

Empowering Women through AI: Ensuring Safety and Awareness

Shakti safe: An Integrated Women Empowerment and Safety Platform Using Artificial Intelligence

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Abstract: Women face multiple challenges in achieving financial independence and personal safety. Although digital solutions exist, entrepreneurship guidance and emergency safety mechanisms are often provided separately. Women interested in starting businesses may lack structured information about startup opportunities, investment requirements, essential skills, financial assistance, and implementation procedures. Personal safety also remains a concern during travel, education, employment, and daily activities. This paper proposes ShaktiSafe, an integrated mobile application designed to address both challenges through a unified platform. The system consists of a Women Empowerment Module and a Women Safety Module. The empowerment module provides categorized business ideas, estimated investments, required qualifications, essential resources, and step-by-step implementation guidance. The safety module incorporates SOS alerts, voice-activated assistance, live location sharing, and emergency contact management. Artificial intelligence can support business discovery and information access, while mobile computing, database management, and location-based services enable essential functions. Multilingual interaction and an accessible interface are considered to support users with different levels of digital literacy. By integrating economic guidance with personal safety features, ShaktiSafe aims to promote awareness, entrepreneurial participation, confidence, and financial independence.

Key Word: Women empowerment, women safety, artificial intelligence, SOS alert, entrepreneurship, mobile application, GPS tracking, voice recognition, financial independence.

I. INTRODUCTION

Women empowerment is an important factor in achieving social equality, economic development, and sustainable progress. Empowered women can contribute to household income, participate in decision-making, establish businesses, develop professional skills, and support their communities. Technological advancements have created opportunities to access education, business information, financial resources, and safety services through digital platforms.

However, many women continue to experience difficulties in achieving financial independence. Starting a business requires knowledge of market opportunities, investment requirements, essential skills, available resources, customer needs, and business operations. Women who are new to entrepreneurship may find it difficult to identify suitable business ideas or understand the procedures required to establish an enterprise. Limited access to organized information and financial awareness can further complicate the process.

Personal safety is another important concern. Women may experience unsafe situations while travelling, attending educational institutions, working, or commuting between locations. During an emergency, accessing a phone, contacting trusted individuals, and communicating an accurate location may be difficult. Easily accessible emergency assistance and reliable communication mechanisms are therefore important components of a practical safety solution.

Existing technologies provide services for both challenges, but these services are often distributed across separate applications and websites. Women safety.

A. Problem Statement

Women face difficulties in accessing organized entrepreneurship guidance and immediate safety assistance through a single digital platform. Existing safety applications primarily focus on emergency communication and location tracking, whereas business platforms concentrate on startup information, financial guidance, and skill development. This separation creates a gap in comprehensive digital support. A unified mobile application is proposed to provide structured business guidance and accessible safety features in one place.

B. Objectives

The objectives of ShaktiSafe are to:

- develop a unified mobile application for women's empowerment and safety;
- provide categorized startup and business ideas for different investment levels;
- present business costs, qualifications, skills, resources, and implementation procedures;
- support SOS alerts and communication with registered emergency contacts;
- provide live location sharing using location-based services;
- incorporate voice-based interaction for supported application functions;
- provide multilingual access to improve usability; and
- explore artificial intelligence for business discovery and information assistance.

C. Scope

The project focuses on a mobile application that provides business information and safety assistance through two interconnected modules. The empowerment module covers smallscale businesses, home-based enterprises, online businesses, and service-oriented activities. The safety module provides emergency functions such as SOS activation, location sharing, and contact notifications. English, Kannada, and Hindi may be supported if suitable language resources are implemented. The application complements existing safety services and entrepreneurship resources rather than replacing emergency responders, financial institutions, or official programmes.

II. LITERATURE SURVEY AND EXISTING SYSTEMS

A. Women Safety Applications

Women safety applications use mobile technology to help users communicate with trusted contacts during emergencies. Common features include emergency buttons, GPS location tracking, contact management, and alert notifications. When a user activates an emergency function, the application may transmit an alert to selected contacts and include the user's current or most recently available location when permission is available. These applications can reduce the effort required to communicate an emergency. However, effectiveness depends on network availability, device permissions, background execution restrictions, and location accuracy. Most safety applications concentrate on emergency support and do not provide organized information about entrepreneurship or financial independence.

