

A SMART AI-ENABLED SUPPORT ECOSYSTEM FOR WOMEN ENTREPRENEURS

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Abstract

This project presents a Smart AI-Enabled Support Ecosystem for Women Entrepreneurs designed to support women entrepreneurs through a unified digital ecosystem. Built using Flask, SQLite, Tailwind CSS, SocketIO, and AI tools, the platform integrates Mentorship, Funding, Marketplace, Chatbot, SOS, and a Health module. Entrepreneurs can access personalized AI funding suggestions, schedule mentorship sessions, and sell products securely. The real-time chatbot enhances usability, while the SOS feature improves safety by sending emergency alerts. A CNN-based breast cancer detection tool provides early health awareness. Overall, the platform empowers women by combining business support, safety, and health monitoring into one accessible solution.

Keywords- Women Entrepreneurship, Gemini AI, Full-Stack Development, Mentorship Ecosystem, Multilingual Chatbot, Flask Framework

1. Introduction

Women entrepreneurship is a powerful driver of economic development, social advancement, and gender equality. Yet, despite their growing participation in business, women continue to face multiple challenges that limit their entrepreneurial growth. These challenges include restricted access to funding, limited mentorship opportunities, lack of technical skills, societal biases, safety concerns, and insufficient digital resources—especially in rural areas. Global studies highlight that women-led businesses receive a disproportionately small share of venture capital funding, while millions of women still struggle to navigate business ecosystems without structured support systems.

To address these challenges, the Smart AI-Enabled Support Ecosystem for Women Entrepreneurs has been developed as a comprehensive, web-based ecosystem designed to empower women through technology, AI-driven guidance, community support, education, safety tools, and now health awareness and screening support. The platform integrates multiple modules such as Mentorship, Funding,

Courses, Marketplace, Chatbot, SOS, and a dedicated Health Section to create a unified solution supporting women throughout their entrepreneurial journey.

The platform is built using Flask, HTML, CSS, JavaScript, Tailwind CSS, and multiple backend libraries. It also integrates modern AI technologies to provide personalized funding recommendations, live mentorship assistance, personalized learning paths, and real-time chatbot support. Multilingual support (English and Hindi) ensures accessibility for women in both urban and rural settings, reducing digital divide barriers.

By combining entrepreneurship, education, safety, AI guidance, marketplace access, and now healthcare support, the platform aligns strongly with United Nations Sustainable Development Goal 5 (Gender Equality) and contributes to women's economic and social empowerment. This all-in-one ecosystem helps women overcome structural barriers, build skills, access capital, ensure personal safety, take care of their health, and transform their ideas into sustainable businesses.

2. Related Work

I. Literature Survey

[1] Gupta & Sharma (2023)

Shows that digital platforms improve visibility, networking, and business sustainability for women entrepreneurs. Supports the need for a dedicated platform for mentorship and funding.

[2] Kumar et al. (2023)

Explains how AI personalization improves user engagement and learning outcomes. Relevant for AI-based chatbot guidance and personalized recommendations in the platform.

[3] Patel & Rao (2022)

Highlights real-time communication using WebSocket technology. Supports the use of Flask-SocketIO for chatbot and live interaction features.

[4] Desai & Joshi (2024)

Discuss secure payment gateway integration in e-commerce systems. Helps design a safe and reliable marketplace module.

[5] Banerjee & Kulkarni (2023)

Explains how AI supports startup growth through better decision-making and market insights. Reinforces AI integration for business support tools.

[6] Verma & Rao (2024)

Shows AI decision support systems can recommend funding based on business data. Supports the funding recommendation module.

II. Existing System

Existing platforms that support women entrepreneurs provide helpful resources such as mentorship, networking, funding information, and skill development, but these systems are mostly fragmented and limited in scope. They usually focus on only one or two aspects of entrepreneurship and do not offer an integrated environment that combines mentorship, funding guidance, skill development, marketplace access, real-time AI assistance, safety features, and health awareness within a single platform. As a result, women entrepreneurs often need to depend on multiple

applications, making the process time-consuming and less efficient. Additionally, current platforms lack personalized AI-based recommendations, dedicated marketplaces for product promotion, built-in safety tools like SOS alerts, and health support features such as early disease screening. Many systems also have limited multilingual accessibility, making them difficult to use for women from rural or non-English-speaking backgrounds. Overall, existing systems fail to provide a unified, intelligent, and women-centric ecosystem that supports both business growth and well-being.

