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AI-BASED EVENT MANAGEMENT SYSTEM WITH AUTOMATION

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Abstract - *This project develops an AI-based event management system using intelligent automation and voice assistance to streamline event lifecycles. By integrating Natural Language Processing (NLP) and Speech Recognition, the system allows users to schedule and query event details via voice commands, reducing manual data entry errors and cognitive load. Built on Python-based AI frameworks, the platform automates attendee registration, resource allocation, and real-time notifications. Results indicate that voice integration reduces task entry time by approximately 40% compared to traditional manual methods. The system provides a seamless, hands-free coordination tool suitable for corporate and academic environments.*

***Key Words**: Artificial Intelligence, Event Management, Voice Assistance, Intelligent Automation, Natural Language Processing (NLP), Python.*

1. INTRODUCTION

Event management has evolved into a complex logistical operation in the modern digital era, requiring the coordination of participants, multi-track schedules, and diverse resources. Despite the availability of digital management software, the primary challenge remains the inefficiency of manual data interaction. Current systems often require time-consuming navigation through complex interfaces, which is impractical during high- pressure live event planning. As organizations transition toward smarter, automated workspaces, there is a growing need for intelligent systems capable of understanding user intent and executing tasks autonomously to improve workflow efficiency.

The emergence of Artificial Intelligence (AI) and Voice Recognition technology provides a viable solution to these operational challenges. By incorporating an AI-driven voice assistant, event organizers can manage workflows hands-free, marking a significant leap in accessibility and speed through Conversational User Interfaces (CUI). Intelligent systems can now handle repetitiveadministrative tasks—such as sending reminder emails, checking venue availability, and updating guest lists— without human intervention. This allows organizers to move away from GUI-based manual entry and focus on the creative and strategic aspects of event execution.

This research focuses on building a cohesive platform that bridges the gap between raw data and actionable insights using a centralized database managed by an AI engine. By utilizing intelligent automation and Natural Language Processing (NLP), the system can proactively predict scheduling conflicts and suggest optimal resource allocation. In this paper, through the integration of Python- based AI frameworks and Speech Recognition, we intend to refine existing event management methodologies. Our focus is on incorporating the latest voice-driven technologies to create a seamless ecosystem where AI serves as an invisible coordinator for events of any scale.

2. SCOPE

The primary objective of this phase is to distinguish and select appropriate scientific methodologies and architectural techniques applicable to the design of an AI- driven event management system. The employed techniques encompass real-time voice processing, natural language understanding, automated scheduling algorithms, and cloud-based data synchronization. The aim is to exploit successful research approaches in human-computer interaction to improve the efficiency of task execution within the application environment. These chosen methodologies enable the seamless development of core functionalities, including voice-activated report generation, interactive scheduling interfaces, attendee management, and automated notification services. The pursuit of an effective and purposeful solution includes the utilization of research techniques that are technically grounded, user- centric, and in compliance with modern data privacy and automation standards.

3. OBJECTIVE

The main aim of this project is to construct the AI-based event management system through an intelligent application with features for better user experience and voice-assisted coordination. The key objectives of the project include:

- [1] Voice-Activated Task Registration and Management: Users can register events and manage logistical tasks using voice commands; the status of these tasks will be tracked and regularly updated until final resolution.
- [2] Knowledge and Resource Repository: The system will have a dedicated "Learn" screen with materials like articles, videos, and graphs which will educate users on event planning practices, automation techniques, and resource management.
- [3] Mapping and Venue Integration: The incorporation of mapping APIs will make it easier for users to locate nearby venues, equipment providers, and catering facilities to help with proper event logistics and promote efficient management practices.
- [4] User Profile Management: To ensure a personalized experience, we will design a user profile screen so that each organizer can tailor their event management activities and participate interactively with the automation system.
- [5] Role-Based Access Control: Implement role- based access to the system for actors such as organizers, attendees, and administrators who can monitor event progress and ensure effective communication among stakeholders.
- [6] Intelligent Command Processing: Employ NLP and Speech Recognition for audio processing to analyze vocal inputs provided by users, categorize event requirements correctly into preformed categories, and enhance the accuracy of system responses.
- [7] Context-Aware Suggestions: Take advantage of the location data and user intent to offer personalized suggestions for nearby logistical services and venue options, allowing users to make informed decisions based on their geographical location.
- [8] Real-Time Data Interaction: Utilize Firebase Storage and Firestore Database to ensure that data interaction and retrieval within the application are as smooth as possible for the users during live event operations.
- [9] Automated Stakeholder Communication: Use integrated notification services to provide regular updates to all participants, ensuring that the final resolution of scheduling and logistical tasks is communicated effectively.

4. LITERATURE REVIEW

[1] The scientific and engineering community is globally examining the integration of voice-assisted technology and intelligent automation within management systems, resulting in a growing body of publications reflecting advancements in user interaction, system efficiency, and automated scheduling. Research by Min and colleagues (2019) utilized the Theory of Planned Behavior to pinpoint how individual engagement is enhanced when users are provided with proactive, technology-driven management tools. Similarly, case studies reported by Wang and Tan (2022) explore how multi-channel interaction and community-focused digital engagement serve as key determinants in changing traditional organizational behaviors and improving management outcomes.

[2] Optimization of complex systems through detailed analysis has been emphasized by Pires & Chang (2011), who demonstrated that systematic process monitoring provides significantly higher operational efficiency. Jin et al. (2019) adopted a science mapping approach to assess the evolving trends in automated management by scrutinizing the widespread scope of research applied in the field of intelligent systems. Additionally, the study by Hannan et al. (2015) demonstrated the state of real-time monitoring and management systems regarding information and communications technology, identifying the specific challenges and opportunities associated with automated resource coordination.

[3] Tang et al. (2022) looked at motivation factors of urban users' digital behaviors and proposed the role of reward and feedback mechanisms in enhancing the practice of systematic task management. Lu & Yuan (2010) performed an in-depth study about success factors for management in high-pressure construction environments, showing that administrative problems become more critical as project scale increases. Further surveys carried out by Gala et al.

(2020) aimed at targeting optimal management strategies specific to diverse resource sources through comprehensive digital monitoring.

[4] The literature constitutes several studies on new technologies for task classification, including multilayer hybrid deep-learning methods where deep learning algorithms are used to escalate the scheduling and categorization processes. Moreover, the improvement of management methodologies, including deep learning-based methods presented byAltikat et al. (2021), showed that AI could be used to optimize logistical practices and overall system responsiveness.

[5] Cerchecci et al. (2018) introduce a multi-sensor node architecture for management in the context of a Smart City, with special attention to the role of IoT in reducing operational friction. In addition, Pardini et al. (2019) worked on a survey on IoT-based management solutions, emphasizing the role of urbanization and cloud computing in facing complex logistical problems in urban areas. In Aarif et al. (2022), a smart management system using deep learning and IoT technologies to distinguish task priorities was presented, demonstrating such technologies' applicability in administrative environments.

[6] Adding to that, automated task separation using natural language processing and machine learning portrays the necessity of automation in management processes for proper resource allocation. In parallel, Mapari et al. discuss a monitoring system that stresses the hierarchy of tasks as a critical component of management design. Chitale (2023) developed a smart management system supported by the Internet of Things, emphasizing the significance of using effective coordination mechanisms to deal with complex organizational issues.

[7] Accumulation of knowledge in the field foreshadows smart systems that utilize IoT devices to strengthen the need for environmentally friendly habits and the reduction of administrative pollution through technology. Lundin et al. (2017) conducted research to operationalize sensor-based solutions that help monitor service and collection of data in public environments. An IoT-based recommendation system proposed by Ghahramani et al. (2022) demonstrates the role of smart management in devising efficient logistical routes when storage and resources are confined.

[8] Concerning the classification and control of management fields, recent research has found viable ways of controlling workflow. Users' mechanisms of decision-making have been studied by Meng et al. (2019), depicting how individuals classify and organize their digital tasks while providing useful information concerning individual participation in system management. Unlike most previous studies, Wong et al. (2022) highlighted the role of numerous connected sensors that can be applied to solve the issue of ineffective resource management.