B. GPS-Based Safety Systems

Global Positioning System technology enables mobile devices to estimate their geographical position using satellite signals. Mobile applications can use location services to obtain coordinates and display them on a digital map. In a safety application, location information can be shared with trusted contacts so they can identify the user's approximate position. Indoor environments, tall buildings, poor satellite visibility, and device settings may affect location accuracy. GPS can sometimes determine a position without internet access, but transmitting that position to another person generally requires an available communication channel.

C. Voice-Based Emergency Assistance

Voice-based safety systems allow users to activate selected functions through spoken commands. This approach can be helpful when manually operating a phone is difficult. A voice-enabled application may recognize a predefined command and initiate an emergency workflow. Voice recognition can be affected by background noise, accents, language differences, microphone quality, and device restrictions. The system should therefore provide a manual SOS button as an alternative. Continuous background listening, whisper recognition, and automatic activation require specific implementation and testing.

D. Digital Entrepreneurship Platforms

Digital entrepreneurship platforms provide information about business opportunities, financial planning, training, marketing, and enterprise development. These services can help aspiring entrepreneurs understand the requirements of starting and operating a business. However, information may be distributed across several portals and websites. Users may need to search different sources for investment estimates, required materials, qualifications, operational procedures, and financing information. A structured collection of business ideas can simplify access to relevant information and help users compare opportunities.

E. Artificial Intelligence for Empowerment

Artificial intelligence can support the organization and presentation of business information. An AI-assisted application may identify potentially relevant business ideas according to the user's interests, skills, qualifications, and available investment. AI may also support conversational assistance, language processing, and information retrieval. Reliability depends on source quality and system design. Financial estimates, loan eligibility, legal requirements, and business projections should be verified against reliable sources. AI recommendations should be treated as guidance rather than guarantees of profitability.

F. Limitations of Existing Systems and Research Gap

The review identifies several limitations: safety assistance and entrepreneurship guidance are generally provided through separate platforms; business requirements and financial information may be scattered across multiple websites; general business lists may not match individual interests, skills, and budgets; some emergency workflows require manual phone operation; and limited language or interaction options may reduce usability. Existing safety systems provide useful emergency features but generally do not provide startup planning resources, while entrepreneurship platforms do not usually integrate SOS alerts and live location sharing. ShaktiSafe addresses this gap by combining both services in one application.

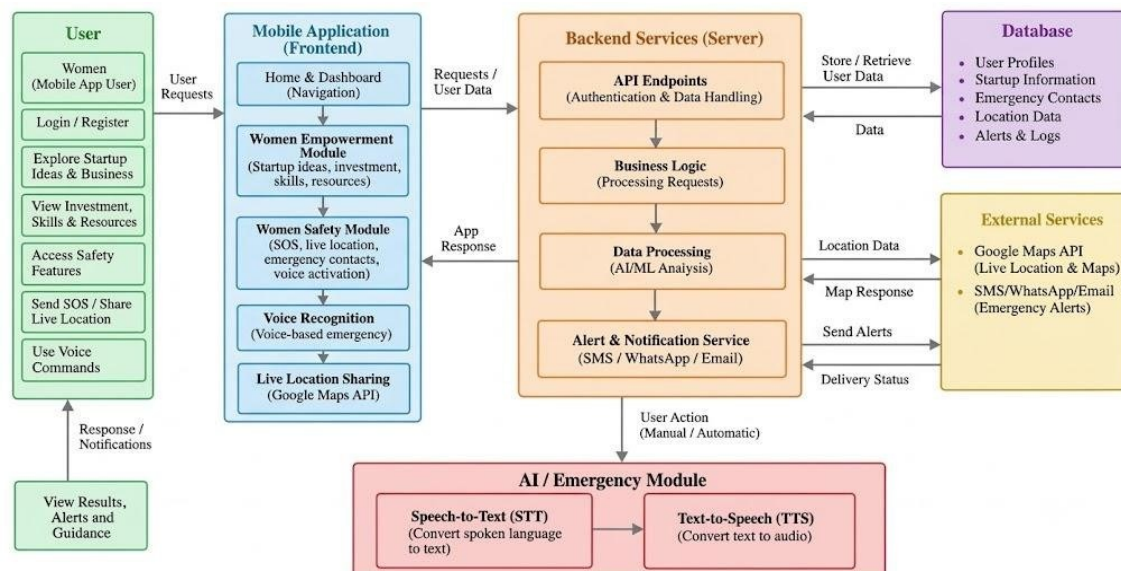
III. SYSTEM REQUIREMENTS AND SPECIFICATIONS

A. Functional Requirements

The proposed system includes the following functional requirements:

- Registration and authentication: allow users to register and access accounts securely.
- Startup exploration: display categorized startup ideas, including small-scale industries, online businesses, and home-based enterprises.
- Business information: provide descriptions, estimated investment, qualifications, skills, materials, resources, implementation steps, and possible financing information.
- Emergency SOS: provide an accessible control that initiates the configured emergency response process.
- Contact management: allow users to add and update trusted emergency contacts.
- Location sharing: obtain location through authorized device services and share it when permissions and connectivity are available.
- Voice activation: recognize supported voice commands while retaining manual activation.
- Multilingual interface: provide supported language options.
- Administration: allow authorized administrators to manage business information and relevant records.

B. Non-Functional Requirements



B. Fig. 1. Proposed architecture of the ShaktiSafe application.

The interface should be simple, consistent, and easy to navigate. Ordinary interactions should be processed efficiently, and emergency workflows should start without unnecessary delay. Authentication, access control, secure communication, and data protection should be implemented. The application should handle errors and connectivity interruptions without displaying misleading success messages. Its architecture should support additional users, business categories, and services. Readable text, clear controls, alternative interaction methods, and independently testable components are also required.

C. Hardware and Software Requirements

Suggested development hardware includes an Intel Core i5 processor or equivalent AMD processor, at least 8 GB RAM (16 GB recommended), 256 GB SSD storage or greater, and a Windows or Linux operating system. Testing requires an Android smartphone with location and microphone capabilities. An internet connection is needed for cloud services, online features, and live location sharing.

The proposed software stack may include HTML5, CSS3, JavaScript, Python with Flask for backend APIs, and MySQL or Firebase for data management. Google Maps Platform or an equivalent service may be used for mapping. Visual Studio Code and appropriate Android development tools may be used for development. AI models or APIs can support business information assistance if implemented. MySQL and Firebase are alternatives unless both are genuinely used in the final system.

IV. PROPOSED SYSTEM ARCHITECTURE

ShaktiSafe uses a layered architecture to separate user interaction, application processing, and data management. The architecture contains a user interface layer, an application processing layer, and a data and services layer.

A. User Interface Layer

The user interface provides the home screen, account functions, startup exploration, safety dashboard, language settings, and emergency contact configuration. It should allow users to access important features with minimal navigation. The SOS control should be clearly distinguishable from ordinary controls. The empowerment interface presents business information in an organized format, while the safety interface provides emergency activation, location sharing, and contact management.

Empowerment Module Safety Module Startup Details SOS / Location / Contacts

B. Application Processing Layer

This layer handles business logic, validates inputs, and coordinates services. The empowerment component retrieves business ideas and presents associated information. If AI-based recommendations are implemented, this component can use user-selected preferences to identify relevant opportunities. The safety component processes SOS activation, checks permissions, obtains available location information, and initiates emergency notifications. RESTful APIs may exchange information between the mobile application and server.

C. Data and Services Layer

This layer stores and retrieves application information, including user profiles, business records, emergency contact details, and relevant application logs. MySQL can store structured information, while Firebase may provide supported cloud database and authentication services. Mapping and notification services support location display and emergency alerts. Sensitive information should be collected only when necessary, stored securely, and accessed according to defined permissions.

D. Data Flow

The user opens the application and selects the empowerment or safety module. In the empowerment module, the application retrieves business information from the database and displays selected details. If recommendation functionality is available, it processes user preferences and presents relevant options. In the safety module, an SOS action or supported voice command initiates the emergency workflow. The application obtains available location information and sends an alert through the configured communication service. Status messages should clearly indicate whether the operation succeeded or failed.

