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# Scheme Seva: An AI-Powered Government Scheme Management Portal

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**Abstract:**

The rapid expansion of central and state government welfare schemes has made it increasingly difficult for citizens to identify programs that match their eligibility, needs, and location. Many beneficiaries remain unaware of schemes relevant to them because existing portals are often fragmented, static, and difficult to navigate. To address this gap, this paper presents Scheme Seva, an AI-powered Government Scheme Management Portal designed to simplify scheme discovery through personalization, intelligent assistance, and an accessible user interface. The proposed system uses Natural Language Processing (NLP) and Machine Learning (ML) to analyze user details such as age, income, occupation, gender, and state, and then recommend suitable schemes. A conversational chatbot further assists users by explaining scheme benefits, eligibility conditions, required documents, and application steps in simple language. The portal is developed using a modern web-based architecture to support secure interaction, scalable data handling, and real-time user assistance. The system also includes an admin module for managing scheme information and monitoring user engagement. Preliminary evaluation indicates that the platform improves scheme accessibility, reduces search effort, and provides a more citizen-centric approach to digital governance. The proposed solution supports the vision of inclusive e-governance by making government benefits easier to discover and understand.

**Keywords:** AI Chatbot, Government Scheme Recommendation, Natural Language Processing, Machine Learning, Digital Governance, Citizen-Centric Portal, Scheme Discovery, Web Application.

## I. INTRODUCTION

India offers a wide range of welfare schemes across sectors such as education, employment, healthcare, agriculture, women empowerment, and social welfare. Although these schemes are created to support different sections of society, many eligible citizens are unable to benefit from them because the information is scattered across multiple platforms and written in complex language. Traditional government portals mainly work as static information repositories, where users must manually search for scheme names, eligibility rules, and application details. This process is time-consuming and often confusing for users who are not technically experienced.

To solve this problem, Scheme Seva introduces an intelligent and user-friendly portal that helps citizens discover appropriate government schemes based on their personal profile and requirements. The system aims

to bridge the gap between public welfare programs and citizens by offering personalized recommendations, conversational support, and a structured management interface. By combining AI-based recommendation logic with a chatbot and a clean web interface, the portal makes scheme access simpler, faster, and more inclusive.

Traditional scheme discovery methods rely heavily on keyword searches and manual filtering. In many cases, citizens are required to visit multiple government websites to compare eligibility conditions, submission procedures, and required documents. This creates accessibility challenges, especially for users from rural regions, senior citizens, and individuals with limited digital literacy. In addition, language barriers and the absence of interactive guidance reduce the effectiveness of existing platforms. As a result, many welfare programs fail to reach their intended beneficiaries despite being publicly available.

The proposed portal addresses these limitations by introducing a recommendation-driven and AI-assisted system architecture. The platform collects user information such as age, gender, income category, occupation, education level, and state, and then processes this data to identify relevant government schemes. Instead of displaying generic lists, the system prioritizes personalized recommendations that are more likely to match the user's profile. This approach reduces unnecessary searching and improves decision-making for users.

Another important feature of the system is the AI-powered chatbot integrated into the portal. The chatbot supports conversational interaction and assists users by answering questions related to scheme eligibility, benefits, required documents, deadlines, and registration procedures. The chatbot is designed to provide responses in a simple and understandable format, making the system more user-friendly and interactive. In future versions, multilingual and voice-based support can further improve accessibility for users from different linguistic backgrounds [3].

The portal also includes an administrative interface for managing government scheme data. Administrators can add, update, delete, and organize scheme records through a centralized dashboard. This improves maintainability and ensures that the system remains updated with the latest welfare programs and policy changes.

The major contributions of the proposed work are summarized as follows:

- Development of an AI-powered government scheme recommendation portal.
- Personalized scheme matching based on user demographic and economic data.
- Integration of a conversational AI chatbot for citizen assistance.
- Secure user authentication and profile management system.
- Admin dashboard for scheme management and monitoring.
- Scalable web-based architecture suitable for future expansion and real-time integration.

The remainder of this paper is organized as follows. Section II discusses related work and existing research in digital governance and AI-based recommendation systems. Section III explains the problem statement and objectives of the proposed system. Section IV presents the system architecture and methodology. Section V describes implementation details and technology stack. Section VI discusses evaluation and observed outcomes. Finally, Section VII concludes the paper and outlines future scope.

## II. RELATED WORK

Digital governance platforms have become increasingly important for improving the accessibility and delivery of public welfare services. Several studies and government initiatives have attempted to simplify citizen

interaction with digital government systems through recommendation engines, conversational interfaces, and centralized information portals. However, many existing systems still suffer from limited personalization, fragmented information management, and insufficient multilingual support [5].

One of the earlier approaches toward personalized e-governance was presented in the IEEE conference publication titled "E-Government Platform of Personalized Information Service Based on Gridding Management." The work proposed a gridding-based architecture to organize government information around citizen needs. The system reduced information overload by grouping services according to user categories and administrative divisions. Although the architecture improved information organization, the model mainly depended on predefined rules and lacked adaptive machine learning mechanisms for dynamic recommendation and real-time personalization.

