

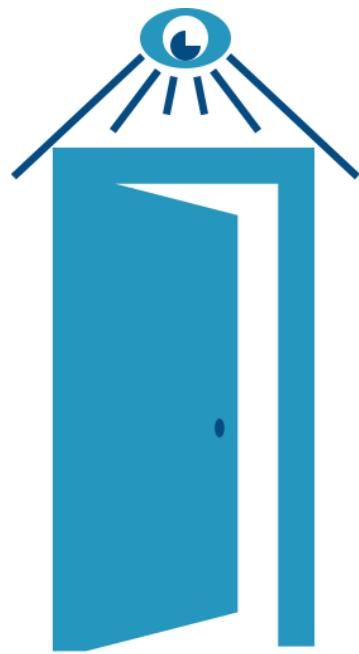
Technical Report - **Product specification**

Count Me In

Course: IES - Introdução à Engenharia de Software

Date: Aveiro, <date of submission>

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Project abstract: CountMeln is an innovative service that leverages camera technology and advanced algorithms to effectively count the number of people within a designated area.

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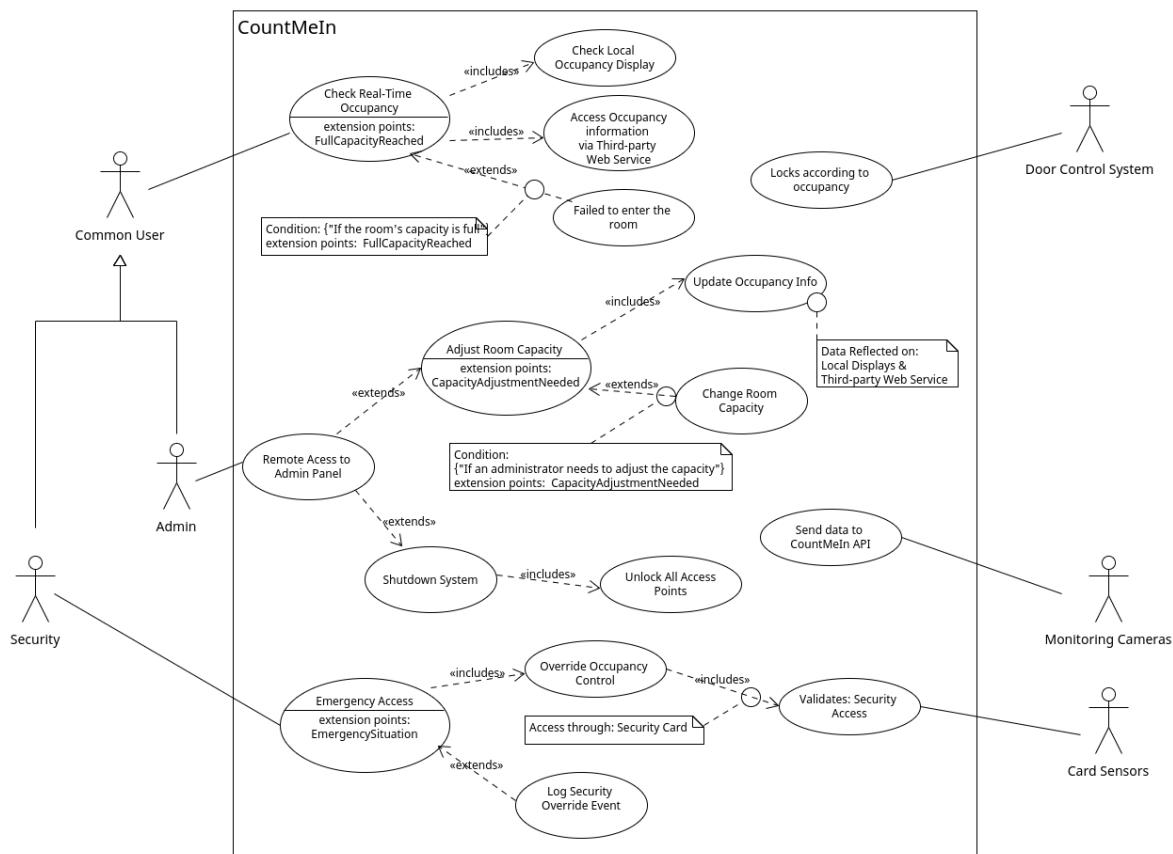
1 Introduction

The CountMeIn project, part of the Integrated Engineering Systems (IES) course, introduces a space management system designed to optimize occupancy in constrained environments. The system integrates real-time monitoring with dynamic access control, distinguishing itself from existing solutions through its automated, data-driven approach to managing foot traffic and enhancing user experience. This report details the product concept, personas, scenarios, and user requirements that shape the development of CountMeIn.

