# AI Voice Assistance for Safe and Independent Mobility of Older Adults in Cities

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**Abstract:**
The Voice Assistant Mobile Application is developed to enhance daily travel convenience and personal safety through hands-free interaction. Built using Flutter for cross-platform support on Android and iOS devices, the app integrates modern technologies such as voice recognition, real-time navigation, multilingual communication, and smart safety alerts. Users can log in using traditional or biometric authentication and set an emergency contact to ensure immediate assistance during critical situations. The application provides voice-controlled navigation with turn-by-turn guidance while eliminating the need for manual inputs on the screen. Additionally, built-in motion sensors such as the accelerometer and gyroscope detect sudden falls or abnormal movements, triggering alerts to the emergency contact if needed. With its combination of safety features and intelligent navigation, the app serves as a practical, reliable, and accessible companion for everyday travel, especially for users requiring enhanced mobility support.

**Key Words:** Voice Assistant, Mobile Navigation, Flutter, Real-Time Location Tracking, Personal Safety, Biometric Authentication, Voice Recognition, Emergency Alert System, Fall Detection.

## INTRODUCTION

This mobile application is designed to make daily travel and personal safety easier by using simple voice commands. Users can navigate from one location to another without manually entering any details on the screen. The app is developed using Flutter, ensuring smooth performance on both Android and iOS devices. With features such as voice recognition, location tracking, and smart motion sensors, the application offers a convenient and secure travel experience. The system allows users to register and log in either through traditional methods like email and password or through biometric authentication such as fingerprint and face recognition for faster access. Once logged in, the user can set an emergency contact who will be notified in case of an accidental fall or sudden harmful event. This enhances personal safety by ensuring immediate assistance when needed.

The main feature of the app is voice-controlled navigation. Users can select their travel route using only voice commands and receive real-time guidance such as “turn left” or “go straight,” similar to Google Maps, but with a more personal and hands-free experience. To support a wider range of users, the application includes multilingual support, enabling interaction in languages like English, Hindi, and Marathi.

Additionally, the app uses smartphone sensors including the accelerometer and gyroscope to detect sudden movements or falls. When such motion is detected, the app prompts the user to confirm whether an alert should be sent to the emergency contact. If confirmed, the alert is delivered instantly, and if the user cancels, the system resets automatically.

Overall, the Voice Assistant application successfully combines smart navigation, real-time safety alerts, and multilingual interaction, making it a reliable companion for everyday travel and user safety.

## LITERATURE SURVEY

Bineeth Kuriakose et al. proposed DeepNAVI, a deep-learning–based smartphone navigation assistant designed for visually impaired users. The system identifies obstacles along with their type, distance, position, and motion status, providing real-time feedback through audio. With a lightweight model and fast processing, it can run smoothly on portable devices and has shown good usability based on pilot user testing.[1]

Junhong Zhao et al. developed a voice-based navigation interface for Augmented Reality using Natural Language Understanding (NLU). The study demonstrated that incorporating NLU improved interface accuracy by 15% and made the learning curve easier for new users, though it did not significantly increase productivity.[2]

Yaar Harari et al. introduced a smartphone-based real-time fall detection system that sends alerts with contextual information. It addresses the high risk of injuries from real-life falls, especially in individuals with mobility challenges, and focuses on collecting real-world fall data to improve accuracy and monitoring.[3]

## METHODOLOGY

The proposed system presents a smart mobile application built using Flutter that functions as a personal Voice Assistant for navigation and safety. It allows complete hands-free interaction through voice commands, eliminating the need for typing or manual tapping. Users can securely register and log in using fingerprint or facial recognition. After logging in, they can set an emergency contact who will be notified during critical situations. The app enables users to select their travel route from source to destination using voice instructions and provides real-time turn-by-turn navigation with spoken directions like “turn left’’ or “go straight.’’ To support a wider user base, multilingual functionality is included, offering navigation prompts in English, Hindi, and Marathi. Additionally, the system uses smartphone sensors such as the gyroscope and accelerometer to detect sudden movements or falls. If a potential fall is detected, the app confirms whether the user needs help; if there is no response, the emergency alert is automatically triggered. This system enhances travel safety and convenience, particularly for drivers, senior citizens, and those who travel alone, making it an innovative solution for smart, secure, and accessible navigation.

