

Final Project

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**Introductory Memo - Business Case Selection**

The problem with our business is to solve sanitization by reducing the amount of disinfectant spray being used. Throughout the COVID-19 pandemic, many stores have sold a lot of hand sanitizers and disinfectant spray such as Microban 24 to its customers, leading to a shortage of these products. These products are helpful in killing many micro-organisms; however, people need to understand that, touching a surface can spread bacteria and viruses even if the surface is sanitized. It is a waste of time for people to spend a lot of money on these products, having to make plenty trips from store to store, but there is a way for people to save money. In this case, we have come up with a solution of using UV cleaners that can kill micro-organisms without having to touch any surface.

The UV cleaner will activate for two minutes after everybody has left the building and the doors will remain locked until the activation is done. That is where smart devices come into play because it needs to interact with not only the user, but with other devices such as sensors linked to it and the program needed to run and execute the code. Bluetooth is mostly used since it transmits data from many devices such as an iPad to a smart TV. After activation, users can choose a preference to lock the door or unlock the door based on if they are away or not. Then it will record the time since its last activation in a database. This is where smart devices come into place because how will the UV light interact with the door when activated? UV light can kill bacteria and viruses, but it can also cause cancer in humans. In a way to provide and suit people’s needs to connect with the digital world, we have seen the importance of making their lives easier.

**Feasibility Analysis**

My group members are comfortable with the functional area of the business because we have a good point of how the service is operating. We have examined many features about it such as the UV cleaners, price, room size. The only thing about people and processes is the capacity because I am not sure how rooms the system has to be installed. However, I will have to determine ways that can meet the guest’s needs. This entire process is all about sanitizing a building which involves using UV cleaners and technology.

The technologies that are used to make the system are the UV cleaners, Servers for data storage, Cameras to make sure nobody is in the building, Sensors to automatically lock the doors during the cleaning process

My group members are satisfied with the technology that was discussed because we have read the whole scenario more than once and got a good understanding what is expected from the cleaning service. Examining the key details in the story, has contributed to finding ways that can make the service better. Once the required technology installed, in case a guest want to clean a room, an IT professional will first of all check if the room is empty if not wait until the room should be empty. Once the room is empty, the IT professional can launch the UV cleaners and the sensor automatically detect the cleaning process and lock all the doors.

I think the project size will be huge because there are a lot of requirements that this project needs including:

* Sensors and cameras for security
* Should require cancellation of the cleaning process once launched
* An IT professional for managing the database
* IT technicians for setting up the system and reparations in case of system failure
* Installation cost ($3,500.00)
* An alert system to let known the cleaning process is executed

According to all that information above, it will take about 20 people to complete since there is a lot of work to do in the building. This is a big project that is being done and so from my perspective, it will take about 2 months to finish. We will need to hire an IT professional, IT technicians, and security expert to help improve the service. Such in a way that the cleaning process can be safe and effective.

**Organizational Feasibility**

We conducted the stakeholder analysis to have access to the organizational feasibility. The image below shows the stakeholder analysis we carried out and an excel file will be attached in case the image is not visible.Table

Description automatically generatedTable

Description automatically generated

The process of building this system requires a lot of workers because there are a lot of parts that needed to be complete. For example, using Python to determine the current time, and to update the time since it was last activated.

Table

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**Use Case Diagrams**

UV Cleaner

**Diagram

Description automatically generated**

Device Interaction

Graphical user interface, diagram

Description automatically generated

Cleaning Process

Graphical user interface, application

Description automatically generated

**Use Case Descriptions**

|  |  |
| --- | --- |
| **Use Case Name:** | Device Interaction |

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| 1. Description (*Provide a brief description of this Use Case*) |
| --- |
| The user has a set of devices that support Bluetooth |

| 2. Actors – *(add lines as needed)* |
| --- |
| Actor 1: Customers  Actor 2: Device  Actor 3: Bluetooth |

| 3. Assumptions / Constraints - *Judgments concerning unknown factors and the future which are made in analyzing alternative courses of action, or outside of the control of the project team* |
| --- |
| 1. User has Bluetooth making communication easier between devices |

| 4. Pre-Conditions (*What conditions must be present before this Use Case can be used? What triggers the Use Case?*): |
| --- |
| 1. The user must have a device that supports the latest version of Bluetooth  2. |

| 5. Basic Flow (*Describe the most common version of this Use Case. Add lines as needed*): | | | |
| --- | --- | --- | --- |
| **Flow Identifier:** | | **The user adds a device to pair up** | |
| **Step** | **User Action** | | **System Response** (optional) |
| 1 | The user uses Bluetooth to connect their device | | Bluetooth finds devices that support the latest version |
| 2 |  | | The device is updated to the latest version |
| 3 |  | | The device sends a pairing info |
| 4 |  | | The device accepts the message and is connected to all the other devices |

| 6. Exception Flows (*Describe Error Conditions. Add additional flow identifier blocks as needed*): | | |
| --- | --- | --- |
| **Flow Identifier: The device contains Bluetooth, but does not support the latest version** | | |
| **Step** | **User Action** | **System Response** (optional) |
| 1 | The device features Bluetooth with an outdated version | Sends a message saying that the device is not supported on the latest version |
| 2 |  | Does not connect to all the other devices that have the latest version of Bluetooth |

| 7. Post-Condition – (*list state of system and outputs at end of this use case*) |
| --- |
| This use case can end with any one of the following post-conditions:  1. All devices that have the latest version of Bluetooth can interact with each other |

| 8. Created by- *(name and date)* |
| --- |
| Created by Ethan Chen on December 14, 2022 at 4:43PM |

**Begin Cleaning Process Use Case Description - Created by Jade Bedlington**

For the cleaning process, the goal of this use case it to make sure there are no individuals in the building/place the UV cleaner will cleanse at the end of the day. The employees will do a manual sweep of the building/workplace to make sure there are no one, if they see people, they can make the decision to put the cleaning process on hold or ask them to leave and continue. If they continue, they will then prompt the UV cleaner to do a motion test before cleaning, if there is motion detected, a message is displayed to the employees. If there is no motion, a 30 second timer is activated before the cleaning so the employees can leave. After the 30 seconds the cleansing of the building starts.

