Project Charter

Project title: Smart Home Security System using AWS Services

Project sponsor: Rohit Rokka **Date prepared:** 01/03/2023

Project manager: Rohit Rokka

Executive Summary:

The market for smart home security systems is growing rapidly, driven by factors such as increased concern for home security, the proliferation of connected devices and the Internet of Things (IoT), and advances in artificial intelligence and machine learning technologies. One of the current problems with smart home security systems is their susceptibility to cyberattacks. As smart home devices and systems become more interconnected, the risk of a security breach increases. Hackers can potentially gain access to a user's network through vulnerabilities in these devices and systems, compromising not only the security of the smart home but also personal and financial data.
I have proposed to solve the current issues of smart home security system by creating a new system with AWS services to by using IMU sensors that measure the motion, orientation, and direction of an object, using accelerometers, gyroscopes, and magnetometers.

Project Justification or Purpose:

Project purpose: to detect unusual or unauthorized movements for home security by triggering alarms and push notification.

While IMU sensors can provide added security measures in a smart home security system, there are also some challenges that need to be addressed. Some of the potential challenges are:

1. Power consumption: IMU sensors require power to operate, and if they are not properly optimized, they may drain the battery of a smart home device quickly. This can be particularly problematic if the sensors are installed in hard-to-reach locations, requiring frequent battery replacement or charging.
2. Compatibility issues: IMU sensors from different vendors may use different communication protocols, making it difficult to ensure compatibility with other devices in the smart home security system. This can lead to interoperability issues and potential security gaps.

3. False alarms: IMU sensors may trigger false alarms if they are not properly calibrated or placed in the right location. For example, if a sensor is too sensitive, it may trigger an alarm if a pet jumps onto a couch or a plant moves due to a breeze.
4. Cost: IMU sensors may be more expensive than other types of sensors, making them less accessible for some homeowners. The cost of sensors can also add up quickly, especially if a large number of sensors are required to provide comprehensive security coverage.
5.

Project Description:

This project aims to create a smart home security system using IMU (inertial measurable unit) using AWS services to detect movements or vibrations at home.

The methods for achieving the goals for this project are as follows:

An appropriate IMU sensor that is capable of detecting motion and orientation changes, and that has a compatible communication protocol will be chosen along with its own set of features and specifications.
The sensor can capture the motion or any type of movement that derivates from unusual patterns into the system. Motions can be unusually slow, fast or erratic or motion that occurs in patterns that are inconsistent with typical human or animal movement. This can include motion that occurs outside of predefined time periods, such as when the homeowner is away or asleep, or motion that occurs in areas of the home that are typically unoccupied.

The IMU sensor will be connecting to the Arduino microcontroller which will be responsible for collecting data from the sensor and transferring it to the AWS cloud. AWS IoT core account will be set up through which we can securely connect IoT devices to the cloud for the dataset. We can manage, process and analyze the data as it generates.

Initial Risks

	Impact				
Likelihood	Insignificant	Low	Moderate	Major	Critical
Certain	MEDIUM	MEDIUM	HIGH	EXTREME	EXTREME
Likely	LOW	MEDIUM	MEDIUM	HIGH	EXTREME
Possible	LOW	LOW	MEDIUM	MEDIUM	HIGH
Unlikely	LOW	LOW	LOW	MEDIUM	HIGH
Rare	LOW	LOW	LOW	LOW	MEDIUM

Risk ID	Risk assessment	Probability	Impact	Score	Strategy	Response
1	Inability to use the necessary Software/Tools/Programs for the Project	Possible	Critical	high		Avoid
2	Impracticability of the Project proposal.	unlikely	major	medium		Mitigate
3						

Project Deliverables:

An IMU sensor that will capture the motion or movements will be detected by the microcontroller along with the help of AWS IoT service.

Summary Milestones:	**Due date:**
Setting up AWS account	01/03/2023
Literature review with 10 articles on home security system	12/03/2023
Buy hardware components (IMU sensor and microcontroller)	19/03/2023
Setup AWS lambda for IoT devices	26/03/2023
Prepare for Early-stage presentation	02/04/2023
Setup Arduino microcontroller to AWS IoT services	12/04/2023

Summary Budget Feasibility:

With the budget, I believe it will not exceed 150 AUD which will be the source of expenses being to the hardware components (IMU sensor and Microcontroller) Register AWS service as a free tier.

Initial Stakeholders:

Stakeholders	Impact	Duties
Admin Panel	High	Reviewing the project title and giving feedback
Mahdi Saki	High	Assisting with similar projects on the related topic and giving feedback
Rohit Rokka	High	Setting up AWS account and look for hardware components I.e., IMU sensors

Project Objectives and Success Criteria

Scope:

The project will consist of imu sensors that can measure the motion, orientation, and direction of an object, using accelerometers, gyroscopes, and magnetometers. We will be using AWS services and tools to analyze data collected by IMU sensors and trigger actions or alerts in real-time. Like AWS IoT core to securely connect and manage IMU sensors in a smart home security system. The sensors can send data to AWS IoT Core, which can then be analyzed in real-time to detect anomalies or trigger alerts. I will be using Amazon Rekognition to analyze video data collected by IMU sensors to detect faces and objects. This can be particularly useful for tracking movement and detecting potential security threats.

Time

The project is expected to be completed at the latest on May 16th,2023

Cost

The costs of this project will not exceed $150.

Quality

The project must be able to detect the motion and direction of anything that tries to trespass through the front door.

Acceptance criteria

To be accepted the project must be able to detect intruders and enhance overall security by trigging alarms and push notifications.

Approvals:

Rohit Rokka	TAFENSW
Project Manager Signature	Sponsor or Originator Signature
Rohit Rokka	TAFENSW
Project Manager Name	Sponsor or Originator Name
05/03/2023	05/03/2023
Date	Date