## OBJECTIVE

1. To develop a voice-controlled mobile application for seamless and hands-free navigation.
2. To provide secure and convenient user authentication through fingerprint and facial recognition.
3. To integrate real-time GPS tracking for accurate route guidance from source to destination.
4. To enhance user safety by detecting sudden falls or emergencies using built-in smartphone sensors.
5. To implement an automatic emergency alert system that notifies the registered contact during critical situations.
6. To create a user-friendly interface suitable for drivers, elderly individuals, and users with physical limitations.
7. To ensure smooth performance on both Android and iOS platforms using Flutter technology.

## PROBLEM DEFINATIONS

Daily travel can be inconvenient and unsafe, especially for drivers, elderly individuals, and people traveling alone. Traditional navigation apps require manual input, which can distract users and increase the risk of accidents. Moreover, these apps do not provide real-time safety monitoring or emergency alert features, leaving users vulnerable in critical situations such as falls or accidents.

There is a need for a hands-free, intelligent navigation system that not only guides users efficiently from source to destination but also monitors their safety in real time. The system should be accessible, easy to use, and capable of sending instant alerts to emergency contacts during emergencies. Additionally, it should support multiple languages to cater to a wider user base and integrate seamlessly with modern smartphones without compromising performance or portability.

## SYSTEM ARCHITECTURE

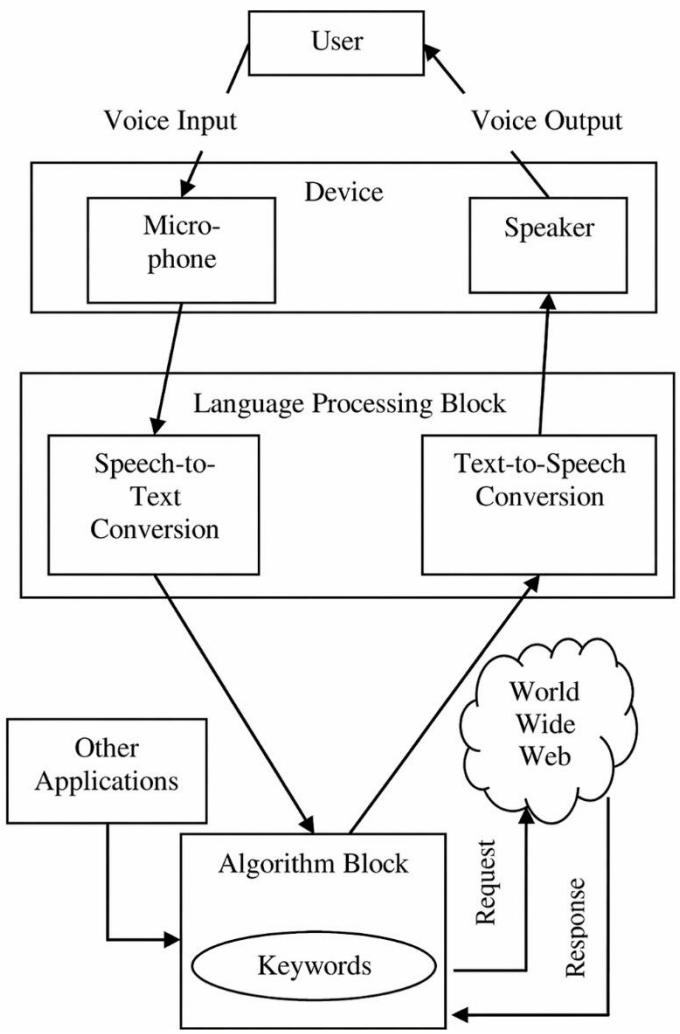



Fig: System Architecture

The proposed system introduces a smart mobile application developed using Flutter that acts as a personal Voice Assistant for navigation and safety. It allows users to interact with the app entirely through voice commands, eliminating the need for manual typing or tapping.

Users can register and log in through multiple secure methods, including fingerprint and facial recognition. Once logged in, the user can set up an emergency contact to be notified during critical events.

