GNI - National Hackathon 2023 Acropolis Institute of Technology and Research, IndoreDraft Idea Submission

Team Name: Kavach

Theme: Security and Surveillance

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**Problem Statement:**

In today's society, personal safety and security have become paramount concerns. The limitations of current SOS technologies, which often lack efficiency, accuracy, and reliability, have left individuals in vulnerable situations without a reliable means of seeking assistance. Moreover, existing methods may compromise user privacy or raise suspicion, further exacerbating the problem. To address these pressing challenges, our project aims to develop a comprehensive mobile application that not only ensures anonymity but also provides a reliable and efficient solution for emergency situations. By combining innovative features and advanced technology, our solution will empower a larger audience to seek help promptly and discreetly, thereby enhancing overall personal safety.

**Proposed Solution:**

Our proposed solution is a mobile application called "Kavach." The application will provide a comprehensive set of features to ensure user safety and enable quick response during emergency situations.

Firstly, Kavach will offer a unique speech recognition feature that will be active at all times. Similar to saying "Ok Google" to activate voice recognition, users can trigger the SOS alert by speaking a predefined keyword or phrase. This hands-free functionality will provide a convenient and discreet method for sending an SOS message.

Kavach will offer a unique speech recognition feature that operates during phone calls. By leveraging advanced voice recognition technology, the application will detect specific trigger words spoken by the user during a call, automatically activating the SOS alert.

Users will have the freedom to choose their own trigger word, such as "help" or "emergency," which, when spoken during a call, will immediately initiate the SOS process. Upon detection of the trigger word, Kavach will discreetly send an SOS message, including the user's location information and images from the front and back cameras, to pre-selected emergency contacts.

This innovative speech recognition feature ensures that even in a monitored or supervised situation, individuals can discreetly and safely send an SOS alert without arousing suspicion. By leveraging the existing phone call functionality, Kavach expands the scope of SOS capabilities and offers an additional layer of safety during critical moments.

With the integration of speech recognition during phone calls, Kavach provides users with a comprehensive and discreet solution for emergency situations. This feature enhances personal safety by allowing individuals to trigger an SOS alert simply by speaking a pre-defined trigger word during a call, ensuring swift assistance and peace of mind.

 Additionally, Kavach will integrate a fingerprint recognition feature for sending SOS alerts. Users can register their fingerprint, and in a critical situation, a simple touch of the fingerprint sensor will activate the SOS alert, ensuring quick response without drawing attention.

Furthermore, the application will include the SOS pattern on a custom lock screen interface. By entering the designated SOS pattern, users can trigger an immediate SOS alert. The application will then automatically send an SOS message, including the user's location information and images from the front and back cameras, to pre-selected emergency contacts.

To prioritize user safety and maintain anonymity, Kavach will not display any notifications or indications that an SOS alert has been sent. This discrete approach ensures that potential attackers are unaware of the distress call, minimizing the risk to the user.

By combining speech recognition, fingerprint recognition, and the custom lock screen SOS pattern, Kavach offers a versatile and reliable solution for individuals in emergency situations. The application aims to empower users with various methods to send SOS alerts quickly and discreetly, enhancing personal safety and providing peace of mind.

**Key Features and Functionality:**

* Custom lock screen interface for setting up an SOS pattern.
* Voice recognition functionality to trigger the SOS alert during phone calls and also personal trigger assistant.
* Fingerprint recognition feature for quick activation of the SOS alert.
* Instant capture of images from the front and back cameras for documentation purposes.
* Sending of SOS messages containing the user's location information and captured images to selected emergency contacts.
* Discreet operation without displaying any notifications or indications on the user's device.
* Anonymity and privacy preservation to ensure user safety in sensitive situations.
* User-friendly interface with intuitive controls for easy navigation and usage.
* Compatibility with a wide range of mobile devices and operating systems.

**Expected Outcomes:**

Our project aims to address the limitations of current SOS technologies by providing a comprehensive and efficient solution for personal safety. By developing a mobile application that ensures anonymity and reliability, we strive to achieve the following outcomes:

* Enhanced Personal Safety: The implementation of innovative features and advanced technology will empower individuals in distress to seek help promptly and discreetly. By removing barriers such as privacy concerns and suspicion, our solution will enable users to reach out for assistance without hesitation, leading to enhanced personal safety.
* Increased Accessibility: Our mobile application will be designed with a user-friendly interface, making it accessible to a wider audience. By incorporating multiple trigger methods, including an SOS pattern, speech recognition, fingerprint recognition, and a call feature, we aim to provide a solution that caters to various user preferences and situations.
* Swift Response Time: The integration of real-time location tracking, instant image capture, and efficient message sending capabilities will ensure that emergency contacts receive timely and accurate information. This will facilitate a faster response time, enabling emergency services or designated contacts to provide the necessary assistance promptly.
* Peace of Mind: By offering a reliable and efficient means of seeking help, our solution will provide users with a sense of security and peace of mind. Knowing that they have a discreet and effective tool at their disposal during emergency situations will alleviate anxiety and contribute to a greater sense of personal well-being.