[9] Chu et al. (2018) introduced the idea of using hybrid deep-learning methods for task classification, meaning the technology can be used effectively in the automation of complex logistical sorting. Liu et al. (2019) went into the mechanisms of formal education and how urban residents applying management behaviors are impacted by environmental campaigns on sustainable practices. Liugboja & Wang (2019) proposed a Convolutional Neural Network based AI system for classification that proves the applicability of AI toward efficient system management.

[10] Furthermore, Chen et al. (2020) and Zhang et al. (2021) made determinations based on user intentions towards systematic classification and actual behaviors, showcasing personality traits dealing with digital management. Vo et al. (2019) demonstrated a new transfer deep learning model, showing the possibility of superior algorithms for sorting procedures in management. According to Yang et al. (2021), a study concerning user readiness for commingled digital collection and its association with awareness of task- classifying behaviors was conducted.

[11] In addition, Zheng et al.'s (2022) latest paper pointed out that different factors and incentives influence people's behavior and how they categorize their tasks. A delicate approach to the obstacles and inspiring forces of digital separation illustrated these insights. Zhou et al. (2019) documented novel regulations and sorting infrastructures for management in Shanghai, aligning these concepts with the challenges and prospects of international policy guidelines.

[12] These studies combined provide insights into management practices, public behaviors, technological innovations, and policy frameworks which ultimately strive to encourage environmentally friendly and efficient management. To contribute to the body of knowledge on systematic classification, this project aims to expand the field by creating an application with Python and voice-assistance technology that integrates advanced functionalities and enhances management methods as well as the commitment toward digital efficiency.

5. PROPOSED METHODOLOGY

To construct an effective AI-based event management system, the proposed algorithm supports the workflow by capturing vocal commands using advanced speech processing and integrating real-time location data. The algorithm employs a sufficiently deep learning basis for high accuracy while classifying user intent and event requirements. The system first captures the voice input or images of event-related documents through the interface of the application. These inputs go through a preprocessing phase using Natural Language Processing (NLP) and intelligent toolkit modules to extract interesting features and entities.The employed Convolutional Neural Network (CNN) model, which is adapted from established architectural frameworks in deep learning research, is utilized for classifying event- related visual data into predefined categories, such as venue types, equipment checklists, and resource logs. The integrated search engine and command controller permit users to file logistical requests and track their status, incorporating registration and tracking enhanced by recent research in automated workflows.Furthermore, an option page with various educational materials for the users to learn about professional event management and automation techniques is implemented within the system. The integration of mapping APIs enables the localization of service points, such as catering hubs and waste disposal facilities for large-scale events, as one of the measures taken to increase overall app functionality. The platform manages the profiles of all stakeholders—including different users, administrators, and government officials—to provide a personalized experience and ensure efficient coordination. This proposed algorithm, which blends these features, is designed to be a user- friendly and effective tool that facilitates intelligent event classification and sustainable management within the application ecosystem.

6. METHODOLOGY

Iterative Waterfall Model The project mirrors an extended waterfall model, combining the clear, structured approach of the traditional waterfall with the flexibility of an iterative framework. This approach empowers the organization to adopt a phased systematic development process while simultaneously allowing for continuous improvements and adaptations based on gathered user feedback.

1. Requirements Gathering (Initial Phase): * The first step is to collect and document the entire set of project requirements accurately.

- Key elements involve listing and developing core features and functions, such as voice-activated command processing, providing educationalmanagement materials, and integrating user profiles with mapping services.

2. System Design (Initial Phase): * The team builds an initial system design that indicates the underlying architecture and data flow within the application.

- This phase includes citing the technologies and tools to be utilized for speech processing, task tracking, educational content management, and map integration.

3. Implementation (Iterative Phase): * The implementation process initiates with a single aspect of the project, such as the voice identification or command processing starting point.
- A market-ready prototype is designed and produced, with testing initially limited to this specific component.
- The module is tested and retested with real-world data, performing corrected iterations to improve accuracy and performance.

4. Testing (Iterative Phase): * Exacting testing is conducted for every new inbuilt system component.
- Testing focuses on voice recognition accuracy, task registration functions, the accessibility of educational content, and correct map integration.
- Issues noticed during testing are reworked through further refinement to ensure every item coordinates with the requirement specifications and operates smoothly.

5. Integration (Iterative Phase): * Various components are woven together to fit perfectly into the overall application.
- Checks are performed to ensure data glides seamlessly from one module to another and the user interface remains coherent.

6. User Feedback (Iterative Phase): * User feedback is gathered by running beta testing sessions and pilot deployments.
- The system relies on this feedback to make incremental adjustments to the app's user- friendliness, responsiveness, and functionality to better solve event management problems.
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7. Documentation (Ongoing): * Thorough documentation is maintained throughout the entire project, updated with each iteration.

- These documents include user manuals, detailed system architecture diagrams, and code documentation.

8. Deployment (Final Phase): * The production-ready, complete, and refined version of the application is released into the production system.

- Final checks ensure all functions—including voice- activated task registration, tracking, learning materials, and user profiles—are linked and the operational flow is smooth.

9. Maintenance and Updates (Post-Deployment): * Following deployment, the application's performance is continuously tracked, and user feedback is collected.

- This knowledge is used to prioritize and set in motion bug corrections, the addition of new features, and necessary modifications.

TECHNOLOGIES USED

1. Natural Language Processing (NLP) and Speech Tools: This project utilizes advanced speech-to-text and machine learning libraries as core components for vocal command processing and intent identification, which are used for accurate task execution and enhancing user experience.
2. Python-Based Frameworks: This project is developed using highly sophisticated AI and backend development tools known as Python, providing the utmost compatibility and a seamless interface for handling complex automation logic.
3. Location-Based Services: The application harnesses geo-location services to guide users in making logistical considerations and service requests depending on their exact geographical location.
4. Firebase Storage and Firestore Database: Data storage, management, and retrieval within the application are handled by Firebase Storage and Firebase Database, which ensure that data interaction is as smooth as possible for users and allow for the effective operation of different data manipulations.
5. Mapping API Integration: Through integrated mapping APIs, users are able to locate appropriate event venues, equipment providers, and logistical facilities.
Such technologies help the AI-based event management app fill the available gap in simple methods for categorizing tasks, raising logistical requests, providing resourceful planning information, and location-based services as a way to ensure that professional management practices and digital efficiency are promoted.

6. SYSTEM REQUIREMENT

For Developers:

- **Hardware Platform:**
  - **Processor:** Core i3 or Higher
  - **RAM:** 2GB or above
  - **GPU:** 1GB or above
  - **Hard Disk:** 100 GB or above
- **Software Platform:**
  - **Development Environment:** Python IDEs (e.g., PyCharm) or VS Code
  - **Operating System:** Windows 7 and above

For Users:

- **Hardware Platform:**
  - **Processor:** Snapdragon 450 equivalent or above
  - **RAM:** 2GB or above
  - **ROM:** 16GB or above
- **Operating System:** Android 11.0 or above