The National Informatics Centre (NIC) and the Ministry of Electronics and Information Technology (MeitY) also emphasized the role of data-driven governance through their Compendium of Data-Driven Decision Making in Governance. The report highlighted how open government datasets can improve public service accessibility and citizen engagement. However, government datasets often remain inconsistent across departments, with different formatting structures and update frequencies. These inconsistencies create difficulties for AI-driven processing and intelligent recommendation systems.

Research on recommendation systems for e-governance applications has further demonstrated the importance of personalized service discovery. Sharma et al. proposed an AI-based recommendation framework that helps users identify relevant government services using recommendation algorithms and demographic analysis. Their work showed that recommendation systems can significantly reduce user effort when searching for government resources. However, the proposed framework did not integrate conversational assistance, multilingual communication, or real-time eligibility evaluation [4][6].

Conversational AI has also gained attention in public-service platforms. The UMANG AI Citizen Assistant demonstrated that multilingual chatbot systems can successfully answer large-scale citizen queries related to government services. The chatbot improved navigation and reduced manual support requirements. Nevertheless, the system primarily focused on query answering and did not include intelligent recommendation features based on complete user profiles and eligibility conditions [2].

Recent developments in Artificial Intelligence, Natural Language Processing, and Machine Learning have enabled more advanced citizen-service systems. NLP-based chatbots now support multilingual interaction, contextual understanding, and dynamic response generation. Similarly, semantic recommendation systems using embedding models and cosine similarity techniques provide more accurate personalization than conventional rule-based filtering [1][3][7].

Despite these advancements, several research gaps remain in the current landscape of government scheme management systems. Most existing portals still operate as static information repositories where users must manually interpret eligibility conditions and compare schemes independently. Personalized recommendation capabilities are either absent or limited to basic filtering techniques. Furthermore, many systems do not support intelligent conversational assistance, multilingual accessibility, or adaptive user interaction.

Another major limitation is the lack of integration between AI-driven recommendation engines and administrative monitoring systems. Existing platforms generally focus on either scheme listing or chatbot assistance, but rarely combine recommendation, analytics, document handling, and user interaction into a unified framework. In addition, many government portals do not support semantic understanding of scheme descriptions, which reduces recommendation accuracy when eligibility conditions are complex or unstructured.

The proposed Scheme Seva is a Government Scheme Management Portal addresses these limitations by combining multiple intelligent components into a single integrated platform. The system uses hybrid recommendation techniques involving rule-based filtering and semantic similarity analysis to match users with appropriate schemes.

TABLE I- Comparison of Related Work

| Work | Technique | Focus Area | Limitation |
|---|---|---|---|
| Gridding-Based E-Government Platform | Rule-based service grouping | Personalized information delivery | No AI-based recommendation |
| NIC Data-Driven Governance | Open government datasets | Governance analytics | Lack of unified structured datasets |
| Personalized E-Governance Recommendation | Recommendation algorithms | Government service matching | No chatbot integration |
| UMANG AI Citizen Assistant | Conversational AI chatbot | Citizen query assistance | Prototype-level deployment |

The literature survey clearly indicates the growing importance of AI in digital governance systems. However, there remains a strong need for integrated, citizen-centric platforms capable of combining recommendation intelligence, conversational support, secure user management, and real-time scheme discovery. The proposed work contributes toward this direction by designing a scalable AI-powered government scheme management portal focused on accessibility, personalization, and usability.

## III. PROBLEM STATEMENT

Government welfare schemes are introduced to support citizens across different economic and social categories, including students, farmers, women, senior citizens, unemployed individuals, and economically weaker sections. Although thousands of schemes are available at both central and state levels, a significant number of eligible citizens remain unaware of them. Existing government portals generally provide only static information and require users to manually search through large collections of schemes distributed across multiple websites.

The absence of a centralized intelligent platform creates several practical difficulties. Citizens must often compare complicated eligibility conditions, understand technical terminology, and navigate fragmented government resources independently. This process becomes even more challenging for rural users, senior citizens, and individuals with limited digital literacy. In many cases, users abandon the search process because they cannot determine which schemes are relevant to their profile.

Another major problem is the lack of personalization in traditional systems. Most portals display generic scheme lists instead of recommending schemes according to user-specific details such as income level, gender, occupation, education, state, and social category. As a result, users spend significant time filtering irrelevant information. Additionally, most existing systems do not provide conversational support, multilingual assistance, or intelligent guidance during the application process [6].

The proposed Scheme Seva is a Government Scheme Management Portal addresses these challenges by introducing an AI-powered recommendation and assistance framework that simplifies government scheme discovery and citizen interaction.

The primary objectives of the proposed system are as follows:

- To develop a centralized web-based platform for accessing government welfare schemes.
- To provide personalized scheme recommendations based on user demographic and socio-economic details.
- To integrate an AI-powered chatbot for conversational assistance and eligibility guidance.
- To support multilingual and user-friendly interaction for improved accessibility.
- To implement secure user authentication and profile management functionality.
- To provide document management and application tracking features for users.
- To design an administrative dashboard for managing schemes and monitoring system activity.
- To create a scalable architecture capable of future integration with official government databases and APIs.

