024-11-21


https://trello.com/c/VOCIS4JA/18-user-manual
User Manual
in list GNG1103 PROJECT
Members
CH KL AZ SO
Notifications
Watching
Due date
Dec 3, 12:27 PM
Description
Edit
Create a user's manual for the project that encapsules all need-to-know information on its use, operation, expansion, failures, reproduction, etc. Must have all the information that is necessary for reproducing the product such as the bill of materials, python code, etc.
Checklist
Delete
0%
Create basic outline of entire manual that includes each section, figure, and table (not yet filled in). -Whole Team.
Fill in then revise all work to create the fully fledged manual. -Whole Team.
Add an item
Add
Cancel
Assign
Due date
Activity
Show details
Write a comment...
Cedric Hoedl added this card to GNG1103 Project
Sep 16, 2024, 12:26 PM
Leave
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy
Make template
You are a guest in this Workspace.
To see other boards and members in this Workspace, an admin must add you as a Workspace member.
Request to join
6°C
Rain
Search
ENG
US
4:25 PM
2024-11-21


https://trello.com/c/UvOXKLXy/16-design-day
Design Day
in list DOING
Members
CH AZ GR KL SO
Notifications
Watching
Due date
Nov 27, 12:27 PM
Description
Edit
Present full set of prototypes (highlighting prototype 3 and 4) and create a slideshow pitch that can demonstrate what the basic idea accomplishes.
We should have simple UI created to showcase how users will interact with the functions of the product
Salem will create UI art and Cedric will code UI
Checklist
Hide checked items
Delete
83%
~~All prototypes are made and the third has visual element.~~
~~Salem will create basic UI~~
~~Complete prototype 4 for design day (Cedric)~~
~~More complex UI may be added upon and created using Figma or other resource.~~
~~Purchase tri-fold board for design day~~
Presentation is created to show off design
Leave
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy
Make template
You are a guest in this Workspace.
To see other boards and members in this Workspace, an admin must add you as a Workspace member.
Request to join
5°C
Rain
Search
ENG
US
4:54 PM
2024-11-21

Design day presentation

Board Layout for Design Day

Title and Introduction (Top Section, Centered)

Secured Zone? The Gasket

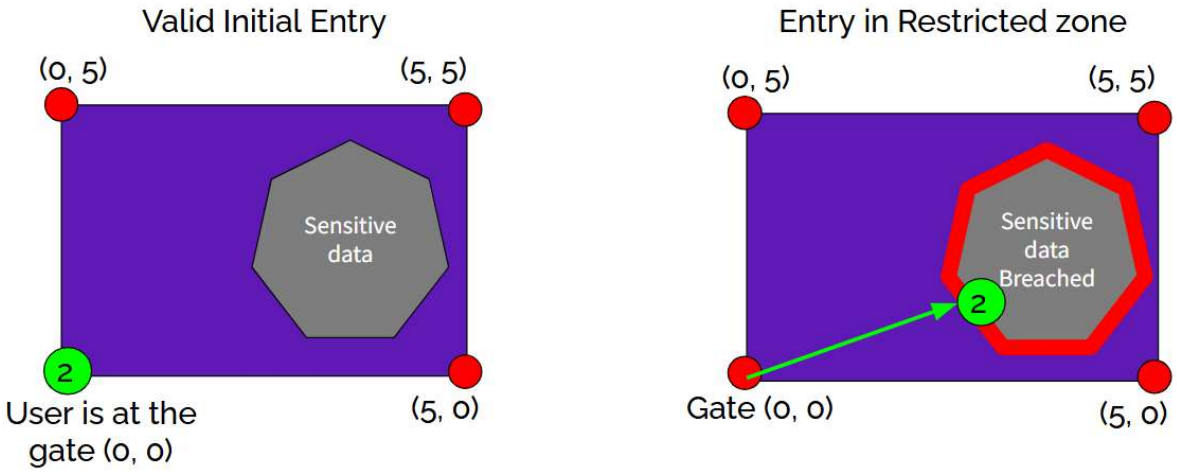
"Smart Security Using Shabodi's NetAware APIs"

Problem Statement and Motivation (Top Left)

Problem statement:

"Create an application with Shadobi's Developer Sandbox capable of restricting access to certain personnel and devices within a given area; providing a warning if bypassed."

Visualization of the problem.