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8. SYSTEM DESIGN

8.1 E-R Diagram

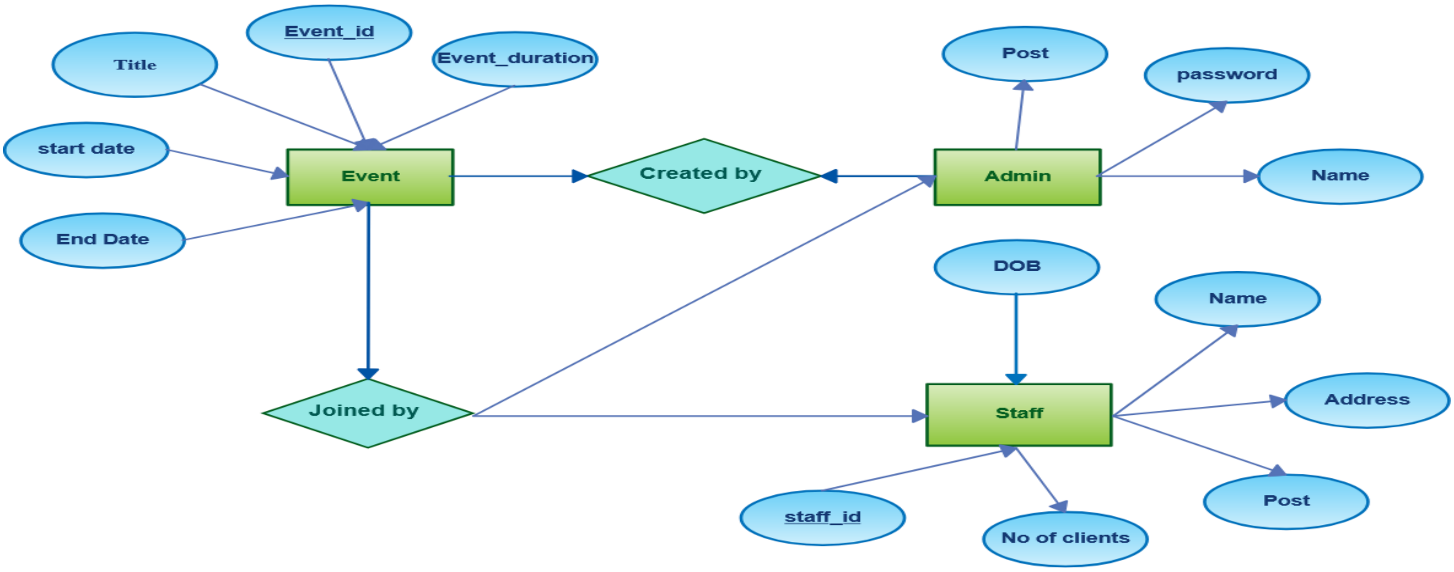

Figure 1 E-R Diagram

8.2 Data Flow Diagram

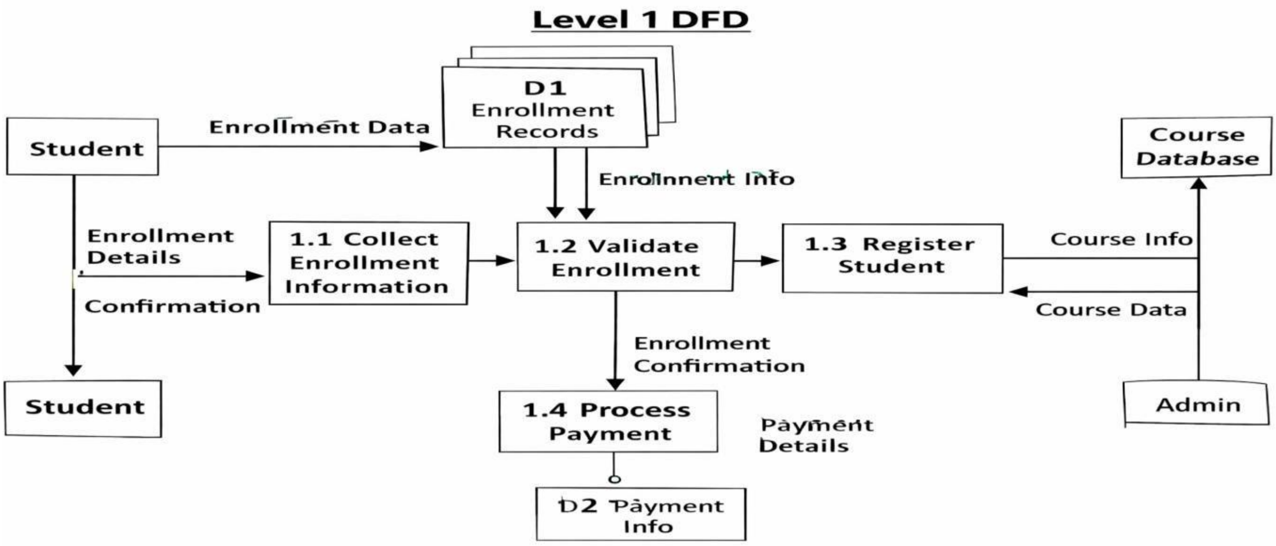

Figure 2 dfd 0 level

8.3 Use Case Diagram

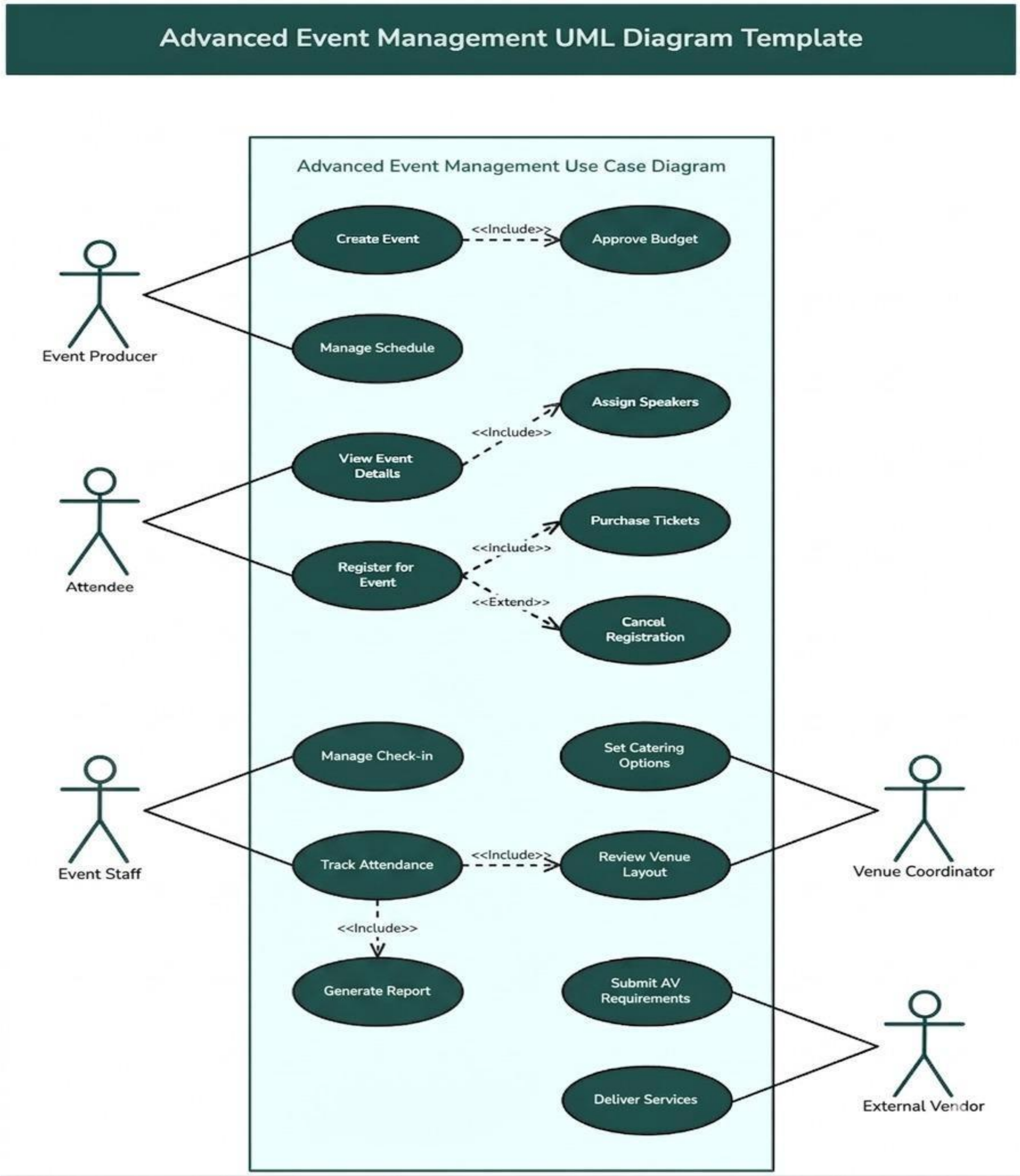