**Technical Approach:**

Here is a detailed technical approach, presented as a roadmap, for the development of the Kavach mobile application:

* Application Architecture and Design:

Define the overall architecture of the Kavach application, considering the integration of speech recognition, fingerprint recognition, and the custom lock screen SOS pattern with the help of Python and Java.

Design the user interface for the custom lock screen interface, ensuring intuitive user interactions and smooth pattern recognition using Python library Kivy.

* Speech Recognition Implementation:

Implement the speech recognition feature using the Python Google Assistant library and API.

Configure the speech recognition module to listen for specific trigger words during phone calls.

Establish the necessary integration with the phone call functionality to detect trigger words and initiate the SOS alert.

* Fingerprint Recognition Integration:

Utilize the selected fingerprint recognition API or library to enable fingerprint registration and recognition within the application.

Implement the necessary logic to capture and store user fingerprints securely.

Establish the integration between the fingerprint recognition module and the SOS alert activation mechanism.

* Custom Lock Screen and SOS Pattern:

Develop the custom lock screen interface, allowing users to set up their SOS pattern.

Implement pattern recognition algorithms to detect the entered SOS pattern accurately.

Integrate the SOS pattern recognition with the SOS alert triggering mechanism.

* SOS Message Sending Mechanism:

Implement the functionality to capture images from the front and back cameras in real-time using OpenCV.

Design and develop the SOS message composition module, including location information and captured images.

Establish secure communication channels to send the SOS message to pre-selected emergency contacts.

* Testing and Refinement:

Conduct rigorous testing of the application, including the speech recognition, fingerprint recognition, and SOS pattern recognition functionalities.

Perform extensive testing scenarios to ensure the reliability, accuracy, and speed of the SOS alert activation.

* Documentation and Deployment:

Prepare comprehensive documentation, including installation instructions, user guides, and technical documentation.

Package the application for deployment on relevant mobile platforms (Android, iOS) and app distribution channels.

Follow best practices for security and data privacy, including encryption of sensitive user information.

By following this roadmap, we will be able to develop the Kavach mobile application, incorporating the speech recognition feature during phone calls, fingerprint recognition for SOS alert activation, and the custom lock screen SOS pattern. This comprehensive solution will enable individuals to send SOS alerts quickly and **discreetly, enhancing their personal safety and security in emergency situations.**

**Resources Required:**

Python programming language and relevant libraries/frameworks (SpeechRecognition, OpenCV, Kivy, PyFingerprint or Fingerprint recognition SDKs).

Development environment (IDE or text editor).

Mobile device or emulator for testing.

Documentation and references for utilizing telephony APIs and integrating call functionality.

**Timeline:**

* Week 1: Research and familiarization with relevant libraries and frameworks, including SpeechRecognition, OpenCV, Kivy, and fingerprint recognition libraries.
* Week 2: Implementation of the custom lock screen interface for setting up an SOS pattern and integration of pattern recognition functionality.
* Week 3: Integration of voice recognition using the SpeechRecognition library for detecting trigger words or phrases during phone calls.
* Week 4: Development of the fingerprint recognition feature, incorporating the selected fingerprint recognition library and logic for authenticating the user's fingerprint.
* Week 5: Implementation of the call feature, utilizing telephony APIs to initiate emergency phone calls from the application.
* Week 6: Testing, debugging, and refinement of the application, ensuring all features work seamlessly together. Finalize the project, document the code and functionalities, and prepare for submission.

**Conclusion:**

In conclusion, the Kavach project aims to address the limitations of current SOS technologies by providing a comprehensive and efficient solution for personal safety and security. Our mobile application, equipped with features such as a custom lock screen with pattern recognition, voice recognition during phone calls, instant image capture and even fingerprint recognition offers a discreet and reliable means for individuals to seek help in emergency situations.

By prioritizing user privacy, anonymity, and the efficient transmission of vital information, our project strives to empower every single soul to enhance their personal safety. With a focus on user-friendly design and seamless integration of cutting-edge technologies, Kavach aims to revolutionize the way individuals can access help promptly and discreetly.

We are excited about the potential impact of Kavach in addressing the pressing challenges of personal safety and security in today's society. Through our commitment to research, innovation, and user-centred design, we are dedicated to creating a mobile application that can make a significant difference in ensuring the well-being and peace of mind of individuals facing emergency situations.

By developing Kavach, we aspire to contribute to a safer society and empower individuals to confidently navigate their day-to-day lives, knowing they have a reliable and discreet solution to seek assistance when needed.