SECP 1513 – Sect. 04
TECHNOLOGY AND INFORMATION SYSTEM

PROJECT: Low Fidelity Prototype (Part 1)

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1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

1.1.1 Our choice of system for this project is the Home Security System based on Internet of Things Applications, which plays a huge part as the drive for technology in the 4th Industrial Revolution. This system will ease and enhance the security of the house from potential threats with advanced IoT devices that fasten the responses and actions taken to ensure the security of the surroundings remotely.

1.1.2 This project emphasizes the application of the Internet of Things (IoT) to deliver excellent performance in securing the house and the surroundings from various threats.

1.1.3 This system provides multiple security services for the smart house which has the ability to solve all problems proposed in this report by implementing IoT devices all around the house.

1.1.4 All of the security services can easily be monitored and controlled at any given time and place by the end-users (house owners) with ease using the application specialized for this purpose in their personal computers and smartphones.

1.2 PROBLEM STATEMENT

This system is designed specially to solve some issues faced by the consumers, the house owners in the security management of their houses which may potentially pose a great threat to the house and the occupants with their priced belongings.

1.2.1 House owners and their families seem to have difficulties in getting to know the person who rings the doorbell at the front gate. Traditionally, they may have to just peek through the peephole on the door, or even worse, if they do not have any peephole, they have to just open the doors, which is at great risk, as they don't even know who is at the front of their house. Hence, this action may lead criminals and burglars to easily barge into the house and cause harm to the families and their belongings.

1.2.2 Another problem that the house owners may experience is that they may find it hard to identify any attempt of intrusion or people trying to sneak into the house no matter if the house owners are in the house or outside away from the house. Hence, this shows a weak spot for thieves to easily sneak into the house to steal precious belongings such as cash and jewelry. This would cause a lot of loss to the house owner since the security of the house is insufficient.

1.2.3 House owners may also experience trouble if they keep forgetting to make sure that their house doors and windows are locked since we are normal human beings with limited capabilities of memory. Thus, this would cause a hard time for the owners since they need to go back to their house to lock the doors and windows, and that is even if they are willing to do so. If that is not the case, then the doors or windows are left unlocked, making the intruders' lives easier to break into the house.

1.2.4 Keeping track of personal belongings is quite exhausting and tiresome sometimes, as people are getting even busier as time goes on. This situation often favors the house cleaners, electricians, or even plumbers who become attracted to these personal belongings and intend to steal them. This situation always occurs and causes the house owner to be extra careful each time any strangers are invited into the house.

1.3 PROPOSED SOLUTION

Based on the problem statement given, we decided to use a video doorbell system. In this system, security combines the functions of smartphones and home network systems. It enables the users to monitor visitors in real-time, remotely via the IoT-based doorbell camera. These captured visuals are also processed for finding potentially harm-causing objects. This system makes security further autonomous by capturing the image automatically and processing the image for facial matching and using mail communication to the server to confirm the intruder is known or unknown.

Other than that, we also decided to design a system that can alert the owner of an intruder break-in by sending a notification to their smartphones. In this system, we use web cameras such that whenever there is any motion detected by the camera, it sounds an alarm and sends a mail to the owner. The owner will also have the ability to stop or start the alarm remotely using just his smartphone. This system will help the users to safeguard their homes by placing the system on the doors or windows and monitoring the activity through their smartphones. When the owner is not at home. The IoT network consists of embedded electronics, sensors, and software from their home, they want to be assured that their home is protected by intruders and thieves while they are gone. This is why the proposed system keeps the owner informed in real-time about the security status of their home. The designed system informs the user when there is a break-in so that the user can take necessary actions.

Next, we also decided to use a remote lock control system. In this system, it is compatibility with other IoT devices, smart assistants, or smart home management systems adds to the usefulness of smart locks. When the door is unlocked, these tasks can include automating operations like turning on lights and changing the temperature, or triggering the security system to record and send video if the door is unlocked outside of normal hours. We also put the sensors on the door and the windows to inform the homeowner as soon as the door or the windows is opened by sending a Push notification. The user will get this notification irrespective of whether the phone is locked or unlocked.