V. IMPLEMENTATION DETAILS

A. User Module

The user module provides registration, login, navigation, and preference management. After authentication, the user can access empowerment and safety features, select a supported language, and configure emergency contacts. Personal information should be protected through suitable authentication and access-control mechanisms. Permissions should be requested only when required, with a clear explanation of their purpose.

B. Women Empowerment Module

The empowerment module provides structured information about business opportunities. Categories may include home-based food preparation, tailoring and clothing services, handmade products, online reselling, digital design, freelance services, beauty services, small-scale manufacturing, and educational services. Each business entry should contain a title, description, estimated investment range, required skills, qualifications, equipment, implementation steps, and possible financial support information.

For example, a home-based tailoring business may require a sewing machine, basic materials, stitching skills, and a suitable workspace. The application can describe the steps involved in learning the skills, estimating costs, obtaining materials, identifying customers, and promoting services. Investment estimates should be approximate because costs vary by location, supplier, scale, and market conditions.

C. AI-Based Business Assistance

AI may improve the discovery and presentation of business opportunities. The user may select preferences such as business category, available investment, educational background, interests, and existing skills. The application can filter business records or use an implemented AI component to recommend relevant options. Users with limited investment might be shown low-cost business ideas, while users with technical skills may explore digital services. If a full AI model is not included, rule-based filtering and a structured database can provide an initial implementation.

D. Women Safety Module

The safety module provides tools for initiating emergency assistance. When activated, the SOS control starts the configured emergency procedure and may send notifications to selected contacts. The application should indicate whether an alert has been sent successfully and should not report delivery unless the communication service provides confirmation. Emergency contacts should be configured in advance and reviewed by the user. The application supplements, rather than replaces, official emergency services.

E. GPS-Based Location Sharing

The location component obtains geographical coordinates through authorized device services. During an emergency, the application can attach the available location to a notification sent to configured contacts. If live tracking is implemented, the application can periodically update the shared position according to the selected interval and permissions. Location availability and accuracy may be affected by indoor environments, GPS reception, battery-saving settings, and device permissions. Internet or mobile connectivity is generally required to transmit location information to remote contacts.

F. Voice Interaction

Voice interaction provides an alternative method for activating supported functions. The application can recognize predefined commands and map them to specific operations. A supported emergency command may initiate the SOS workflow. Recognition may fail because of noise, language differences, or device restrictions, so a manual SOS control should remain available. Continuous background listening or whisper-based activation should be included only if implemented and tested.

G. Database Management and Multilingual Support

The database may store user profiles, business categories, startup descriptions, investment estimates, skills and resource requirements, emergency contact records, language preferences, and relevant application logs. A structured database helps maintain consistency and allows information to be updated without redesigning the interface. Access to emergency contact details and user records should be restricted. Passwords must not be stored as plain text, and sensitive information should be protected through appropriate security controls.

The application may provide English, Kannada, and Hindi language options. Interface labels, navigation controls, safety instructions, and business descriptions should be translated and reviewed for clarity. Voice recognition must separately support the intended languages if voice commands are expected to work in those languages. Translated interface text alone does not guarantee multilingual speech recognition; the selected technology must be verified.

VI. TESTING AND EVALUATION

Testing determines whether the application behaves according to its requirements. The proposed system should be evaluated through functional, integration, usability, security, and emergency workflow testing. Actual performance measurements should be recorded after implementation.

A. Functional Testing

Table I lists representative functional test cases and their expected results. These are planned tests; they should not be reported as completed until the implemented application has been tested.

B. Integration and Emergency Workflow Testing

Integration testing evaluates communication between the mobile interface, backend, database, and external services. It should verify that business records can be retrieved, authorized requests are processed, emergency contact information is accessed securely, location data reaches the notification workflow, and mapping services display available coordinates correctly. Error messages should be returned when a service is unavailable.

Test case	Expected result
User registration	Valid information is accepted.
User login	Authorized users access the application.
Startup category	Relevant business categories are displayed.
Business details	Investment, skills, resources, and steps are shown.
SOS activation	Emergency workflow is initiated.
Notification	Configured service processes the alert.
Location sharing	Available location is shared when permitted.
Voice command	Supported command activates its function.
Language selection	Selected supported language is displayed.
Permission denial	Limitation is explained and an alternative is provided.