3. Project Goals and Requirements (Top Right)

- **Restrict access to sensitive areas with high accuracy.**
- **Notify administrators instantly of breaches.**
- **Utilize Shabodi's APIs for seamless integration.**
- **Provide a solution that is:**
  - **Cloud-ready**
  - **Demonstrable**
  - **Cost-effective**
  - **Scalable**

4. Methodology and Approach (Middle Left)

- **Development Process: A flowchart showing the steps:**
  1. **Research and Requirements Analysis**
  2. **Concept Design and Prototyping**
  3. **API Integration**
  4. **Testing and Refinement**

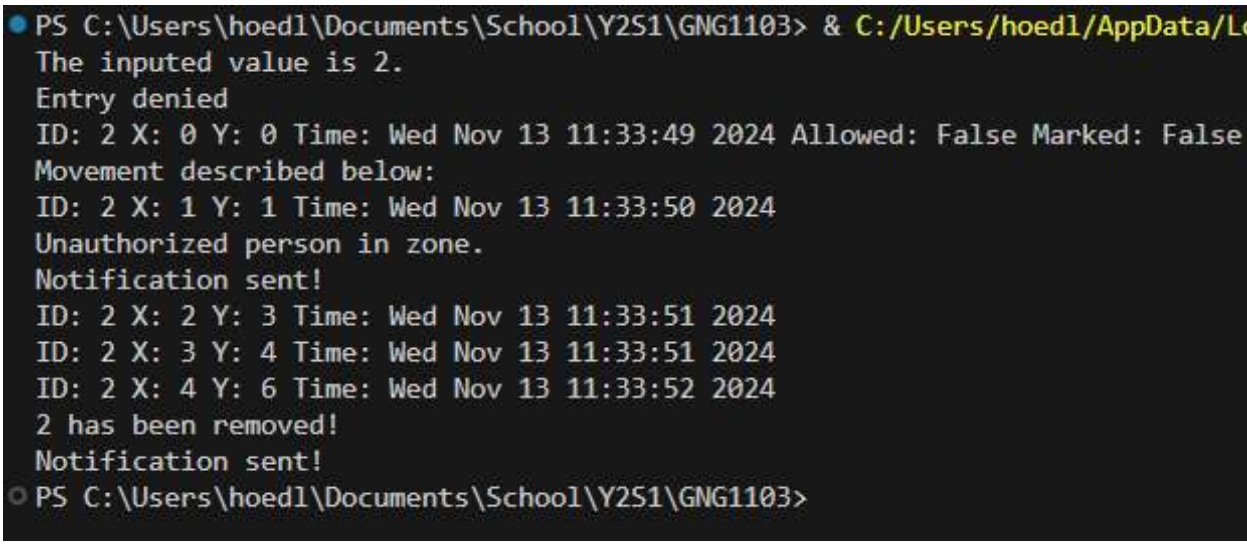
5. Features and Key Innovations (Middle Center)

- **Core features:**
  - **Feature 1: Accurate location tracking.**
  - **Feature 2: Alerts sent via SMS.**
  - **Feature 3: Detection within +/- 10 cm accuracy.**
  - **Feature 4: Reliable breach logging and reporting.**

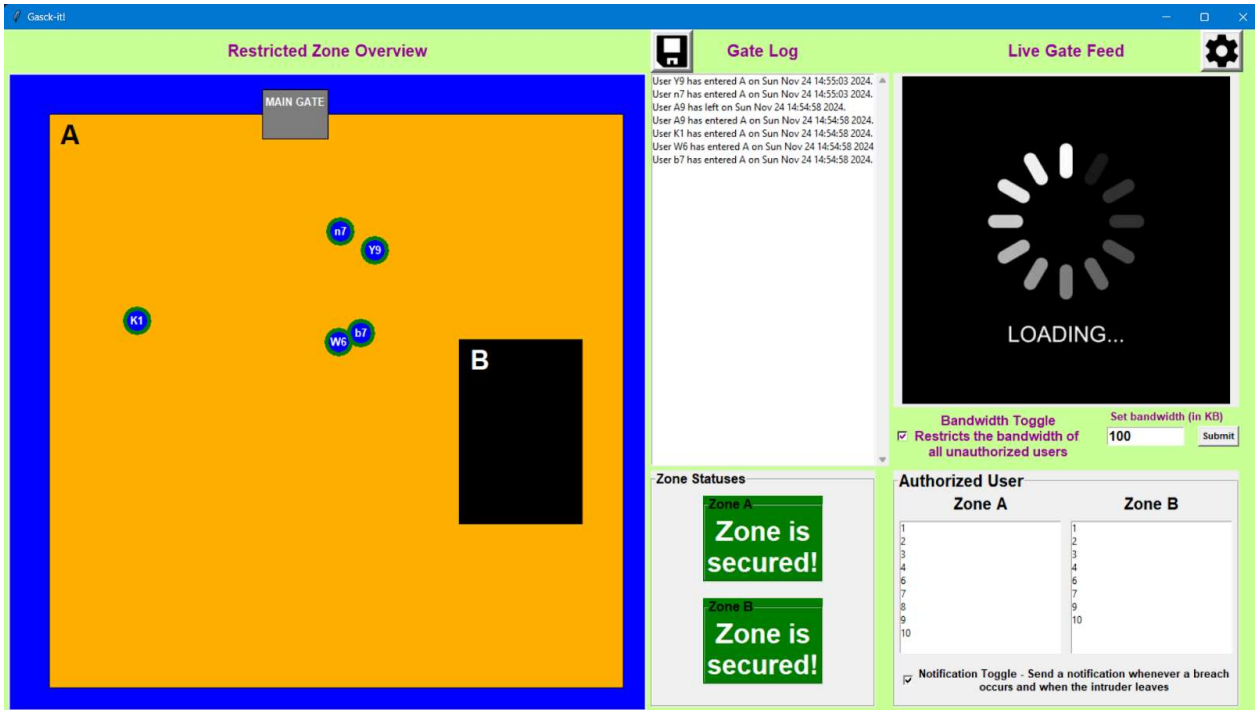
6. Prototype Description (Middle Right)