1.4 PROJECT OBJECTIVES

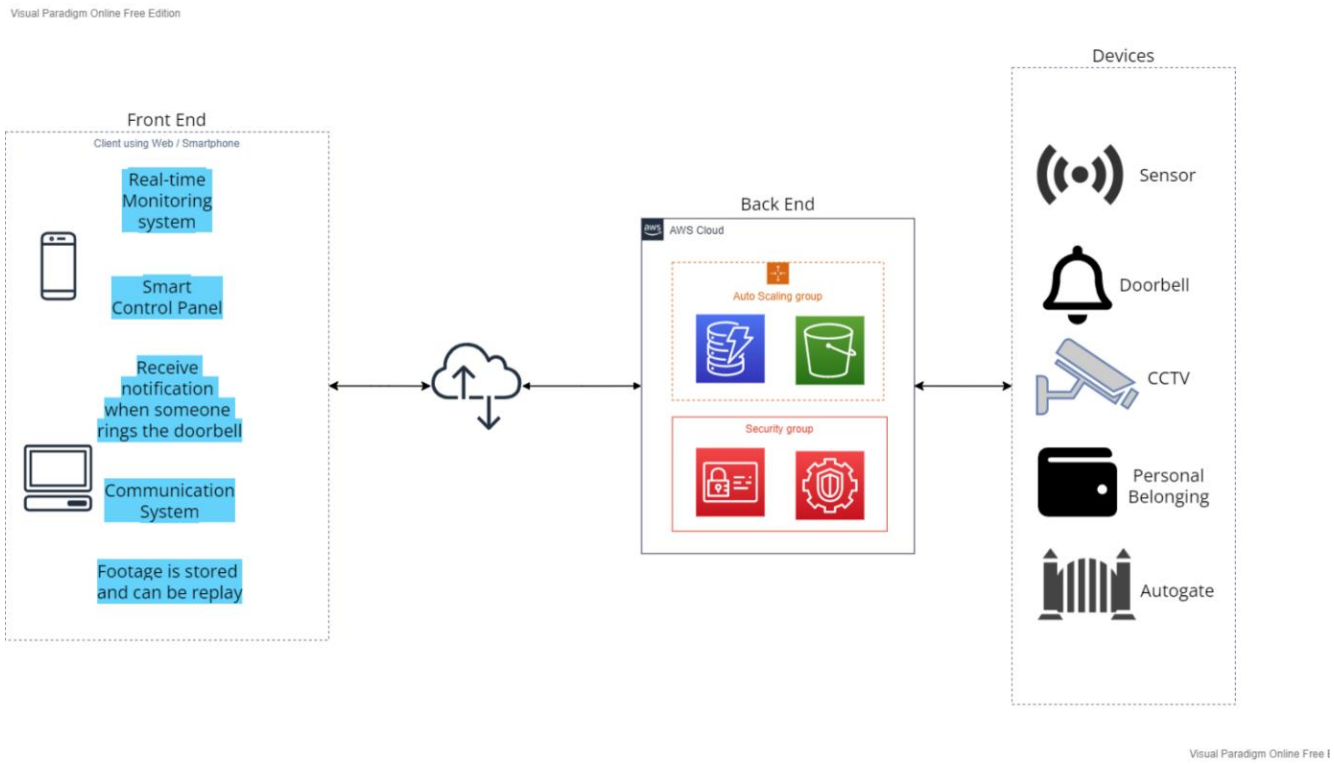
1.3.1 Design a system that can alert the owner and easily monitor our front-door traffic in real-time and send a notification to their smartphones.