The proposed system is designed not only as a scheme discovery portal but also as an intelligent citizen-assistance framework that improves accessibility, transparency, and efficiency in digital governance. By combining AI recommendation techniques, conversational interfaces, and modern web technologies, the platform aims to reduce the information gap between government welfare programs and eligible beneficiaries.

## IV. PROPOSED SYSTEM ARCHITECTURE

The architecture of the proposed system is organized into multiple interconnected layers responsible for user interaction, recommendation processing, conversational assistance, data management, and administrative control. The modular architecture improves scalability, maintainability, and future extensibility of the system.

The proposed architecture follows a multi-layered design consisting of the presentation layer, application layer, AI processing layer, database layer, and administrative layer. Each layer performs a dedicated role within the overall interaction pipeline and communicates with other modules through secure APIs and service calls.

### *A. System Layers*

The first layer is the presentation layer, which provides the user interface of the portal. This layer is developed using modern frontend technologies such as React.js, Tailwind CSS, and TypeScript to ensure responsive and interactive web pages. Users interact with the system through dashboards, search interfaces, chatbot windows, application forms, and recommendation panels. The frontend also supports voice-enabled form interaction and real-time user feedback.

The second layer is the application layer, which handles the business logic of the portal. This layer is implemented using Node.js and Express.js. It manages user authentication, request handling, recommendation processing, document operations, and communication between frontend and backend services. Secure JWT-based authentication is used to maintain protected user sessions and role-based access control.

The third layer is the AI processing layer, which forms the core intelligence of the system. This layer combines rule-based eligibility filtering with semantic recommendation techniques. User profiles are analyzed according to attributes such as age, occupation, state, income category, and gender. The system uses

embedding-based semantic similarity methods to compare user requirements with scheme descriptions and eligibility conditions. AI models further support conversational interaction through the chatbot module.

The fourth layer is the database layer, where all user records, scheme details, chatbot interactions, recommendation logs, and application information are stored. MongoDB is used because of its flexible schema structure and efficient handling of semi-structured data. The database is designed to support dynamic updates as government schemes change over time.

The final layer is the administrative layer, which allows authorized administrators to manage system content and monitor activity. Through the admin dashboard, administrators can add new schemes, update existing records, verify scraped data, manage applications, and observe system analytics.

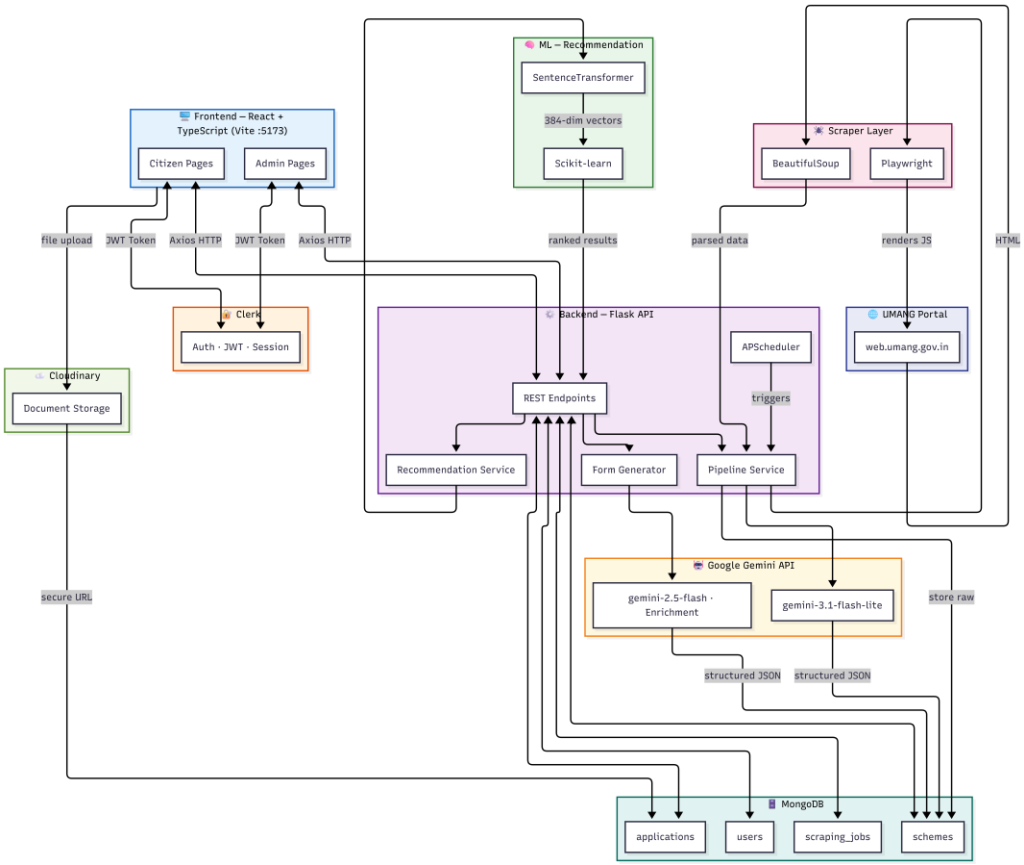


**Fig. 1. Proposed system architecture of the Scheme Seva portal.**

TABLE II- Functional Modules of the Proposed Framework

| Module | Function |
|---|---|
| User Management Module | Handles user registration, login, and profile management |
| Recommendation Module | Provides personalized recommendations based on user data |