III. Proposed System

The proposed system is a web-based, AI-powered startup platform developed to support and empower women entrepreneurs through a single integrated digital ecosystem. Instead of using multiple separate applications for mentorship, funding, learning, and business promotion, this platform brings all essential services together in one place. The system is developed using Flask, HTML, CSS, JavaScript, Tailwind CSS, SQLite, and AI libraries, making it user-friendly, scalable, and accessible for both urban and rural users. The platform consists of several interconnected modules:

- **Mentorship Module** – Provides a community forum for discussions, one-to-one mentor meeting scheduling, and AI-assisted guidance to help women receive continuous and structured support for business growth.
- **Funding Module** – Uses AI to recommend suitable funding options such as grants, schemes, and investors based on the user's business profile. Investors can also provide funding offers through the platform.
- **Courses Module** – Supports skill development by providing structured learning content, quizzes, online exams, and automatic certificate generation to help women improve technical and entrepreneurial skills.
- **Marketplace Module** – Allows women entrepreneurs to list products or services, receive orders, and promote their business, helping them generate income and increase visibility.

- **Chatbot Module** – A real-time AI assistant that provides 24×7 support by answering queries related to platform features, funding, courses, and business guidance.
- **SOS Module** – Provides an emergency alert feature that sends notifications to a predefined contact, ensuring safety support for women during business activities.
- **Health Module** – Integrates a CNN-based breast cancer detection tool that helps in early awareness by analysing uploaded medical images and encouraging timely medical consultation.
- **Multilingual Support** – The platform supports English and Hindi, improving accessibility for women from different regions and language backgrounds.

Overall, the proposed system provides a **complete, intelligent, and women-centric platform** that supports entrepreneurship, skill development, financial growth, safety, and health awareness within a single environment.

3. Materials and Methods

I. Methodology

1. Requirement Analysis

- Identify the needs of women entrepreneurs such as mentorship, learning, marketplace, safety, and AI support.
- Gather functional and non-functional requirements for each module.

2. System Design

- Create the architecture of the platform including frontend, backend, and database.
- Prepare use case diagrams, workflow diagrams, and design interfaces.

3. Database Development

- Build structured tables for users, courses, products, events, posts, and orders.
- Ensure data validation, relationships, and secure storage.

4. Frontend Development

- Develop user-friendly, responsive UI for dashboards, courses, marketplace, and SOS.

5. Backend Development

- Use Flask to implement routing, authentication, database operations, and role-based access.
- Integrate modules for courses, events, mentorship, marketplace, and SOS alerts.

6. AI Chatbot Integration

- Connect the platform with an AI model (Gemini API) to provide instant assistance and business-related guidance.

7. Marketplace & Order System

- Develop product upload, inventory management, and customer order features.
- Build admin tools for product monitoring.

8. SOS Alert System

- Implement quick email/SMS emergency alerts using SMTP for safety support.

9. Testing

- Perform testing for each module to ensure proper functionality, security, and performance.

10. Deployment

- Deploy the system on a server with necessary configurations and ensure stable performance.

II. Framework

1. Operating System

- Windows 10 / Windows 11
- Compatible with Python development and local server execution.

2. Programming Language

- **Python 3.9+**
Used for building the Flask backend, AI integration, CNN model loading, and database operations.

3. Backend Framework

- **Flask 2.0.3**
Lightweight web framework for routing, server-side logic, and module integration.

4. Libraries and Dependencies

- **Flask-SQLAlchemy** – ORM for database management
- **SQLite** – Local database for storing user, product, post and meeting data
- **Flask-Login** – User authentication and session handling
- **Flask-WTF** – Form validation
- **email_validator** – Email verification
- **Flask-SocketIO** – Real-time communication (Chatbot, AI assistance)
- **google-generativeai** – Gemini API integration for funding suggestions & chatbot responses
- **smtplib (built-in)** – Sending SOS emergency emails
- **TensorFlow / Keras** – Loading the trained CNN breast cancer detection model
- **OpenCV / Pillow** – Image preprocessing in the health module
- **reportlab** (optional) – Certificate or PDF generation
- **Razorpay or Payment Gateway SDK** – Processing online payments in the marketplace

5. Web Technologies

- **HTML5, CSS3, JavaScript** – Frontend structure and interactivity
- **Tailwind CSS** – Modern and responsive UI design
- **SocketIO JS** – Real-time chat functionality