2 Product concept

Vision statement

For businesses with limited floor space or who want to restrict foot traffic, our aim is to provide a service that helps put the control of the flow of customers back in your hands. Unlike other products on the market, CountMeIn integrates real-time graphical data, collected via cameras installed at the desired location, with algorithms to provide on-site feedback via graphical displays, with the option of integrating the data with an autonomous door system that unlocks/locks depending on the current information. Our service also offers an online platform where our customers may edit the settings per floor/division and a Private API that returns information about the service for the customer to integrate with their own platform.



Personas and Scenarios

Personas

Name: Sofia

Demographics:

- **Age:** 22
- **Course:** Software Engineering



Profile: Sofia is a dedicated software engineering student, deeply engaged in her academic pursuits. The library is her sanctuary for learning and coding, where she spends considerable time honing her skills for a future in tech. Her life is meticulously organized, as she balances a rigorous study schedule with her personal development in the field of technology.

Motivations: Sofia is driven by her ambition to excel in software engineering. She values a study space that minimizes distractions and maximizes her productivity. Tools and services that can streamline her study sessions and enhance her focus are essential to her daily academic routine.

Name: Dona Celeste

Demographics:

- **Age:** 52
- **Role:** Library Administrator

Profile: Dona Celeste is the Library Administrator who has recently overseen the implementation of the CountMeln service. She is dedicated to maintaining an environment that is both orderly and welcoming for all library users.



Motivations: Dona Celeste is motivated by her commitment to providing a well-managed space that enhances the educational experience. She values the CountMeln system for its ability to help her monitor and adjust the library's occupancy, ensuring a balanced and accessible environment for students like Sofia.

Name: Carlos Costa

Demographics:

- **Age:** 40
- **Role:** Library Security



Profile: Carlos is an integral part of the library's security team, tasked with maintaining a safe and orderly environment. His approach is proactive and focused on the well-being of library patrons.

Motivations: Carlos's primary motivation is the safety and security of the library's visitors and staff. He finds the CountMeln system invaluable for its support in managing occupancy levels, which is crucial for both everyday security and emergency situations.

Scenarios

Scenario 1 - Local Display

Sofia is in the middle of a week of intensive study for a crucial exam to finish her Software Engineering degree. She has planned to spend the day in the library to do one last revision.

When she arrives at the library, the graphic display indicates that the library is currently full.

Based on the information given, she decided to go and study at an alternative location, for example, DETI and didn't need to waste time trying to find a place in the library.

Although she prefers the library, the ability to make this decision saves her time and ensures that she can maintain her productivity and focus throughout the day.

Scenario 2 - Online Website

Sofia has an important exam next week and wants to study in the library, but she's worried about how full it is. She accesses the library's platform, which shows the library's capacity in real-time, and sees that there are currently plenty of places available. This relieves her because she knows she doesn't have to rush and can get to the library calmly.

Scenario 3 - Dona Celeste's Library Management

Dona Celeste, a library keeper, has been using the CountMeln service to efficiently manage the library's occupancy and improve the experience for students. One day, she encounters a situation that requires her to utilize the system:

Dona Celeste receives a notification that warns her of a possible visitor surge due to an upcoming seminar in the Software Engineering department. She knows that this increased demand for library resources could lead to a crowded and less effective studying environment.

Using her admin access, she logs into the CountMeln system and makes real-time adjustments. She decides to open a previously closed section of the library to accommodate the additional students. She also extended the library's operating hours for that day to provide more flexibility for the students.

Dona Celeste sends a notification to the library staff, informing them of the changes and

providing guidelines to ensure a smooth experience for the students during this period of high demand.

Dona Celeste's ability to manage the library's capacity and resources in real time helps ensure that students like Sofia can have a conducive studying environment, even during special events or unexpected situations. This proactive approach improves the overall experience of library users.

Scenario 4 - Library Security Guard

The security guard enters the art gallery to deal with an unforeseen incident. The guard carries an ID card, allowing them to enter and exit the venue ignoring the set capacity.

Product requirements (User Stories)

Epic 1: Real-Time Occupancy Monitoring

User Story 1: Real-Time Occupancy Information Access

Priority: High

As a library patron,

I want to access real-time occupancy information of the library,

So that I can plan my visit to ensure a study spot without the need to wait or return at a later time.

Acceptance Criteria:

1. Given a user desires to view the current occupancy status of the library,
2. And the library has successfully integrated CountMeln's API into their website,
3. When the user navigates to the designated occupancy information section on the library's website,
4. Then the website should display the up-to-date occupancy levels, reflecting real-time changes as they occur.
5. Additionally, the displayed information should be clear, and easily understandable, and should indicate if the space is available for immediate use or if there are any restrictions due to full capacity.