| | |
|---|---|
| AI Chatbot Module | Offers conversational assistance and user support |
| Scheme Management Module | Stores, updates, and organizes government scheme information |
| Document Management Module | Manages document uploads, verification, and secure storage |
| *Analytics Module* | *Displays user activity, application trends, and insights* |
| Admin Dashboard | Controls system monitoring, scheme approvals, and user management |

### *B. Core Interaction Workflow*

The interaction workflow of the proposed system begins when a user registers and creates a personal profile within the portal. The profile contains information such as age, gender, occupation, annual income, education level, social category, and state. This information acts as the foundation for recommendation generation and eligibility analysis.

Once the profile is created, the recommendation engine processes the user data and compares it with the eligibility criteria of available government schemes. The system first applies rule-based filtering to eliminate schemes that do not satisfy mandatory eligibility conditions. After filtering, semantic similarity analysis is used to rank schemes according to relevance and user suitability. The final recommendations are displayed with eligibility indicators and recommendation scores.

The AI chatbot remains available throughout the interaction process. Users can ask questions related to eligibility, required documents, application deadlines, registration procedures, and scheme benefits. The chatbot processes user queries using Natural Language Processing techniques and generates contextual responses through the integrated generative AI model.

If the user decides to apply for a scheme, the system provides application assistance features including document upload, application tracking, and form guidance. Uploaded documents are securely stored using cloud-based storage integration, reducing repeated uploads for multiple applications.

### *C. Hybrid Recommendation Mechanism*

The recommendation framework combines rule-based filtering with semantic AI similarity techniques to improve recommendation quality. Rule-based filtering ensures that users only receive schemes satisfying minimum eligibility conditions such as age range, state eligibility, occupation category, and income limits.

After eligibility filtering, semantic analysis is performed using embedding models and cosine similarity methods. Scheme descriptions, benefits, and eligibility details are converted into vector representations. These vectors are compared with processed user-interest representations to identify schemes that are contextually relevant. This hybrid approach improves personalization accuracy compared to simple keyword-based search systems [4][7].

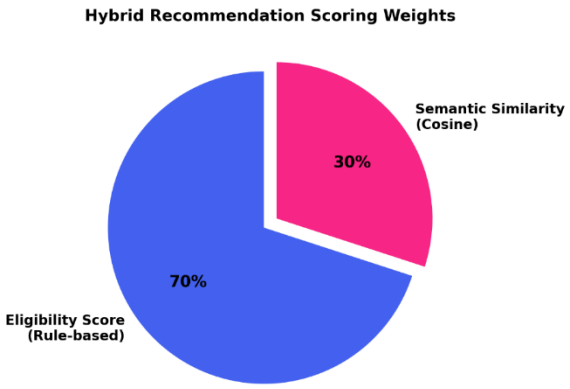


**Fig. 2. Hybrid Recommendation Scoring Weights.**

### *D. AI Chatbot Integration*

The chatbot component acts as a virtual citizen-assistance system within the portal. The chatbot supports conversational interaction and reduces dependency on manual browsing. Unlike traditional FAQ systems, the chatbot generates dynamic responses based on user queries and contextual understanding.

The chatbot is capable of assisting users with the following tasks:

- Eligibility verification
- Required document guidance
- Scheme comparison
- Application procedures
- Recommendation explanation
- Frequently asked questions

The integration of conversational AI improves accessibility and simplifies interaction for users who may not be familiar with technical government terminology [2].

### *E. Extension and Scalability Support*

The architecture of the proposed system is designed for scalability and future extension. The modular structure allows independent upgrading of recommendation models, chatbot services, and frontend interfaces without affecting the overall system operation.

Future versions of the system can support the following capabilities:

- Real-time synchronization with government APIs
- Regional language voice interaction
- Mobile application deployment
- Predictive analytics for governance insights

- Advanced machine learning recommendation optimization
- Accessibility-focused interfaces for differently-abled users

The extension-ready design ensures that the portal can evolve into a comprehensive AI-driven digital governance platform.

## V. IMPLEMENTATION AND TECHNOLOGY STACK

The implementation of the proposed Scheme Seva, Government Scheme Management Portal focuses on creating a scalable, secure, and intelligent citizen-service platform using modern web technologies and Artificial Intelligence frameworks. The system integrates frontend technologies, backend services, AI-based recommendation models, conversational AI, and cloud-based storage mechanisms to deliver an efficient user experience.

