Project Proposal - SafeT Alarm

1. Name of Teammates: Alexis Lee, Stephanie Chen, Hanh Nguyen, Regina Norton

2. Project Description:

a. Initiative

Our project seeks to solve the issue of campus security and overall life safety. By providing users with the ability to notify authorities and activate an alarm, users will be better equipped to protect themselves. This initiative aims to provide individuals with a reliable and convenient safety solution, promoting a safer environment.

b. Background

Centers for Disease Control and Prevention reports that "over half of women and almost 1 in 3 men have experienced sexual violence involving physical contact during their lifetimes" (CDC). Additionally, there were nearly 25,000 lives lost to homicide in 2020. Violence is common and affects all people, and youth and young adults are "especially vulnerable to community violence" (CDC). We can attempt to address these issues through the implementation of a safety device that will hopefully deter assailants.

Safety alarms are not new, and have been implemented as home security devices, attempted car burglary alarms, and more. They may provide video monitoring services, a physical speaker, and real-time alerts, in order to solve issues of theft, fire safety, and home protection. As society develops, so too, does technology. The creation of new inventions and tech has prompted an evolution in the devices that we use, and has expanded the potential applications of safety alarms beyond conventional areas such as healthcare, transportation, and public safety.

c. Motivation

We are committed to safeguard lives and promote peace of mind. Recent trends in crime rates, emergency response times, and a rising awareness of personal safety has brought with it a pressing need for innovative safety solutions. In the modern age, family members and trusted friends can be notified almost instantly when a victim is in danger. Technology can be harnessed as a tool to create easy, and affordable ways to provide protection. In light of these developments, it is imperative that we address these safety concerns to the best of our ability. This project proposal seeks to leverage advancements in mobile devices and GPS technology to create a cutting-edge safety alarm that meets current needs and also anticipates future challenges.

d. Objective

- Creating a safety device that sends out a text message from a person's phone to alert first responders/police. For the purposes of demonstrating, we will have the messages sent to three chosen contacts.
- Bluetooth Connectivity: Establish a secure and efficient Bluetooth connection between the Arduino device and the user's smartphone.
- Distress Button Integration: By pressing a physical button (e.g., Arduino), triggers the sending of distress messages to designated contacts, and a speaker alarm feature that deters assailants.
- Contact Management: Implement a contact management system that allows users to configure their top three close contacts.
- Safety and Privacy: Ensure that all data transmission is secure and respects the user's privacy.

e. Functions

The proposed safety alarm system has been designed with user convenience and simplicity in mind. The device features a single, multifunctional button that serves as a central control point for the safety alarm's functions. The safety alarm system, accessible through a single button on the device, include:

- Warning/Attention Siren: The safety device will emit a loud alarm in order to draw attention in case you need assistance, or startle attackers.
- Text Message Alerts to Designated Contacts: The button will trigger the system to send text message alerts and notifications to predefined contacts and emergency services.

f. Competitor Products

- Personal Alarm Keychain
  - https://shorturl.at/eNRY9
  - Loud safety siren sounds when panic button is pressed or safety pin is pulled
- Birdie Personal Safety Alarm
  - https://shorturl.at/BNQTU
  - Has a loud alarm and flashing strobe light designed to deter an attack

3. Project Management:

a. Breakdown of Tasks

- Design Phase:
  - Hardware Design: Responsible for designing the physical components of the Arduino safety device, including selecting the necessary sensors, buttons and enclosure.

        - Software Architecture: In charge of designing the software architecture for the device, how it will handle Bluetooth connectivity, and message composition.
        - User Interface Design: Focus on designing the user interface for the device, make sure it is user-friendly and intuitive
    - Implementation Phase:
        - Hardware Assembly: Take the lead in assembling the physical components of the Arduino device based on the hardware design.
        - Software Development: Start implementing the software components of the project, focusing on Bluetooth connectivity and basic functionality.
        - User Interface Development: Begin implementing the user interface for the companion mobile application ensuring it matches the design specifications.
    - Testing Phase:
        - Hardware Testing: Conduct hardware testing to ensure that all components of the Arduino safety device are functioning correctly.
        - Software Testing: Test the software components, including Bluetooth connectivity, message composition.
        - User Interface Testing: Focus on testing the user interface for both the device and the mobile application, ensuring a smooth user experience.

b. Project Timeline/Milestones

- Wednesday (9/06): Define project scope, objectives and align on goals.
- Wednesday (9/13): Turn in the project proposal and purchase hardware components.
- Wednesday (9/27): Develop code for, and put together hardware for the alarm at the press of a button.
- Wednesday (10/18): Develop code for, and put together hardware for SMS messaging system.
- Wednesday (10/25): Test safety alarm functionality and record demo video showcasing its features.
- Wednesday (11/8): Finish project report and ReadMe files.

c. Distribution of Tasks

- Each group member can be involved in one or more development task categories
- Agile development (Sprints) or Waterfall development
    - Bluetooth or wifi device connectivity: Hanh, Stephanie
    - Hardware set-up: Alexis, Regina
    - Software development: all
        - Functionality:

        - Button press → text message alert: Hanh, Stephanie
        - Button press → trigger alarm: Alexis, Regina
    - Establishing the link between the smartphone and Arduino: Hanh, Stephanie
- Record demo video: all
- Project report: all
- Source code & ReadMe file: all

d . Current Progress:

- Completed the project proposal
- Purchased all needed devices