6. APIs & External Integrations

- **Google Calendar API** – Automated meeting scheduling
- **Gemini AI API** – AI-based text generation and funding suggestions
- **Mail SMTP Service (Gmail SMTP)** – SOS alert emails
- **Payment Gateway API** – Secure order transactions

7. Development Tools

- **Visual Studio Code / PyCharm** – Code editor
- **Postman** – API testing
- **Git / GitHub** – Version control
- **Browser (Chrome/Edge)** – Frontend testing

8. Development Machine (Local System)

- **Processor:** Intel Core i5 or above
- **RAM:** Minimum 8 GB
 - (Recommended 16 GB if training CNN model locally)
- **Storage:** At least 20–30 GB free space
 - For dataset storage, project files, Python environment, and logs
- **Graphics:** Integrated GPU sufficient for running trained models
 - Dedicated GPU (NVIDIA) recommended *only if training CNN from scratch*

9. Server / Deployment Requirements (optional if hosted)

If hosting on cloud services:

- **Cloud Hosting:** AWS / PythonAnywhere / Render / Azure
- **RAM:** Minimum 4 GB for smooth Flask execution
- **CPU:** 2+ vCPUs
- **Storage:** 10–20 GB for database and logs
- **Network:** Stable connection for API calls (Gemini, Payment Gateway, SMTP)

10. User-Side Hardware

End users accessing the platform need:

- **Any Smartphone / Laptop / Desktop**
- **Basic RAM: 2 GB or higher**
- **Browser:** Chrome / Firefox / Edge
- **Internet Connection:** Minimum 2 Mbps

III. System Architecture

The system architecture of the Smart AI-Enabled Support Ecosystem for Women Entrepreneurs follows a modular, layered, and scalable design built on the Flask web framework. The architecture supports different modules such as Mentorship, Funding, Courses, Marketplace, Chatbot, SOS, and Health (Breast Cancer Detection) within a single structured system.

The architecture is divided into five main layers:

- **Presentation Layer (Frontend UI)** – Built using HTML, Tailwind CSS, JavaScript, and Jinja2 templates, this layer provides the user interface for login, dashboard, mentorship forum, course pages, marketplace, chatbot,

SOS, and health image upload. It ensures a responsive and multilingual interface for easy user interaction.

- **Application Layer (Flask Backend)** – Acts as the core logic of the system. It handles routing, authentication, form validation, scheduling mentorship meetings, managing funding offers, processing exams, generating certificates, sending SOS alerts, and connecting frontend requests with AI services and database operations.
- **AI Processing Layer** – Integrates Gemini API for chatbot responses, funding suggestions, personalized learning guidance, and mentorship assistance. It also includes a CNN-based breast cancer detection model that analyzes uploaded medical images and predicts risk levels to support early health awareness.
- **Data Layer (Database)** – Uses SQLite with SQLAlchemy ORM to securely store user details, course content, mentorship discussions, funding data, product listings, orders, and health module records, ensuring reliable data management.
- **External Integration Layer** – Connects the system with third-party services such as Gemini API, SMTP, Razorpay, Google Calendar, ReportLab, Socket.IO, and Flask-Babel.

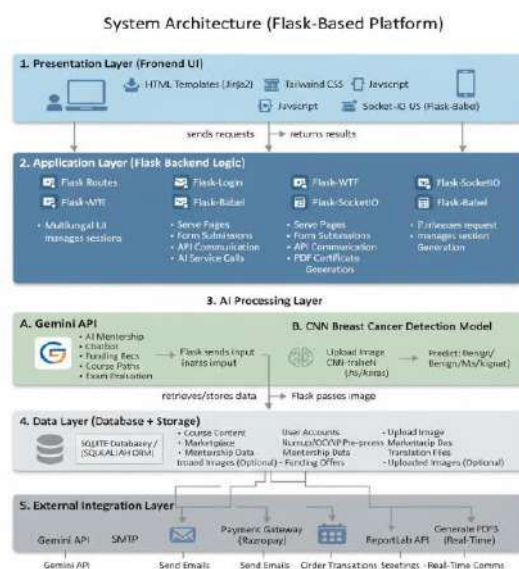


Fig. 1. System Architecture

4. Results and Discussion

I. Experimental Results

1. Start

The user begins by opening the web application in their browser. The home page is displayed.