- **Prototype 1 & 2 (Tracking and detection testing) :**

  This prototype was meant to show the position tracking feature and the detection entry of unauthorized and authorized users



- **Prototype 3 (the UI): The user interface**



7. Testing Results and Metrics (Bottom Left)

- **Detection accuracy: *100% breach identification*.**
- **Alert time: *<2 seconds on average*.**
- **System reliability: *0% failure rate over 50 tests*.**

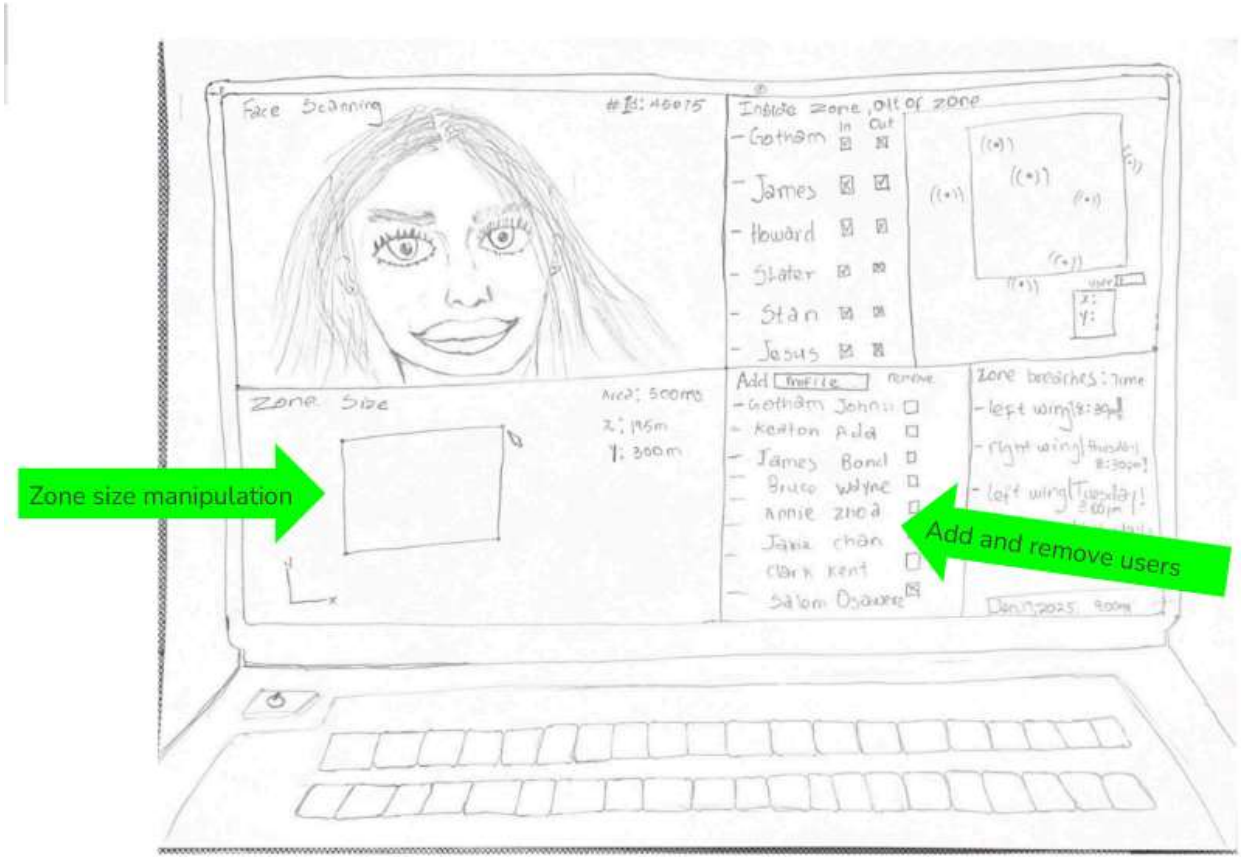
“Highly reliable and intuitive system.” – feedback from colleagues during stress test.

8. Future Applications and Impact (Bottom Right)

- **The future of the Gasket**
  - **Manufacturing zones.**

- **Enterprise-level restricted areas.**
- **Airports or data centers.**
- **Military.**

Product is scalable and adaptable:



9. Call to Action (Bottom Center)

Gasck: *Transforming Security, One Zone at a Time.*