Table I. Functional Test Cases

Test case Expected result User registration valid information is accepted. User login authorized users access the application. Startup category relevant business categories are displayed. Business details Investment, skills, resources, and steps are shown. SOS activation Emergency workflow is initiated. Notification Configured service processes the alert. Location sharing Available location is shared when permitted. Voice command Supported command activates its function. Language selection Selected supported language is displayed. Permission denial Limitation is explained and an alternative is provided.

Emergency workflow testing should verify the process from SOS activation to notification handling. The test should examine whether the application recognizes activation, obtains available location information, initiates the selected communication service, and displays the correct status. Designated test contacts and controlled conditions should be used rather than generating unnecessary emergency alerts. Test cases should include denied location permissions, interrupted internet access, and unavailable mobile networks.

C. Usability, Security, and Performance Testing

Usability testing evaluates navigation, visibility of the SOS control, clarity of business information, readability, language selection, contact configuration, and understanding of location sharing status. Feedback from representative users can identify confusing controls and guide improvements.

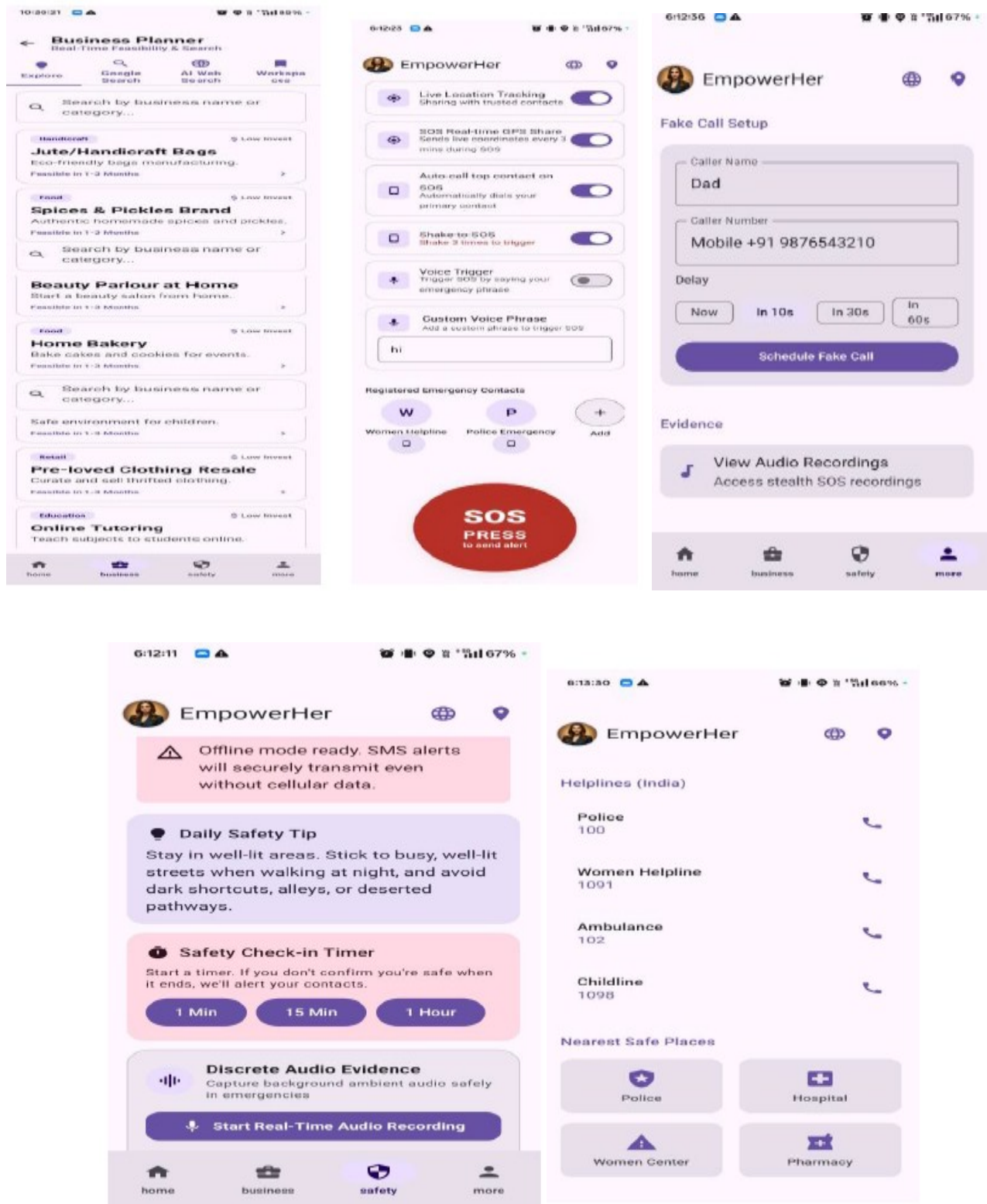
Security testing should verify authentication, access permissions, data validation, and secure communication. The application should not expose one user's private information to another unauthorized user. Logs should avoid unnecessary sensitive information, and data collection and sharing practices should be clearly explained.