User Story 2: Local Occupancy Display Check

Priority: High

As a library patron,

I want to be able to check the library's space occupancy through a local display at the entrance,

So that I can immediately know if there is available space for me to use.

Acceptance Criteria:

1. Given a user approaches the library's entrance,
2. And the library has a local display connected to the CountMeln system,
3. When the user views the display,
4. Then the display should show the current occupancy status, updated in real-time.
5. The display should indicate clearly, possibly with a colour-coded system, whether the library is full or if space is available.
6. If the library is full, the display should provide an indication of the expected wait time or peak hours to assist in planning a future visit.

Epic 2: Administrative Control and Space Optimization

User Story 3: Space Optimization for Enhanced Student Experience

Priority: High

As the library administrator,

I want to utilize the CountMeln system to adjust room capacities,

So that I can manage space more effectively and enhance the study experience for students.

Acceptance Criteria:

1. Given the library administrator identifies a need to adjust the space based on user flow,
2. And the administrator has access to the CountMeln admin panel,
3. When the administrator inputs new capacity limits or opens/closes sections of the library within the system,
4. Then the system should immediately reflect these changes in real-time, both on the local display and on the library's website.
5. After the changes, the system should automatically adjust the access control mechanisms (like door locks) to comply with the new capacity settings.

Epic 3: Overriding the implemented system in case of emergency

User Story 4: Emergency Access for Security Personnel

Priority: High

As a security guard hired by the client,

I want to be able to bypass the occupancy control system to access any area within the premises,

So that I can perform my duties effectively, especially in urgent situations.

Acceptance Criteria:

1. Given a security guard needs to access a room or area in an emergency or for security reasons,
2. When they present their authorized security card to the card reader,
3. Then the system should recognize the security clearance and immediately unlock the door,
4. The system should log the security override event for accountability and reporting purposes.

User Story 5: Emergency System Shutdown

As a client admin,

I want to have the ability to quickly shut down the occupancy control system in case of an emergency (e.g. Fire),

So that all occupants can exit the building safely without any delay.

Acceptance Criteria:

1. Given a client admin identifies an emergency situation where an immediate evacuation is necessary,
2. When they access the emergency shutdown feature in the admin panel,
3. And activate the shutdown procedure,
4. Then the system should unlock all controlled access points instantly,
5. The system should also signal the emergency mode on displays and the client's website,
6. The system should notify the appropriate personnel about the activation of the emergency protocol.

3 Architecture notebook

Key requirements and constraints

<Identify issues that will drive the choices for the architecture such as: Will the system be driven by complex deployment concerns, adapting to legacy systems, or performance issues? Does it need to be robust for long-term maintenance?

Identify critical issues that must be addressed by the architecture, such as: Are there hardware dependencies that should be isolated from the rest of the system? Does the system need to function efficiently under unusual conditions? Are there integrations with external systems? Is the system to be offered in different user-interfacing platforms (web, mobile devices, big screens,...)?

E.g.: (the references cited in [XX] would be hypothetical links to previous specification documents/deliverables)

There are some key requirements and system constraints that have a significant bearing on the architecture. They are:

- The existing legacy Course Catalog System at Wylie College must be accessed to retrieve all course information for the current semester. The C-Registration System must support the data formats and DBMS of the legacy Course Catalog System [E2].
- The existing legacy Billing System at Wylie College must be interfaced with to support billing of students. This interface is defined in the Course Billing Interface Specification [E1].
- All student, professor, and Registrar functionality must be available from both local campus PCs and remote PCs with internet dial up connections.
- The C-Registration System must ensure complete protection of data from unauthorized access. All remote accesses are subject to user identification and password control.
- The C-Registration System will be implemented as a client-server system. The client portion resides on PCs and the server portion must operate on the Wylie College UNIX Server. [E2]
- All performance and loading requirements, as stipulated in the Vision Document [E2] and the Supplementary Specification [15], must be taken into consideration as the architecture is being developed.>

Architectural view

- Discuss architecture planned for the software solution.
- include a diagram

Module interactions

- explain how the identified modules will interact. Use sequence diagrams to clarify the

interactions along time, when needed

→ discuss more advanced app design issues: integration with Internet-based external services, data synchronization strategy, distributed workflows, push notifications mechanism, distribution of updates to distributed devices, etc.>

4 Information perspective

<which concepts will be managed in this domain? How are they related?>

<use a logical model (UML classes) to explain the concepts of the domain and their attributes>

5 References and resources

<document the key components (e.g.: libraries, web services) or key references (e.g.: blog post) used that were really helpful and certainly would help other students pursuing a similar work>