The system enables users to select their travel route from source to destination using only their voice. During travel, the app provides real-time turn-by-turn navigation similar to Google Maps, with spoken directions such as “Turn left” or “Go straight.”

The app includes multilingual support for English, Hindi, and Marathi, making it accessible to a wider range of users. It integrates with smartphone sensors such as the gyroscope and accelerometer to detect sudden movements or falls. When such events occur, the app asks the user if they wish to contact their emergency contact. If the user does not respond or declines, the alert is canceled automatically.

This system enhances both convenience and safety, especially for drivers, elderly users, and individuals who travel alone. The combination of real-time navigation, emergency detection, and multilingual interaction makes this project an innovative solution for smart, safe, and accessible travel.

## FUCTIONAL REQUIREMENTS

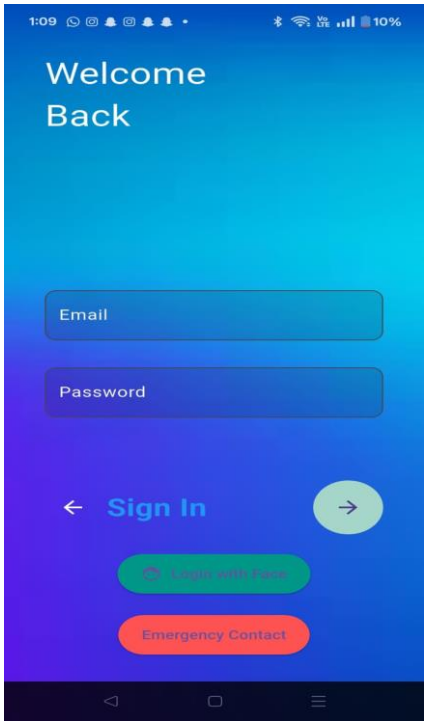
1. The system provides a secure platform where users can register and authenticate themselves using advanced biometric options such as fingerprint and facial recognition.
2. Once authenticated, users can fully interact with the application through voice commands, eliminating the need for manual input.

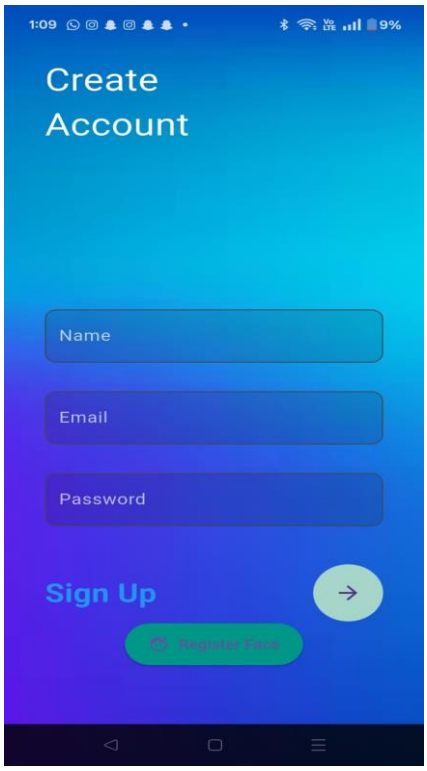
3. The application enables seamless voice-based route selection from source to destination and offers real-time turn-by-turn navigation with spoken instructions. It integrates GPS and mapping services to continuously track the user's location and recalculate the route in case of deviation.
4. To ensure accessibility, the system supports multilingual interaction in English, Hindi, and Marathi.
5. In addition to navigation, the system continuously monitors the smartphone's gyroscope and accelerometer sensors to detect sudden movements, falls, or any abnormal motion that could indicate an emergency.
6. The application provides timely notifications, alerts, and feedback through both voice and visual prompts to ensure smooth and safe travel. All user information, routes, and emergency-related data are securely stored and managed in a cloud-based database.