Performance evaluation should measure response times and operation success rates under documented conditions. Useful measurements include time to open business information, time to initiate an SOS workflow, notification processing time, location retrieval time, voice-command recognition accuracy, successful-operation rate, and behaviour during connectivity interruptions. Values should be included only after actual testing.

VII. RESULTS AND DISCUSSION

A. Expected Outcomes

ShaktiSafe is intended to provide a common platform for accessing entrepreneurship guidance and safety assistance. The empowerment module is expected to make business information easier to understand by presenting startup ideas in a structured format. Users can explore estimated investment, required skills, resources, and implementation procedures. The safety module is intended to simplify emergency communication through SOS activation, emergency contact management, and location sharing. Integration may reduce the need to switch between unrelated applications. Multilingual support and voice interaction can improve accessibility.



B. Benefits

The proposed system combines economic empowerment and safety assistance in one interface. It may improve business awareness by helping users understand the basic requirements of establishing a business. It provides a clear method for initiating a configured emergency workflow, and available location information can help trusted contacts identify the user’s position. Business ideas and requirements are presented in an organized format, supported language options can improve understanding, and AI-based recommendations may help users discover relevant opportunities. Modular design also supports maintenance, testing, and future development.

C. Limitations and Discussion

Emergency communication depends on the availability and reliability of the selected services. Live location sharing may not work without connectivity, and location accuracy can vary by environment. Voice activation may fail because of noise, language differences, or device restrictions. AI-generated business information may contain inaccuracies unless reliable sources and validation are used. Access to business information does not guarantee business success; users may still require training, capital, market research, and professional advice.

ShaktiSafe treats economic empowerment and personal safety as complementary areas of support. The empowerment module focuses on improving access to information and helping women understand entrepreneurship requirements. The safety module focuses on providing accessible tools for requesting assistance. Actual benefits must be evaluated through implementation, usability studies, functional testing, and user feedback. Success depends on information accuracy, emergency workflow reliability, accessibility, and data protection.

VIII. CONCLUSION AND FUTURE ENHANCEMENTS

A. Conclusion

Women empowerment and personal safety are important considerations in building an inclusive society. Although digital technologies provide services for both areas, these services are often distributed across separate applications and websites. This paper presents ShaktiSafe, a proposed integrated platform that combines entrepreneurship guidance with personal safety assistance. The Women Empowerment Module provides structured business ideas, investment estimates, required skills, resources, and implementation procedures. The Women Safety Module provides SOS activation, emergency contact support, and location-sharing capabilities.

The proposed architecture uses mobile application technologies, backend processing, database management, and mapping services to coordinate these functions. Artificial intelligence can support business discovery and information assistance when implemented with suitable data and validation mechanisms. By integrating these services, ShaktiSafe aims to improve access to useful information, encourage entrepreneurial participation, and provide practical tools for seeking emergency assistance. Its effectiveness will depend on implementation quality, security, connectivity, accessibility, and validation through testing.

B. Future Enhancements

Future work may include improved AI recommendations based on skills, interests, budget, and local market conditions; links to verified official sources for business and financing information; enhanced multilingual voice interaction; offline access to selected information with clear connectivity-status messages; accessibility improvements such as screen-reader compatibility and adjustable text size; stronger privacy controls; connections with verified training resources, mentors, and support organizations; and real-user usability studies and field testing.

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