**Display time since last activation – Created by Honore Signe Signe**

After the UV cleaner did its job, it will notify the user’s cell phone that will display information about the last activation.

Actor 1: Customers

Actor 2: Python

Actor 3: Cell Phone

**Assumptions / Constraints - Judgments concerning unknown factors and the future which are made in analyzing alternative courses of action, or outside of the control of the project team**

1. There are people inside the building

2. Nobody has left

**Pre-Conditions (What conditions must be present before this Use Case can be used? What triggers the Use Case?):**

1. The UV Cleaner is in its cleaning process while the customers are still out

**Basic Flow (Describe the most common version of this Use Case. Add lines as needed):**

**Flow Identifier: The customer gets notified about the last activation; Step User Action System Response (optional)**

1. The UV cleaner finishes its job When the timer is done, it stops the activation of the UV lights

2. Cell phone gets notified Python sends a signal to notify the user’s cell phone about its last activation

3. The user’s cell phone gets a notification that will display information about the last activation

4. User enters the building The doors will unlock when they see someone at the front door

**Post-Condition – (list state of system and outputs at end of this use case) This use case can end with any one of the following post-conditions:**

1. The user can see when the UV cleaner was last activated based on the notification, they get on their cell phone.

|  |  |
| --- | --- |
| **Use Case Name:** | Cleaning Process |

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| 1. Description (*Provide a brief description of this Use Case*) |
| --- |
| The building has a set of cameras and sensors built on the ceiling and checks if there is any activity going on. |

| 2. Actors – *(add lines as needed)* |
| --- |
| Actor 1: Customers  Actor 2: Sensors  Actor 3: Cameras  Actor 4: UV Lights |

| 3. Assumptions / Constraints - *Judgments concerning unknown factors and the future which are made in analyzing alternative courses of action, or outside of the control of the project team* |
| --- |
| 1. There are people inside the building 2. Nobody has left |

| 4. Pre-Conditions (*What conditions must be present before this Use Case can be used? What triggers the Use Case?*): |
| --- |
| 1. There is some activity going on in the building  2. |

| 5. Basic Flow (*Describe the most common version of this Use Case. Add lines as needed*): | | | |
| --- | --- | --- | --- |
| **Flow Identifier:** | | **The customers leave the building** | |
| **Step** | **User Action** | | **System Response** (optional) |
| 1 | The customers are inside the building | | The camera and sensors detect that there is activity going on inside the building |
| 2 | The customers leave the building when they’re ready | | The camera times if there is no activity for 10 minutes |
| 3 |  | | The sensor sends a signal to the automatic locker to lock all doors inside the building |
| 4 |  | | The timer activates the UV lights for two minutes while nobody is in the building |
| 5 |  | |  |

| 6. Exception Flows (*Describe Error Conditions. Add additional flow identifier blocks as needed*): | | |
| --- | --- | --- |
| **Flow Identifier: UV light rod does not work** | | |
| **Step** | **User Action** | **System Response** (optional) |
| 1 | Customers have left the building | A two-minute timer starts after 10 minutes of inactivity |
| 2 |  | The UV light rod is broken and cannot operate |
| 3 | Customer get a notification saying that the light rod is broken | Notification is sent to the customer’s phone saying that the system is not working properly and stops the process |
| 4 |  | Sensor sends a signal to the automatic locker to unlock the doors |
| 5 | Customer returns to the building and turns off the UV cleaner | The cleaning system is turned off, but the sensors continue working |

| 7. Post-Condition – (*list state of system and outputs at end of this use case*) |
| --- |
| This use case can end with any one of the following post-conditions:  1. The UV cleaner is very functional and can interact with the timer, camera and the sensors  2. |

| 8. Created by- *(name and date)* |
| --- |
| Created by Ethan Chen on November 30, 2022 at 11:23PM |

**Activity Diagrams**

Cleaning Process

Diagram

Description automatically generated with medium confidence

Device Interaction

Graphical user interface, application

Description automatically generated

End of Day

Graphical user interface, application

Description automatically generated

Security

**Diagram

Description automatically generated**

**Class Diagram**

**Timeline

Description automatically generated**

**Closing Memo**

As a group, we have never built a system that no one has seen before. Our system had a lot of features that needs to interact with not only devices, but with wireless pairing such as Bluetooth. This will help shape the future of technology since it will be used to make cleaning easier rather than having a single person using a sanitizing product to clean the whole building. Thanks to Ray, he was able to help us format the document and to answer our questions.

This project is intended to help the company improve on its products and to manufacturer it to those who are interested. Picking out a system to design may be challenging, but it can have some disadvantages such as skin cancer. A lot of planning is required to make sure the system works properly so that it suits the customer’s needs.

Thank you to those who worked on the project and I hope it will be useful as a sample for future SYDE students.