Figure 3 Use Case Diagram

9. IMPLEMENTATION:

9.1 Getting Started Screen:

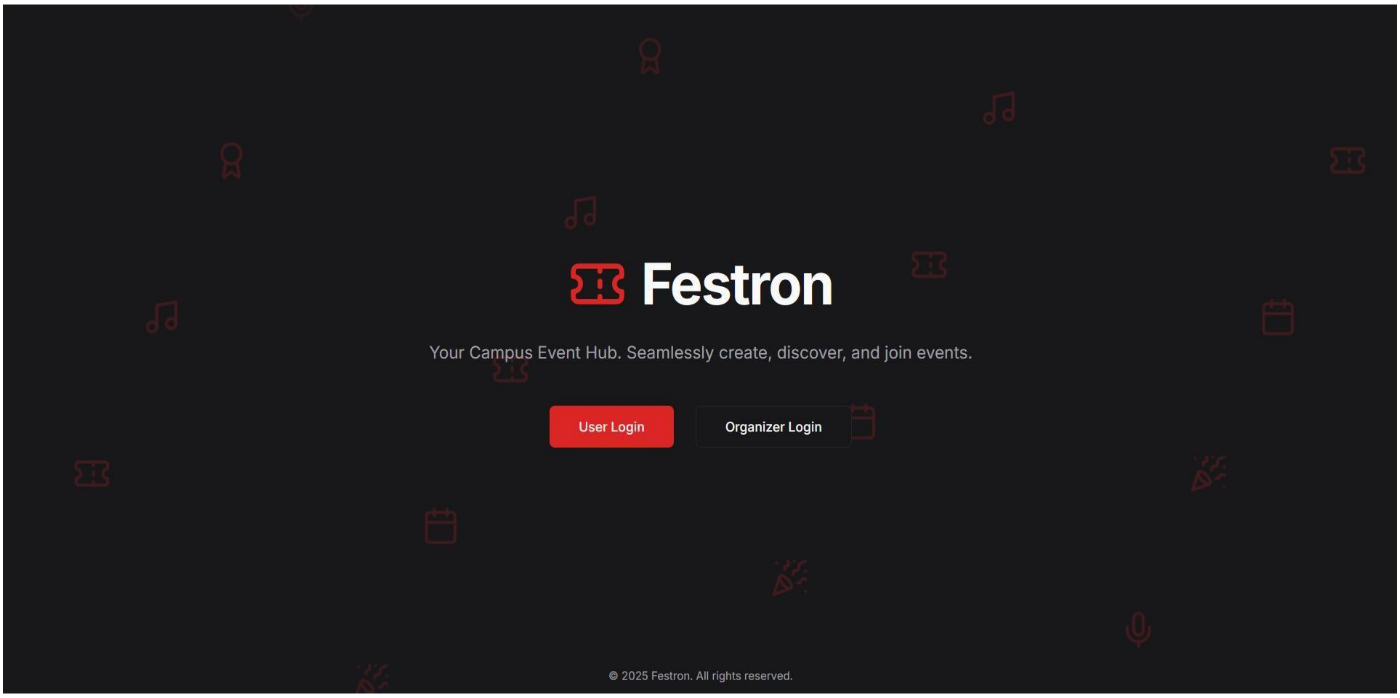

Fig 9.1 Getting Started Screen

9.2 User Login Screen:

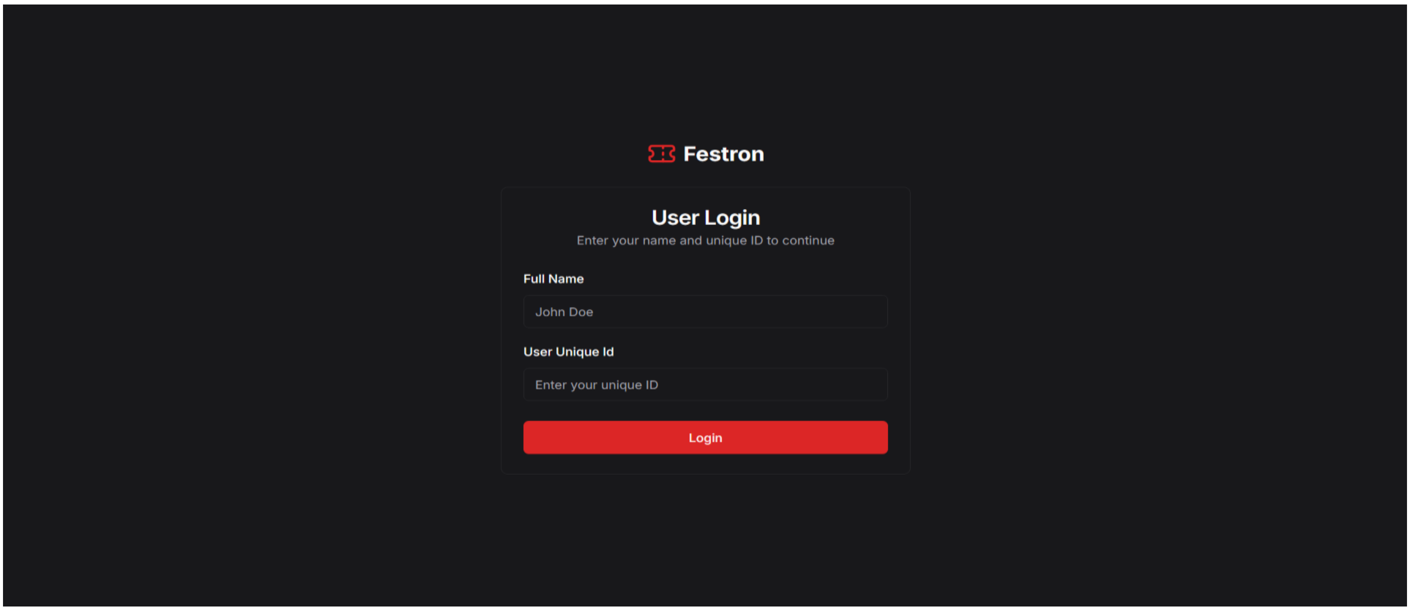

Fig 9.2 User Login Screen

9.3 Home Screen:

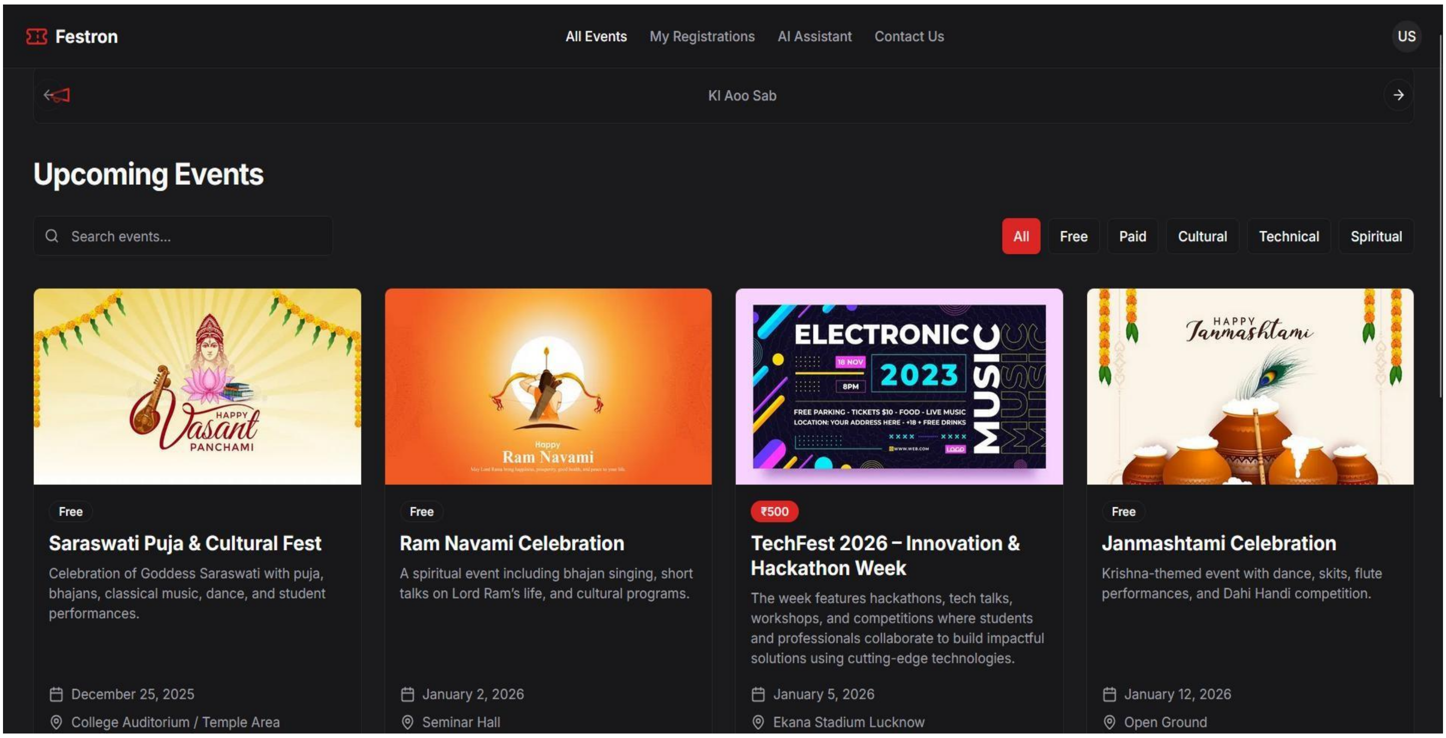

Fig 9.3 Home Screen:

9.4 My Registrations:

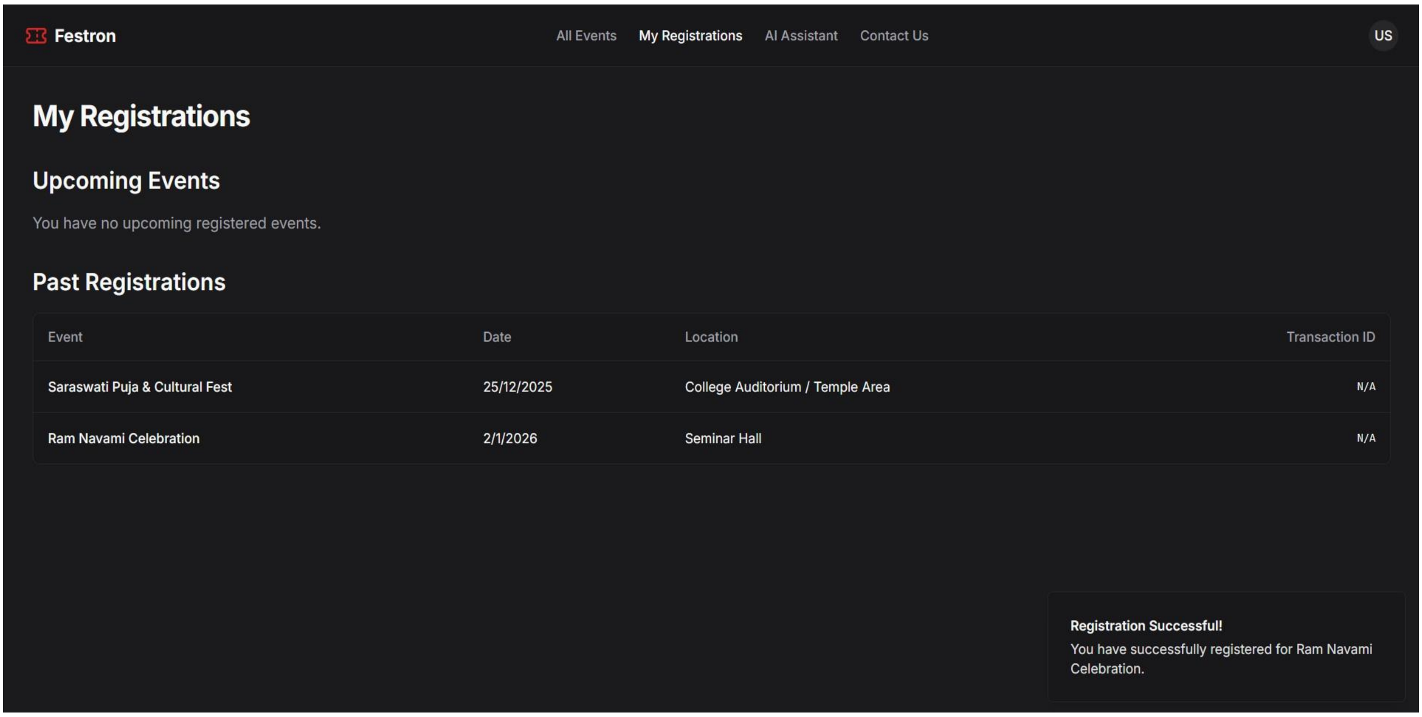

Fig 9.4 My Registrations:

9.5 AI Assistant Chatbot:

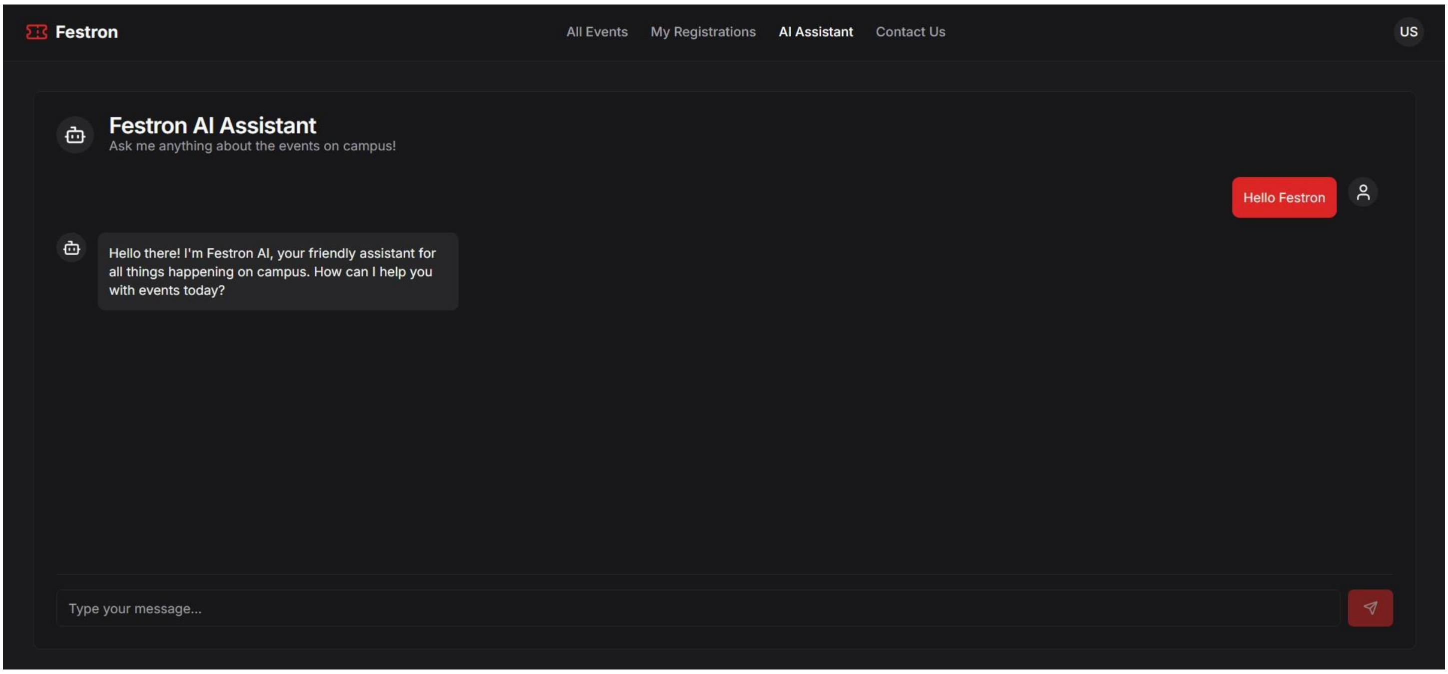

Fig 9.5 AI Assistant Chatbot

9.6 Contact Us Screen:

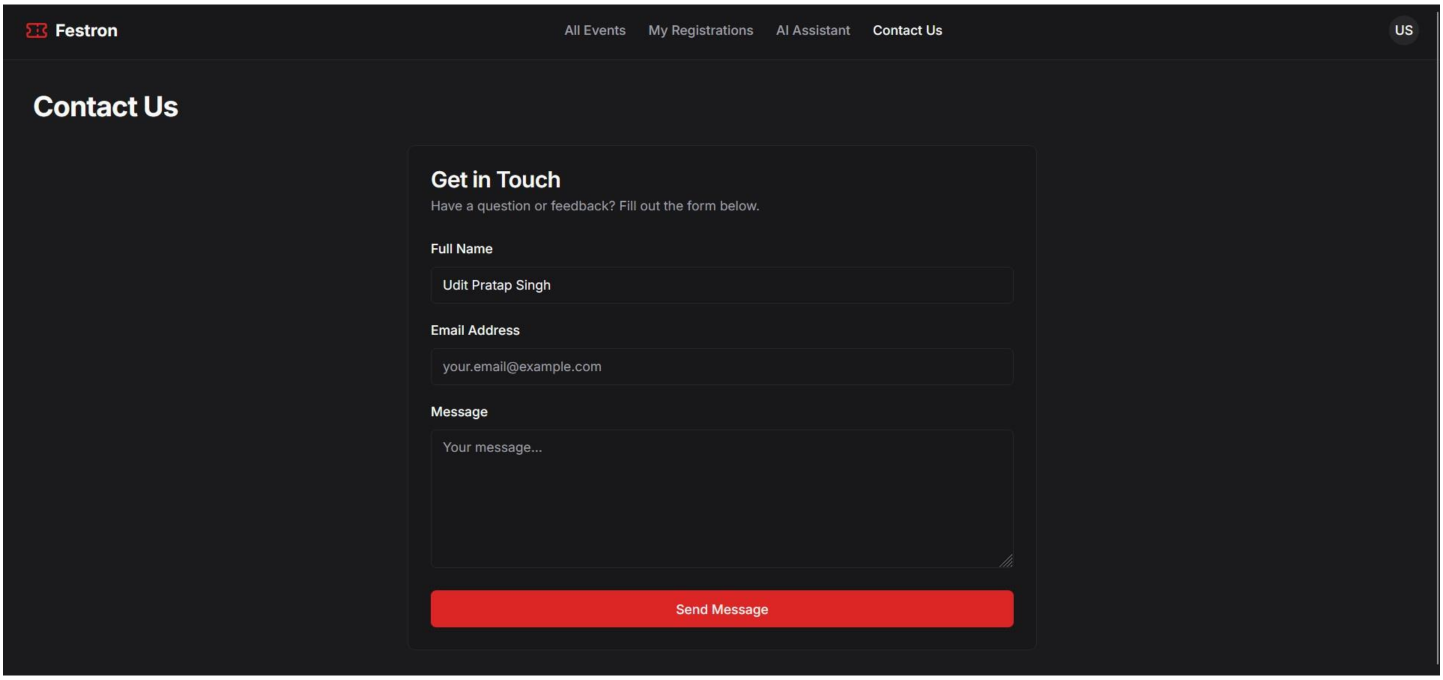

Fig 9.6 Contact Us Screen

9.7 User Profile Screen:

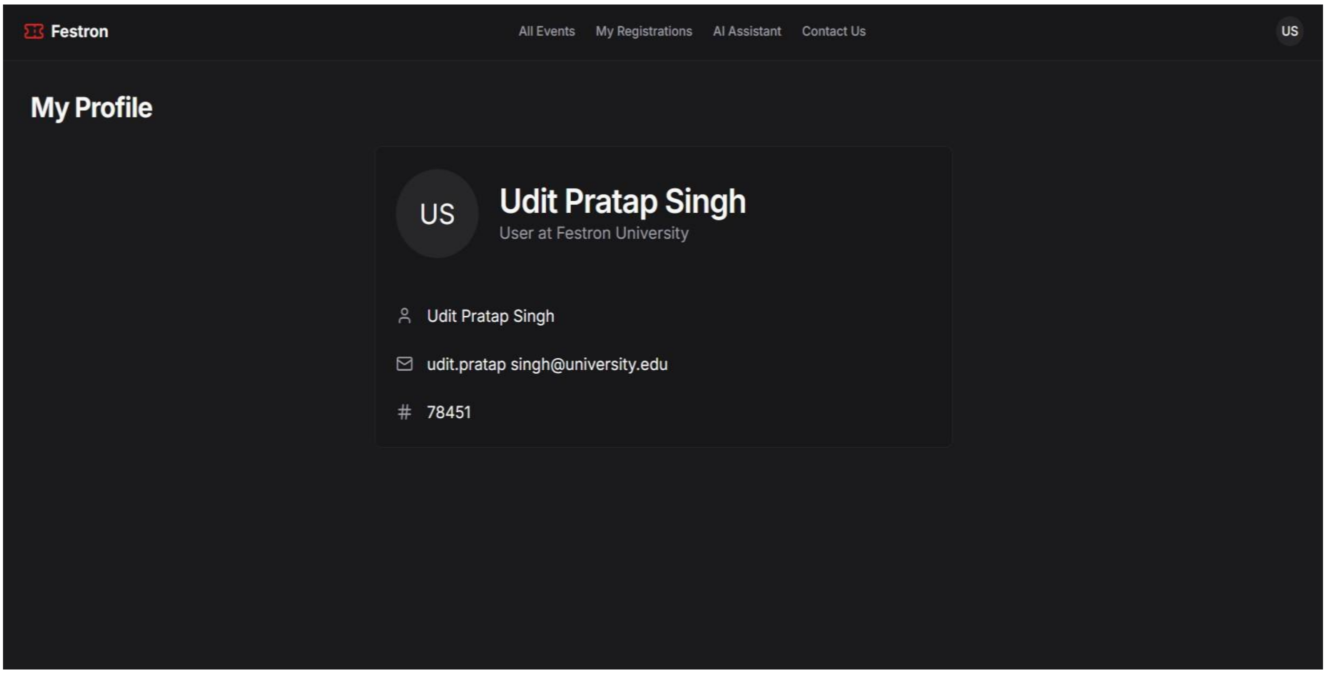

Fig 9.7 User Profile Screen

9.8 Organizer Login Screen:

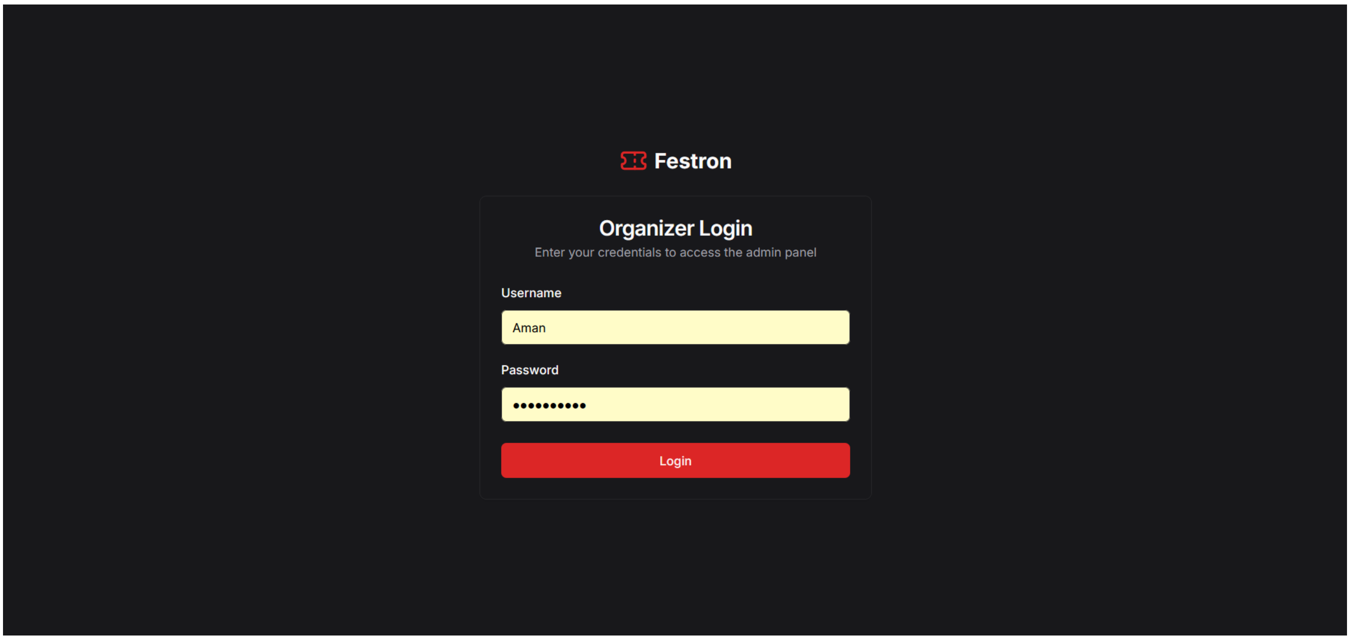

Fig 9.8 Organizer Login Screen

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9.9 Admin Dashboard Screen:

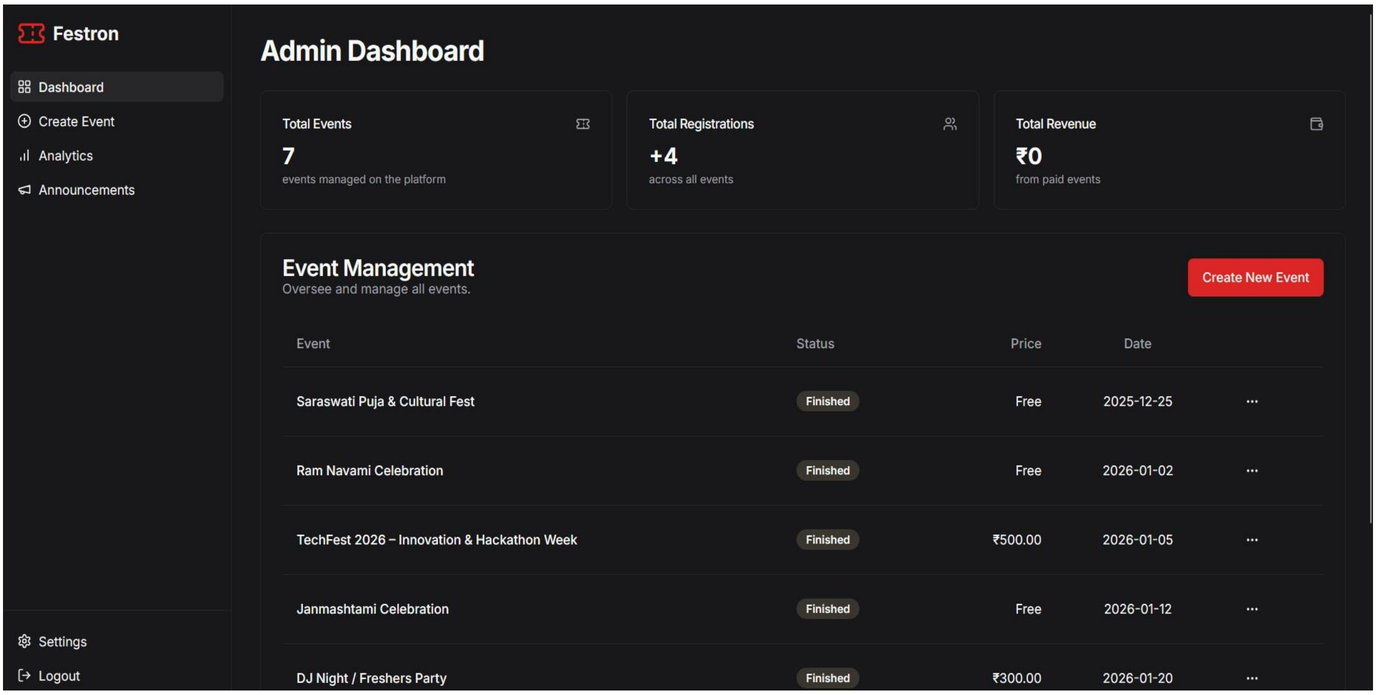

Fig 9.9 Admin Dashboard Screen

9.10 Create Event :

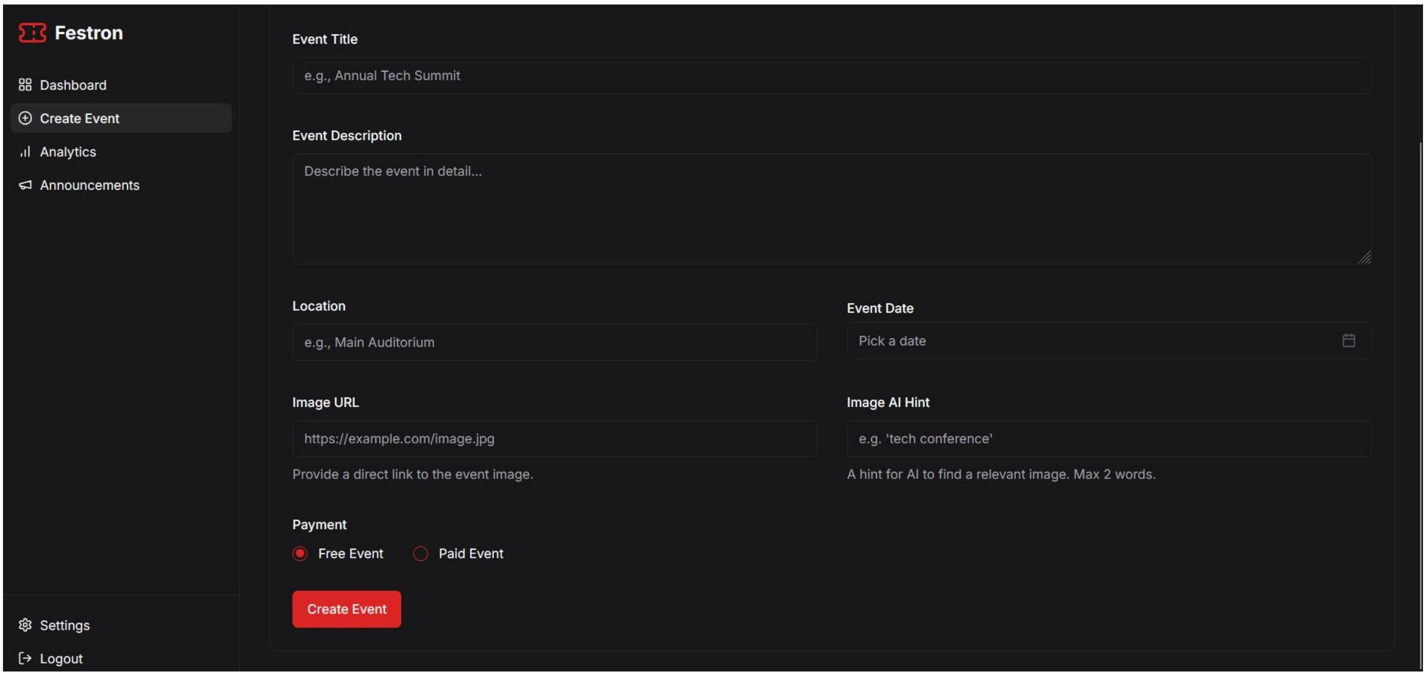

Fig 9.10 Create Event

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9.12 Analytics

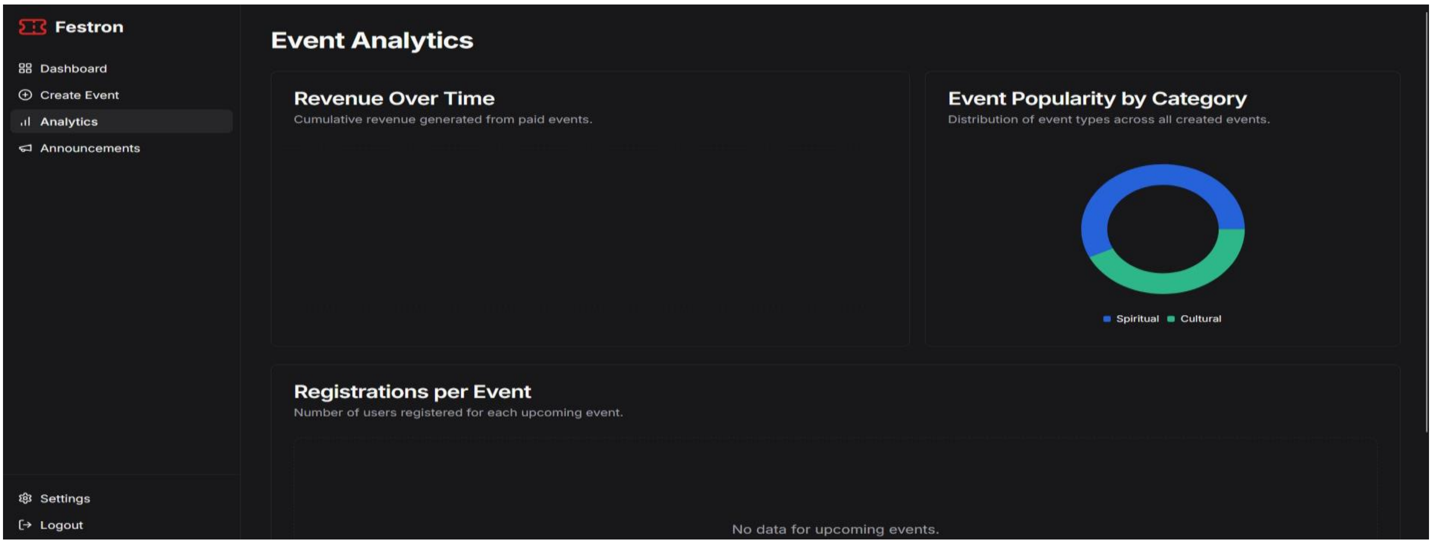

Fig 9.12 Analytics

9.13 Post An Announcement

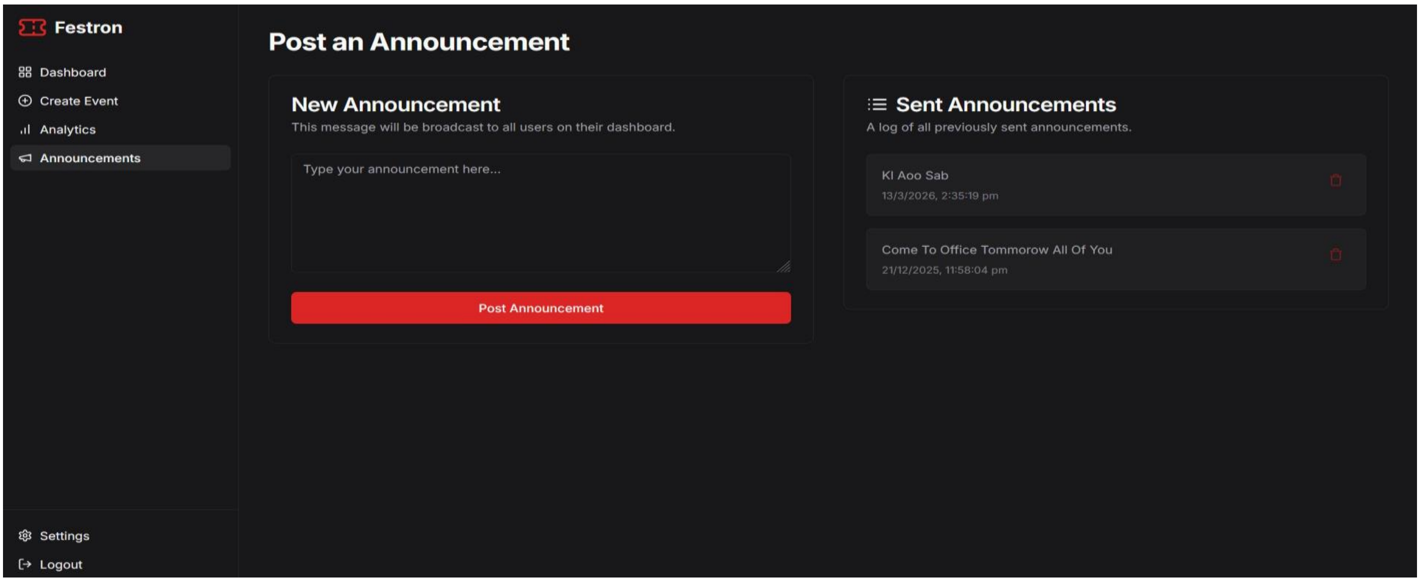

Fig 9.13 Post An Announcement

10. SYSTEM FLOW

The application flow starts with an authentication gate requiring users to log in or register. Upon successful authentication, the user is directed to the Home Screen; otherwise, they remain at the login interface to secure the session. This Home Screen serves as a central hub, displaying icons for Home, Education, Direction, Sense of Place, and Summary. These sections allow users to access specific features:

Task Management: The home part can be used for the registration of logistical requests or complaints in a preferred category.

Educational Resources: In the Learning part, there are educational videos or articles available for access.
Mapping Services: In the map section, users can mark or locate service center locations on an interactive map.
Status Tracking: Under the Status section, one can observe the real-time progress of problem resolution and task completion.
Personalization: There is a Profile section dedicated to editing and managing the user profile.
This structured design ensures that users benefit from seamless navigation and immediate access to all features, making the application significantly more user-friendly and operationally efficient.

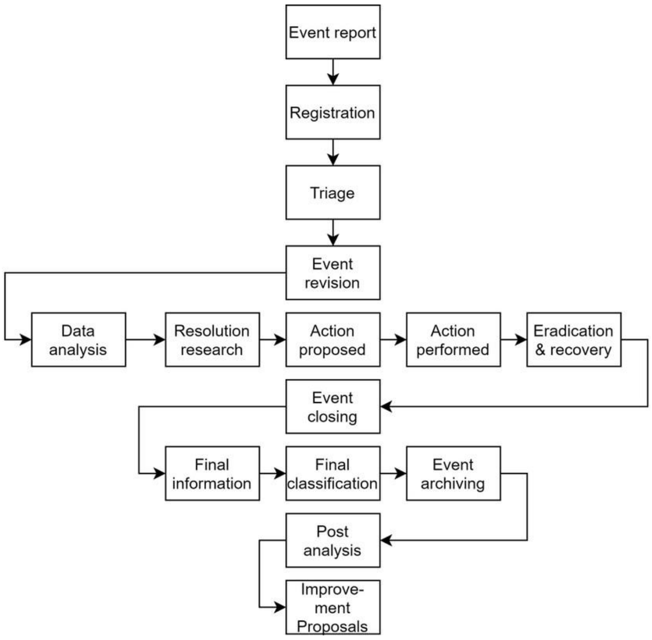

Figure 10 System Flow

11. RESULT:

The research introduces the successful development of an AI-based event management application using Python- based frameworks. The system utilizes advanced speech processing and machine learning modules to improve the accuracy of event and task classification. By employing cross-platform development tools, the application ensures high-quality interface design and device compatibility.