1.3.2 Design a system that can alert the owner of an intruder break-in by sending a notification to their smartphones.

1.3.3 Design a system that can alert the owner when their gadgets have been taken away or moved by sending a notification and alarm to their smartphones.

2.0 PROPOSED PROTOTYPE

2.1 CLOUD COMPUTING ARCHITECTURE (DESIGN)



2.2 DESIGN BREAKDOWN

- Amazon Simple Service and Amazon DynamoDB

Amazon Simple Storage Services (S3) and Amazon DynamoDB are placed in the auto-scaling group. This means that users can be scaled up or down the storage capacity based on users' requirements. For the Amazon Simple Storage Service (S3) the data such as images and videos can be stored and collected as objects in buckets securely. It provides low latency access to the data over the internet, can easily access the data anytime and anywhere. Secondly, Amazon DynamoDB is a fast and flexible NoSQL database service. It partitions the data into the table and performs the data backup for safety purposes. In our home security management system, the video footage that is recorded will be stored into the Amazon Simple Storage Services (S3) whereas the Amazon DynamoDB will perform data backup and classify the video footage into different timelines like years, months and days. If we accidentally lost our data, we are still able to retrieve the data back. Besides, if there is an intruder detected or our personal gadgets are moving away, a notification will send to the user through the database.

- Security Identity & Access Management and Amazon Guard Duty

Furthermore, we also have Security Identity & Access Management and Amazon Guard Duty in the security group. We placed the security group in our backend is to prevent computer security threats such as malware, hackers, virus, and so on in order to shield our data from malicious activities. Security Identity & Access Management provides a high level of data protection, the developer can grant different permissions like view only, view and create only to certain people or groups for specific resources only. It also provides multi-factor authentication (MFA), the user not only provides a password but also a special code from the configured device when the user wants to log in to their own account. This will protect the data from being stolen or theft by someone else. Second, the Amazon Guard Duty is a threat detection service to guard the stored data. It will guard against threats, malicious activity, and unusual data access. The video footage and personal information of the user will be protected from being stolen or hacked by an unknown person. In our home security management system, we use these two resources, Security Identity & Access Management and Amazon Guard Duty to strengthen the security of our application and prevent cybersecurity threats.

2.3 POTENTIAL CLIENTS

- House Owners

Our home management system is available for everyone who has a house. People who know how to use a gadget and have a house are our potential clients. We mainly focused on the home security systems instead of the big company or factory security systems. The home management system is applicable for people aged 12 or above to use it.

3.0 CONCLUSION

To conclude, we believe that this project will be useful and helpful to billions of people that own houses. With the implementation of the 4th IR technology, this system has come to fruition into a completely better version of its past system. The house security systems in the past are incomparable to this system that is available on the market nowadays. We strongly believe that with putting enough effort and time, this project has the potential to compete with other house security systems in the market nowadays.

Moreover, as it's already been explained, this project is solving a lot of problems that are faced by house owners these days. For example, the family members are able to view who is rigging the doorbell in a safe manner from their phones which avoids unfriendly people like burglars, and thieves from entering the house. This system also helps the families to be safe from intruders with the aid of a great alarm system surrounding the house. The family members also could control the locks on their doors and windows from anywhere anytime in case they forgot to lock them ahead of time. This system also, helps the client to keep their personal belongings intact all the time with the help of sensors.

Besides the benefits, there are certain limitations to the project. Firstly, the system requires the user to have a good internet connection. Although there are certain features in this system that do not require internet access to be used, it is recommended to have a good internet connection so that it is possible to send information quickly and efficiently with high-quality footage. Secondly, it will cost some money for the installations process of the system and hardware around the house. With the benefits and safety that are provided, we believe that the money spent on this system is affordable compared to other house security systems in the market. We also believe that life is more important compared to the money that is going to be well spent on this system. With that, we hope that this project will lessen the worries of the world in the matter of thieves and burglars that are increasing day by day and able to live life in peace and harmony.