### *A. Frontend Implementation*

The frontend of the system is developed using React.js because of its component-based architecture and efficient rendering capabilities. React enables reusable UI components, dynamic content rendering, and smooth page transitions. Tailwind CSS is used to create a responsive and visually accessible interface suitable for different screen resolutions and user categories. TypeScript is incorporated to improve code reliability and maintainability through static type checking. React Router manages navigation between pages such as user dashboard, recommendation interface, chatbot panel, profile management, and admin dashboard.

The frontend interface includes the following features:

- Personalized scheme recommendation cards
- Search and filtering options
- AI chatbot interaction window
- User profile dashboard
- Application tracking section
- Document upload functionality
- Administrative management pages

The user interface is designed with simplicity and accessibility as major priorities to ensure usability even for users with limited technical knowledge.

### *B. Backend Architecture*

The backend is implemented using Node.js and Express.js to support RESTful API communication and modular service handling. The backend processes user requests, manages authentication, communicates with AI services, and handles recommendation computations.

JWT-based authentication is used to provide secure user sessions and role-based authorization. Different access levels are maintained for citizens and administrators. The backend also validates uploaded data and manages communication between frontend interfaces and database services.

Key backend functionalities include:

- User authentication and authorization
- Scheme retrieval and filtering
- Recommendation generation
- Chatbot request handling
- Document management
- Application tracking
- Administrative operations

The modular backend structure improves scalability and simplifies future integration with external government APIs and additional AI services.

### *C. Database and Cloud Storage*

MongoDB is selected as the primary database system because it efficiently handles semi-structured and dynamic data. Government schemes often contain varying eligibility fields, categories, and document requirements, making MongoDB suitable for flexible schema management.

The database stores user profiles, scheme metadata, recommendation logs, chatbot interactions, application records, and administrative data. Cloud-based storage integration is used for secure document handling. Uploaded files such as identity proofs and certificates are stored through cloud storage services, reducing local storage dependency and improving scalability.

### *D. AI Recommendation Engine*

#### *Eligibility-Based Filtering*

In the first stage, the system evaluates mandatory eligibility conditions such as age criteria, gender category, state eligibility, income range, occupation type, and social category. Schemes that do not satisfy the required conditions are removed from the recommendation list. This filtering process improves efficiency by reducing unnecessary semantic comparisons.

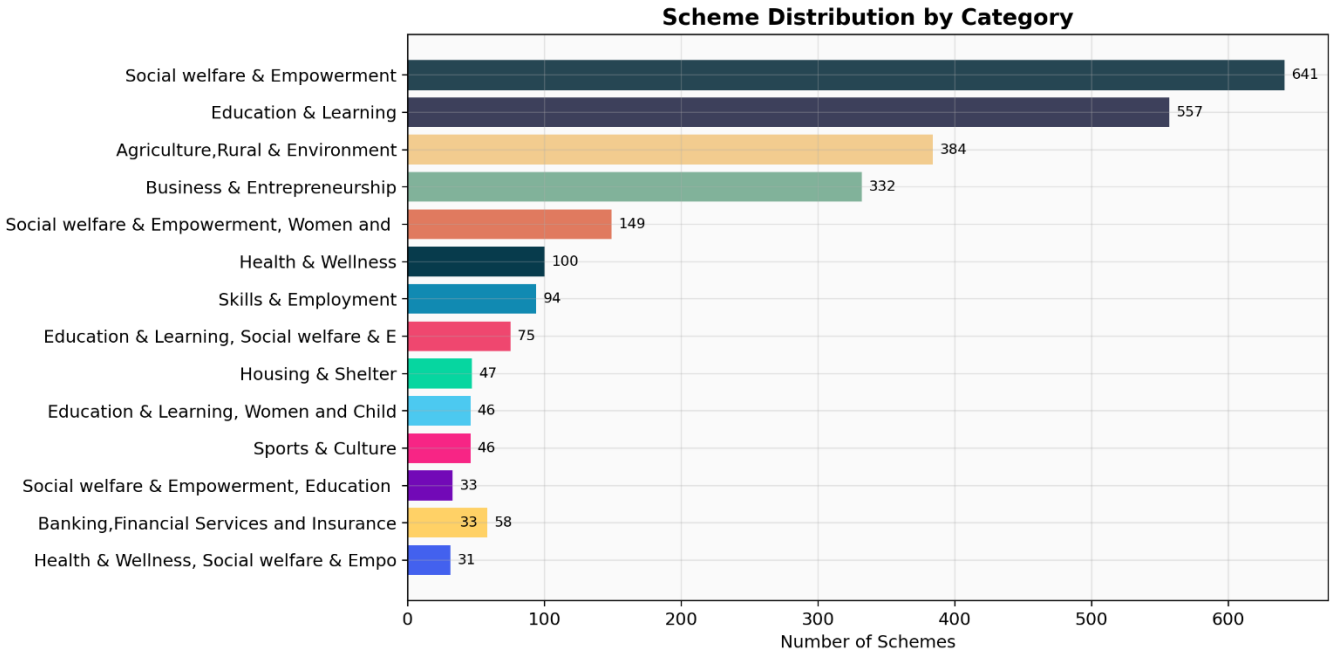


**Fig. 3. Scheme Distribution by Category.**

***Semantic Similarity Analysis***

After eligibility filtering, semantic similarity techniques are applied to rank the remaining schemes according to contextual relevance. Scheme descriptions and user interests are converted into vector embeddings using Sentence Transformer models. Cosine similarity calculations are then performed to determine the closeness between user requirements and scheme information.