Integrated location services enable users to identify nearby venues and service providers using GPS coordinates. Firebase Storage and Database are utilized to ensure smooth, real-time data interaction during event operations. Additionally, mapping API integration facilitates the discovery of resource centers and logistical facilities. This specialized solution demonstrates how next-generation technologies can create a highly organized and environmentally friendly approach to complex event coordination.

12. CONCLUSION:

Eventually, the AI-based event management application will be launched as a comprehensive coordination solution consisting of planning, execution, and feedback phases. Instead of traditional methods, several innovative features have been applied, including wearable device support, mapping integration, intelligent command processing, and profile management, allowing individuals to easily distinguish and manage their logistical tasks. The algorithm, on the other hand, consumes expertise and data from established literature to effectively arouse engagement and accuracy in task classification using deep learning models and the intelligent things paradigm.

Such a theoretical framework corresponds with the appropriate development of automated technologies, as previous literature reviews point out the value of AI and machine-learning algorithms in the automatic classification of complex data.

This algorithm targets the main challenge of a faultless sorting process for event resources, aiming to be among the most sustainable management systems through integrated sensor networks and advanced implementation methods. As an advanced and diverse system, this multifaceted approach is proof of the effectiveness of the solution, as its practical application resolves current logistical issues and directs subsequent efforts toward long-term digital efficiency.

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