2. User Authentication

- The user chooses to either **log in** or **register** a new account.
- During registration, the system collects essential details such as email, password, role (entrepreneur, mentor, or investor), and emergency contact email.
- On login, the entered credentials are validated with the database.
- After successful authentication, the user is redirected to the dashboard.

3. Dashboard Access

Once logged in, the user gains access to the main dashboard, which allows navigation to all major modules of the platform:

- Mentorship
- Funding
- Marketplace
- Chatbot
- SOS
- Health (Breast Cancer Detection)

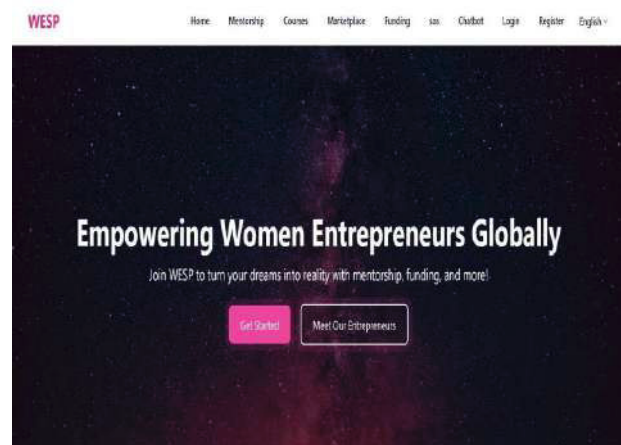


Fig.2. Dashboard of the platform

4. Mentorship Module Flow

1. The user selects the Mentorship section.
2. They can view the community forum containing posts from other users.
3. They may create a new post for guidance or discussion.
4. If required, the user proceeds to the meeting scheduling page.
5. The user selects a mentor, chooses a date and time.

6. The system communicates with the Google Calendar API to create the meeting event.
7. Email notifications are sent to both mentor and mentee.
8. The user may also interact with AI-assisted mentoring support for additional tips and insights.

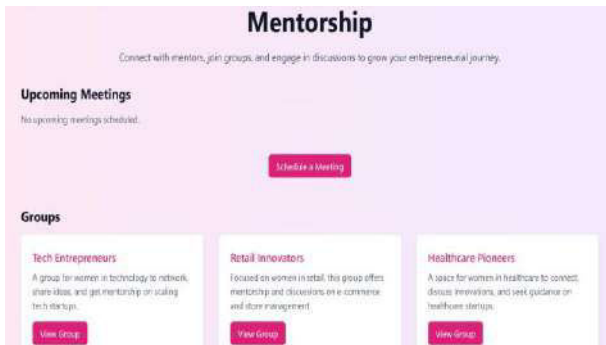


Fig.3. Mentorship Module of the platform

5. Funding Module Flow

1. The user navigates to the Funding section.
2. The system retrieves the user's business details from the database.
3. These details are sent to the Gemini AI model for analysis.
4. AI generates personalized funding recommendations based on the business profile.
5. These recommendations are displayed to the user.
6. If the user is an investor, they can submit investment offers which are saved and displayed to entrepreneurs.

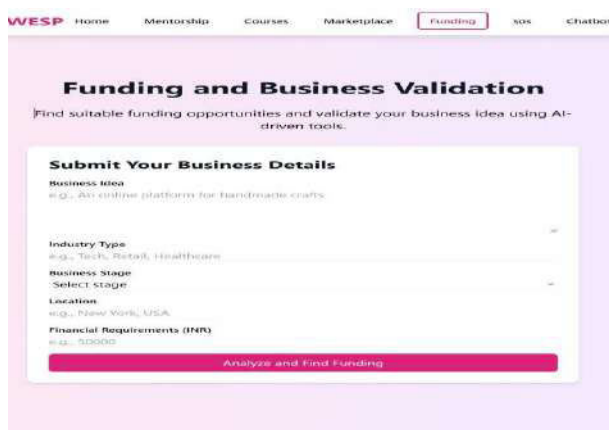


Fig.4. Funding Module of the platform

6. Marketplace Module Flow

1. The user opens the Marketplace page.

2. Entrepreneurs can list new products with name, description, and price.
3. Users can browse available products and choose one to purchase.
4. The user proceeds to checkout, where the platform connects to the payment gateway.
5. Payment is completed securely through the gateway.
6. On successful payment, the order is recorded in the database and confirmation is shown.