This approach allows the system to identify meaningful recommendations even when users use informal or non-technical language. Compared to traditional keyword-based systems, semantic analysis provides better personalization and recommendation accuracy.

### *E. AI Chatbot and NLP Integration*

The AI chatbot is integrated using modern Natural Language Processing and generative AI technologies. The chatbot assists users through conversational interaction and reduces dependency on manual navigation.

The chatbot performs the following operations:

- Answers user queries related to schemes
- Explains eligibility conditions
- Provides document guidance
- Assists in application procedures
- Suggests recommended schemes

The conversational interface improves accessibility for users unfamiliar with government terminology or complex digital interfaces.

### *F. Automated Data Collection and Processing*

The system also supports automated scheme data collection through controlled scraping and processing pipelines. Government scheme information from official sources is collected and converted into structured records for recommendation analysis.

The data processing workflow includes scheme data extraction, text cleaning and normalization, eligibility field identification, structured JSON conversion, duplicate detection and removal, and database storage and indexing. This automated approach helps maintain updated scheme information while reducing manual administrative effort.

TABLE III- Technology Stack Used in the System

| Component | Technology Used |
|---|---|
| Frontend | React.js, Tailwind CSS, TypeScript |
| Backend | Node.js, Express.js |
| Database | MongoDB |
| Authentication | JWT |
| AI Chatbot | Generative AI / NLP |
| Recommendation Engine | Sentence Transformers, Cosine Similarity |
| Cloud Storage | Cloudinary |
| Data Processing | Python, Flask |
| Version Control | GitHub |

The integrated technology stack ensures scalability, efficient processing, secure communication, and intelligent interaction within the proposed platform.

## VI. RESULTS AND DISCUSSION

Scheme Seva was evaluated using prototype-level testing with mock user datasets and structured government scheme records. The evaluation focused on recommendation relevance, response efficiency, usability, and overall system performance.

### *A. Recommendation Accuracy*

The hybrid recommendation engine demonstrated improved personalization compared to conventional keyword-based filtering systems. By combining eligibility filtering with semantic similarity analysis, the system was able to generate more contextually relevant recommendations for users with different demographic and socio-economic profiles.

During controlled testing, user profiles containing parameters such as age, gender, state, income range, and occupation were evaluated against the available scheme database. The system successfully filtered ineligible schemes and prioritized relevant recommendations with higher contextual similarity scores.

The recommendation engine showed the following observations:

- Reduced irrelevant recommendation results
- Faster scheme discovery process
- Improved matching accuracy for complex eligibility conditions
- Better contextual understanding of scheme descriptions