**NON FUCTIONAL REQUIREMENTS**

1. Performance: The system is designed to deliver high performance by ensuring smooth and fast processing of voice commands, real-time navigation updates, and sensor-based emergency detection with minimal delay.
2. Scalability: The system should be able to grow as the number of users and data increases. For example, if more social media platforms are added or the number of users rises, the system should continue to perform well without needing a complete redesign.
3. Security: Since the system deals with personal and social media data, it must ensure that all information is kept safe and private. Proper encryption, secure login, and restricted access should be used to prevent unauthorized users from accessing or misusing the data.
4. Usability: The interface should be simple, clear, and easy for anyone to use, even for users with little technical knowledge. All features should be well-organized, with instructions and visual indicators that make it easy to understand the results and navigate through the system.

**IMPLEMENTATION**

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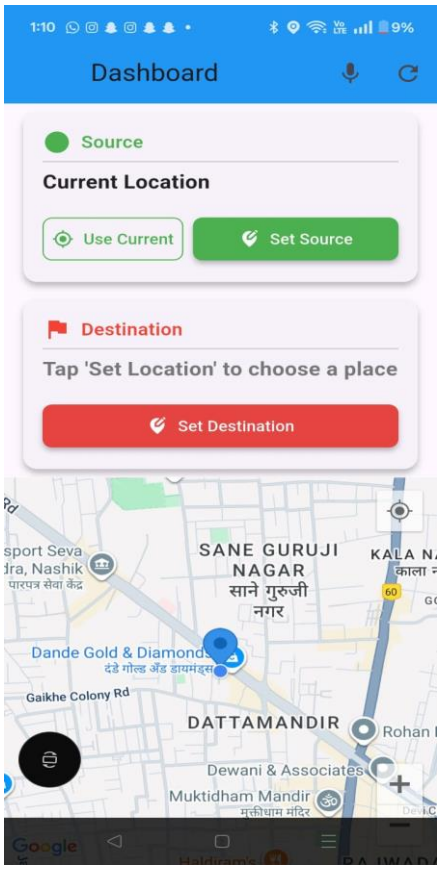
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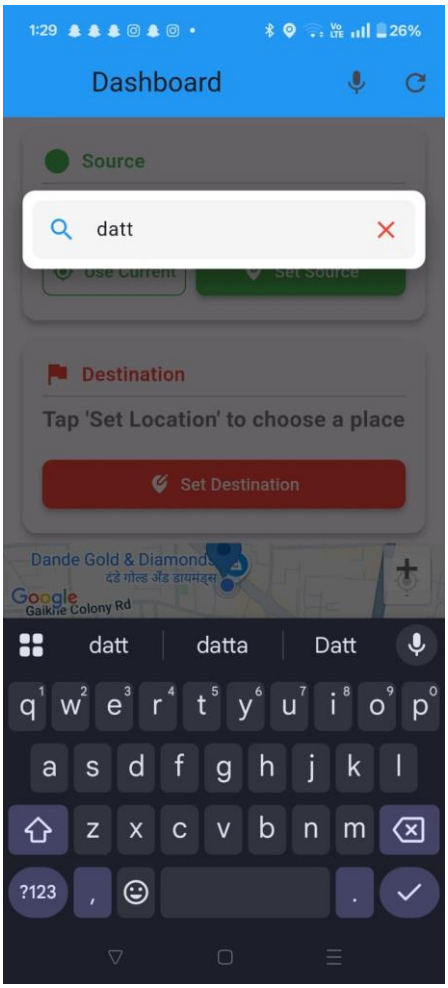


## CONCLUSION

This mobile application offers a smart and hands-free way to make daily travel and navigation easier and safer. It allows users to control the system using simple voice commands, removing the need to touch the screen or type while moving. This feature is especially useful for drivers and travelers who need to stay focused on the road. The app listens and responds instantly, helping users reach their destinations more easily and comfortably. One of the key strengths of this system is its support for multiple languages. Many navigation tools are limited to English, which can make them difficult to use for people from different regions. By supporting languages like Hindi and Marathi in addition to English, this application ensures that users can interact in the language they are most comfortable with. This makes the system more inclusive and user-friendly for a wider audience. Overall, this system combines convenience, safety, and modern technology to make travel smarter and more secure. It simplifies navigation through voice commands, offers multilingual support for better accessibility, and enhances safety through automatic emergency alerts. Together, these features make it a reliable companion for everyday travel.

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