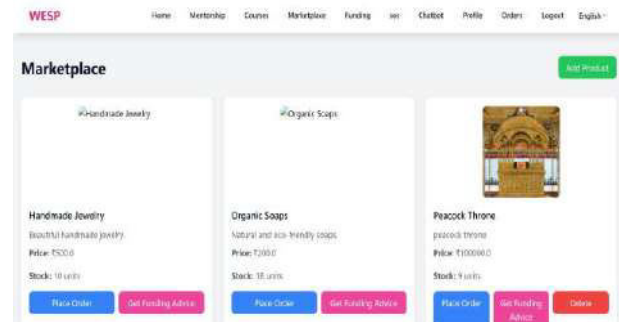


Fig.5. Marketplace Module of the platform

7. Chatbot Module Flow

1. The user opens the Chatbot page.
2. They type a question in the chat input field.
3. The message is sent to the backend using SocketIO.
4. The backend forwards the message to the Gemini AI model.
5. The AI generates an appropriate response.
6. The system delivers the response back to the user in real time.
7. The conversation continues as needed.

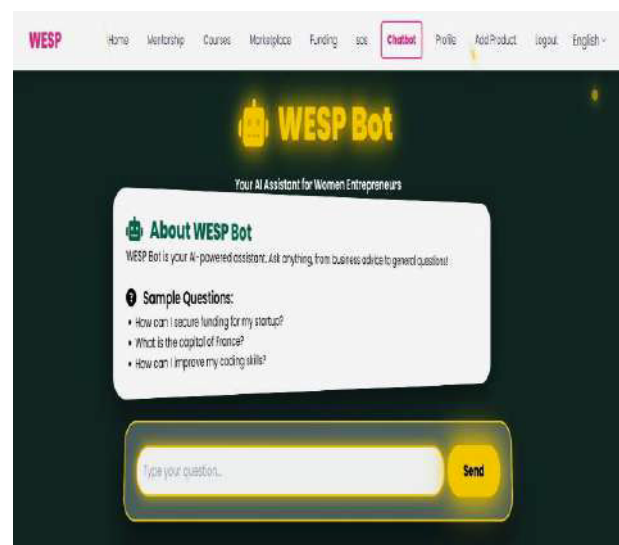


Fig.6. Chatbot

8. SOS Emergency Module Flow

1. The user clicks the SOS button during an emergency.
2. The system retrieves the user's registered emergency contact email.
3. The system prepares an alert message containing the user's details.
4. The SOS email is sent to the emergency contact via SMTP.
5. The system logs this emergency alert event for reference.
6. A confirmation message is shown to the user.

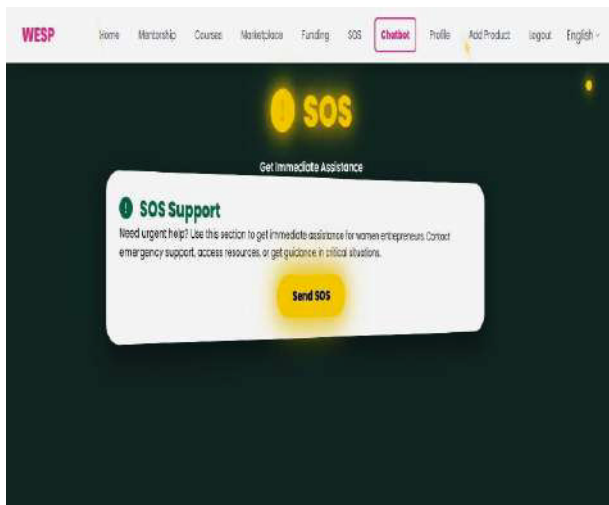


Fig.7. SOS Support for women

5. Conclusion

The AI Powered Shark Tank Inspired Startup Platform for Women Entrepreneurs successfully demonstrates how technology, artificial intelligence, and digital tools can collectively address the challenges faced by women in entrepreneurship. By integrating modules such as Mentorship, Funding, Marketplace, Chatbot, SOS, and an AI-driven Health Section, the platform creates a holistic ecosystem that not only supports business growth but also prioritizes safety and well-being. The use of Gemini AI enhances user experience through personalized funding recommendations, real-time chatbot assistance, and intelligent mentoring support, while the CNN-based breast cancer detection model adds a unique health-awareness component. The Marketplace empowers women to digitally promote and sell their products, and the SOS feature ensures that safety remains central to the platform's mission. Overall, the system bridges critical gaps in guidance, financial access, digital presence, and health

awareness—providing women entrepreneurs with the tools and confidence needed to thrive.

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