

Team 7
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Product Backlog

Project Name: CoRec Occupancy Tracker

Problem Statement

Many customers of the corec want to know how occupied the corec is at certain times of the day so they can plan their workouts at times where the corec is at low occupancy. However, it's currently very hard to gauge how occupied the corec will be at certain times. Team 7 plans to utilize Computer Vision and human detection to accurately keep track of the occupancy rate of each of the different rooms of the corec and analyze the equipment usage/availability in real time while also using those statistics/data to both graph past corec occupancy over different times of the day and predict corec occupancy at future times of the day.

Background Information

- a. The target audience for this app will be people who go to the corec. Right now, these people can somewhat gauge how occupied the corec will be using the existing Facility Usage feature on the corec website (more on that in section B). For the domain, the app aims to use Computer Vision and human detection to calculate corec occupancy. We also plan to use the Flask framework in Python along with MongoDB to construct the backend of the app/website and the database, respectively. As for the GUI, that will be constructed using React.
- b. Right now, there exists an occupancy tracker (named "Facility Usage") on the corec's website that tracks the number of people in different rooms of the corec. It also tells you the maximum capacity of each room. There also exists open-source libraries for human detection and tracking. We plan to use one of those libraries, found at <https://github.com/ITCoders/Human-detection-and-Tracking>. Human detection and tracking is essential to this project and we will be referencing existing projects to get an idea of the implementation.
- c. Some of the information provided in the current corec occupancy tracker is not accurate. For example, the maximum capacity of the Olympic Weight Lifting room is displayed at 50; realistically, the room can only accommodate 6 lifters at once. Furthermore, the website updates every 10 minutes or so. Unlike our competitors, we're planning for our occupancy tracker to update almost instantaneously so that users can see occupancy statistics as close to real time as possible. Also, the use of Computer Vision will lead to more accurate occupancy values. In addition, our app will tell you occupation statistics at past and future times. Moreover, we will be incorporating existing computer vision libraries for this project but we need to further modify them to suit our needs as this project requires more than just human detection and tracking, it requires the system to be able to detect the machine that is occupied. We also plan for our app to send out email and

SMS notifications so that users can be notified when the corec will be at an occupancy level that fits their desires, something that the existing facility usage system is not capable of.

Requirements

Functional	Non-functional																							
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(we are unable to use Corec footage for security reasons)</td></tr><tr><td>The system must produce correct output every 5 minutes to achieve real-time update.</td></tr><tr><td>The accuracy of these cameras will have a 5% false positive and a 5% false negative.</td></tr><tr><td>The response time of the app should be 5 seconds or less so that users stay updated with the latest statistics.</td></tr><tr><td>Server sends a request to the service every 5 minutes to process, compute, and update SQL table</td></tr><tr><td>Every 1 minute, store the current occupancy of a particular room in the database</td></tr><tr><td>Capture an image of each area of the corec every 5 minutes to analyze the utility rate of equipment/space.</td></tr><tr><td>Once an output is produced, the results will be updated to a dashboard for users to view.</td></tr><tr><td>Ensure that this system runs at all corec operating hours (10-20 hours) without experiencing failure.</td></tr></table>	Performance Requirements	Connect the security cameras supervising the 5 different rooms so that the cameras can detect humans and count how many people are present in a particular room/area. 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room's overall business changes drastically	Clean the database every so often by deleting old records (over 2 weeks old) to maintain fast querying
As a user, I want to create an account so I can receive custom notifications about the rooms that I care most about	Detect people up to 30 feet away
As a user, I want to be able to sign up with Google so that I won't need to go through the trouble of creating a new account	Be able to detect people up to 75 field of vision
As a user, I want to be able to access the app as a guest so that I don't have to create an account	Server is required to run 24/7 with an ideal failure rate of 2%
As a user, I want to check which rooms I want to receive notifications for so that I won't get spammed with notifications from corec rooms that I don't use	Be able to detect people even when face or part of the body is cut off (partial body detection)
As a user, I want to toggle email and SMS notifications on and off so that I won't get spammed with notifications when I don't want to	
As a user, I want notifications to be sent between reasonable time intervals so I won't get bombarded with notifications.	
As a user, I want to pick a custom threshold value for each corec room so that I'll receive a notification when the occupancy for a room drops below the threshold	
As a user, I want to see which gym equipments (e.g. squat rack, bench press, etc.) are occupied or unoccupied so I can minimize wait time for equipment availability (if time allows)	
As a user, I want to submit error reports regarding app data so that the developers can receive feedback and update the app to function as accurately as possible. (if time allows)	
As a user, I want to filter occupancy statistics by time so that I can only see data within desired time periods	
As a user, I want to view all of the pages on the website normally using a phone, so I do not have to download the app	
As a user, I want my login info to be remembered, so I don't have to log in every time I access the website	
As a user, I want to be able to report crashes to the	

developers

As a user, I want to set timeframes for when I am notified about corec occupancy levels so that I don't get notifications at unwanted times.

As a user, I want to chat online with the front-desk employees at the corec so I can ask them questions. (if time allows)

As a user, I want to toggle between "light mode" and "dark mode" for the GUI so I can view a GUI that's easier on the eyes. (if time allows)

As a user, I want the app to automatically create the best workout plan based on my profile/the least busiest times so that I don't have to go through the trouble of manually planning out workouts. (if time allows)

As a corec employee, I want access to extra features in the app so that I can manage/monitor corec activity more easily (if time allows)

As a corec employee, I want the app to count how many people are not wearing masks in each room so that I can prioritize which room to reprimand first. (if time allows)

As a user, I want to be able to login using facial detection/fingerprint recognition so that I can log in faster. (if time allows)

As a user, I want to be able to "swipe in" electronically through the app so that I don't have to bring my ID card to the corec. (if time allows)

As a user, I want to pick what kind of graph the data is displayed in so that I can analyze the data based on my preferred graphs. (if time allows)

As a user, I want to see what percentage of corec users are gathered in each room so that it's easier to see which rooms are the busiest. (if time allows)delete oldest file

As a user, I want to see a list of the most used gym machines at a certain hour, ordered by popularity. (if time allows)

As a user, I want to have the app track my activity when I'm

at the corec so I can see how much time i'm putting into my workouts (if time allows)

As a user, I want to make sure the app tracks my location with my permission so that my privacy doesn't get violated (if time allows)