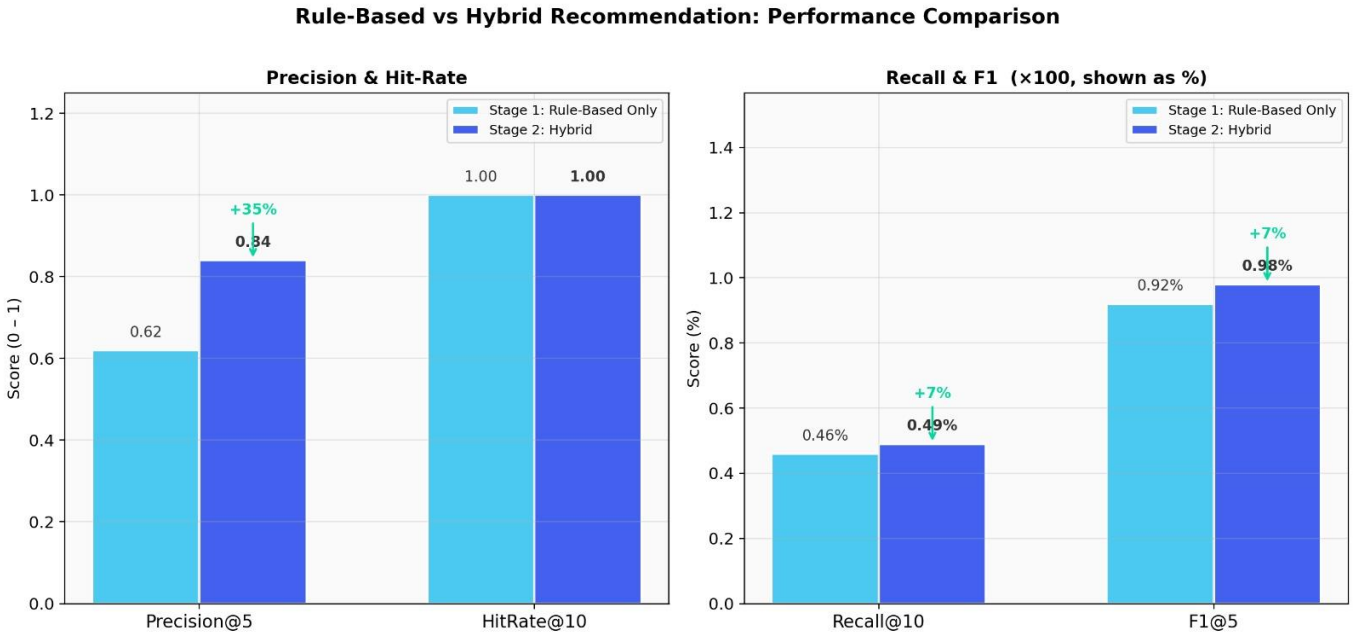


**Fig. 4. Performance Comparison.**

The semantic recommendation stage proved particularly useful when scheme descriptions contained unstructured or technical language that traditional keyword systems fail to interpret effectively.

### *B. Chatbot Performance*

The AI chatbot successfully handled conversational queries related to eligibility verification, required documentation, application procedures, scheme benefits, and recommendation explanations. The conversational interface reduced manual browsing effort and improved user engagement. Users were able to interact with the chatbot using natural language queries instead of navigating multiple pages or reading lengthy documents.

The chatbot demonstrated the following characteristics:

- Fast response generation
- Context-aware interaction
- Improved accessibility for first-time users
- Simplified explanation of technical information

The multilingual conversational capability further improved usability for users more comfortable with regional languages.

### *C. User Experience Evaluation*

The frontend interface was designed with emphasis on simplicity, readability, and accessibility. Prototype-level user interaction testing indicated that users could navigate recommendation pages, chatbot interaction windows, and application tracking sections without significant difficulty.

Key usability observations included:

- Simplified scheme discovery workflow
- Reduced search complexity
- Clear recommendation presentation
- Faster access to relevant information
- Improved engagement through conversational assistance

The integration of recommendation, chatbot support, and profile management into a unified interface significantly improved the overall digital governance experience compared to static government portals.

### *D. System Performance Analysis*

System performance was analyzed on the basis of response time, scalability, recommendation efficiency, and modularity. The integration of lightweight REST APIs and optimized database queries helped maintain smooth interaction between frontend and backend components.

The recommendation pipeline achieved efficient processing by performing eligibility filtering before semantic similarity computation. This reduced computational overhead and improved response generation speed. Frequently accessed scheme records and recommendation results were also optimized through indexing and caching strategies.

The system demonstrated the following performance characteristics:

- Fast recommendation generation
- Efficient scheme filtering
- Low-latency chatbot interaction
- Scalable modular architecture
- Secure authentication and session handling

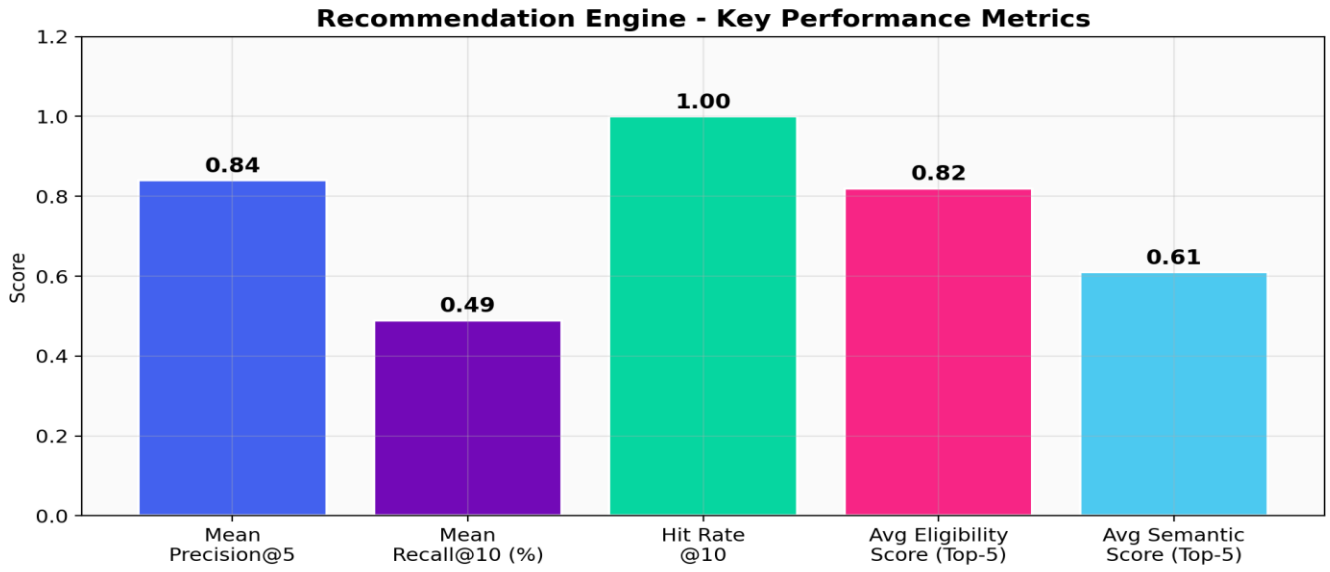


**Fig. 5. Recommendation Engine – Key Performance Metrics.**

The modular implementation also allows independent scaling of AI services, frontend interfaces, and database systems according to user demand.

### *E. Comparative Analysis*

The proposed system was compared with traditional government scheme portals based on functionality, personalization capability, and user interaction quality.

TABLE IV

Comparison Between Existing Systems and Proposed System

| **Feature** | **Traditional Government Portals** | **Proposed Scheme Seva System** |
|---|---|---|
| Scheme Discovery | Manual searching across multiple portals | AI-based personalized scheme recommendations |
| Recommendation Support | Limited or unavailable | Hybrid intelligent recommendation engine |
| Conversational Assistance | Static FAQ pages | AI-powered chatbot support |
| Personalization | Generic information display | User-profile-based recommendations |
| Language Interaction | Mostly English-only interfaces | Multilingual conversational assistance |

| | | |
|---|---|---|
| Application Guidance | Manual interpretation of guidelines | Guided chatbot-based assistance |
| User Experience | Complex navigation and fragmented systems | Simplified and interactive user interface |
| Analytics Support | Limited analytics and reporting | Integrated analytics dashboard with insights |

The comparison highlights the effectiveness of integrating Artificial Intelligence with e-governance services. Traditional portals mainly provide information access, whereas the proposed system focuses on intelligent assistance and citizen-centric interaction [5].

### *F. Limitations of the Current System*

Although the proposed system demonstrates the feasibility of intelligent government scheme recommendation and assistance, certain limitations remain in the current prototype implementation.

The major limitations include:

- Dependence on structured and updated scheme datasets
- Limited real-time government API integration
- Prototype-scale deployment environment
- Restricted multilingual dataset availability
- Requirement of stable internet connectivity for AI services

Additionally, recommendation quality depends heavily on the completeness and accuracy of user-provided profile information. Future large-scale deployment would require continuous dataset updates, stronger API integration, and expanded regional language support. Despite these limitations, the prototype successfully demonstrates the potential of AI-driven digital governance systems for improving citizen accessibility and welfare scheme awareness.

## VII. FUTURE SCOPE

Although the current implementation demonstrates the effectiveness of the proposed framework, several advanced features can be incorporated in future versions to improve scalability and real-world applicability.

Future enhancements may include:

- Real-time integration with official government APIs and databases
- Advanced multilingual voice interaction support
- Mobile application deployment for wider accessibility
- AI-driven predictive analytics for policy insights
- OCR-based document verification and validation
- Integration with Aadhaar-based authentication systems
- Recommendation optimization using deep learning techniques
- Offline support for low-connectivity regions

Future research can also explore reinforcement learning and adaptive recommendation systems capable of continuously improving recommendation quality based on user feedback and behavioral patterns. These advancements would further strengthen the role of AI in modern e-governance systems.

## VIII. CONCLUSION

The Government Scheme Management Portal presents an intelligent and user-centric approach toward improving access to government welfare schemes through Artificial Intelligence, Natural Language Processing, and modern web technologies. The system addresses major challenges associated with existing government portals, including fragmented information, lack of personalization, complex navigation, and limited conversational assistance.

By integrating a hybrid recommendation engine with an AI-powered chatbot, the platform enables citizens to discover relevant government schemes based on their demographic and socio-economic profile. The recommendation framework combines eligibility-based filtering with semantic similarity analysis to improve recommendation accuracy and contextual relevance. In addition, the chatbot simplifies interaction by providing conversational guidance related to eligibility conditions, documentation requirements, application procedures, and scheme benefits.

The modular architecture of the system improves scalability, maintainability, and future adaptability. Features such as secure authentication, document management, application tracking, and administrative monitoring further enhance the practicality of the proposed platform. The implementation demonstrates how AI can transform traditional static governance portals into intelligent citizen-assistance systems.

The proposed work contributes to the development of a centralized government scheme discovery platform designed to simplify citizen access to welfare schemes and public services. It incorporates an AI-driven personalized recommendation framework that analyses user information to suggest relevant schemes efficiently. The system also includes a conversational citizen-assistance chatbot to improve user interaction and accessibility through natural language communication. Additionally, the platform provides a secure user and document management system to ensure safe handling of citizen data and uploaded documents. Administrative analytics and monitoring features are integrated to assist authorities in tracking platform usage, user engagement, and scheme effectiveness. Furthermore, the proposed architecture is designed to be scalable and adaptable, allowing future expansion and integration with broader digital governance applications.

The experimental observations and prototype evaluation indicate that the system reduces user search effort, improves accessibility, and enhances user engagement through intelligent interaction mechanisms. The proposed solution therefore contributes toward the broader vision of inclusive and citizen-centric digital governance.

## CODE AVAILABILITY

The implementation repository for the proposed Scheme is available on GitHub: Scheme Seva Portal Repository.

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