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National Career Scholarship Portal

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Abstract: India's national scholarship ecosystem is difficult to navigate due to scattered information sources, unclear eligibility rules, and limited personalized support making discovery and application slow, confusing, and error-prone. This work presents the National Career Scholarship Portal, a centralized, AI-enabled web platform designed to simplify scholarship search and improve end-to-end application assistance for students and working professionals. The portal is built with a secure and scalable backend using Python (Django) and a responsive frontend using Vue.js to ensure an intuitive user experience across devices.

A key feature is an AI-powered chatbot that applies Natural Language Processing (NLP) to answer user queries instantly, recommend scholarships based on user profiles, and provide step-by-step guidance for meeting eligibility and documentation requirements. By combining consolidated scholarship datasets, intelligent filtering, and real-time conversational support, the platform enhances accessibility, transparency, and efficiency in scholarship discovery and application workflows. The proposed system demonstrates how modern web engineering and AI can reduce friction in public-service information access and help users secure financial aid opportunities more effectively.

Keywords- Scholarship Portal, AI Chatbot, Natural Language Processing, Django, Python, Vue.js, Personalized Recommendation, Application Assistance, Student Support

I. INTRODUCTION

Scholarship distribution systems are a critical part of an education-support ecosystem because they directly influence access, equity, and social mobility. In theory, national scholarships are designed to reduce financial barriers, encourage merit and inclusion, and support underrepresented groups in pursuing education and professional development. However, the effectiveness of any scholarship program depends not only on funding availability but also on how efficiently eligible candidates can discover, understand, and successfully apply for the opportunities.

Information Systems Perspective

From the viewpoint of information systems, scholarship portals act as decision-support platforms. Users must make choices based on multiple variables eligibility constraints, deadlines, documentation requirements, benefit amounts, and application procedures. When information is dispersed across many sources, the system becomes an example of information fragmentation, where users expend excessive effort gathering and validating data. This increases cognitive load and decreases successful participation, especially for first-generation learners or applicants with limited digital literacy.

A centralized scholarship platform theoretically reduces this friction by:

- consolidating data into a single repository,
- standardizing scholarship attributes (eligibility, deadlines, benefits),
- enabling structured search and filtering,
- improving reliability through controlled data management.

Human–Computer Interaction (HCI) and User Experience Theory

In HCI theory, a platform becomes usable when it reduces user effort and uncertainty. Scholarship applications are typically multi-step and rule-heavy, which increases chances of mistakes and drop-offs. Poor usability leads to:

- incomplete applications,
- missed deadlines,
- wrong document uploads,
- rejection due to minor errors.

A well-designed interface improves task completion by providing clarity, navigation simplicity, and contextual assistance. Therefore, responsiveness and intuitiveness (as enabled through frameworks like Vue.js) are theoretically tied to higher completion rates and user satisfaction.

AI and NLP as an Intelligent Support Layer

Traditional portals rely on static pages, FAQs, or helpline numbers. These approaches do not scale well and fail to provide personalized guidance. The theoretical advantage of Artificial Intelligence, particularly Natural Language Processing (NLP), is that it enables a system to interact with users in human language, interpret intent, and deliver precise, context-aware responses.

II. LITERATURE REVIEW

[1] Presto, H. (2023) in their paper “Scholarship Recommendation System using Hybrid Filtering and Deep Learning” (published in 2023 IEEE 12th International Conference on Communication, Networks and Satellite (COMNETSAT)) found that integrating collaborative filtering with deep learning models improves the accuracy of scholarship recommendations by effectively matching eligibility criteria with user profiles.

[2] Kumar, A. (2023) in their paper “Leveraging Natural Language Processing for Enhanced Public Service Information Access” (published in 2023 IEEE International Conference on Smart Information Systems and Technologies (SIST)) found that NLP techniques such as semantic search and intent recognition significantly enhance the ability of systems to understand user queries and retrieve precise information from complex datasets.

[3] Chen, L. (2023) in their paper “Design and Implementation of a User-Centric Web Platform for Public Service Delivery” (published in 2023 IEEE 3rd International Conference on Computer, Communication and Public Service (CCCPS)) found that adopting a user-centric design with responsive frameworks and strong backend architecture improves usability, security, and system reliability in public service platforms.

[4] Wang, J. (2023) in their paper “A Unified Data Integration Framework for Heterogeneous Educational Datasets” (published in 2023 IEEE International Conference on Big Data (BigData)) found that integrating multiple educational datasets into a unified system enables better data analysis and personalized services such as scholarship recommendation and filtering.

[5] Lee, S. (2023) in their paper “Enhancing User Experience in E-Learning Platforms through Intuitive UI/UX Design” (published in 2023 IEEE International Conference on Advanced Learning Technologies (ICALT)) found that effective UI/UX design principles such as clear navigation, responsive layouts, and visual consistency significantly improve user engagement and reduce complexity in digital platforms.

[6] Patel, R. (2023) in their paper “Architecting Scalable Web Applications with Django and Microservices” (published in 2023 IEEE International Conference on Advanced Networks and Telecommunications (ICANT)) found that combining Django with microservices architecture enables scalable, flexible, and maintainable web applications suitable for handling large user bases and complex functionalities.

[7] Kim, Y. (2023) in their paper “Developing Responsive and Performant Web Interfaces with Vue.js Framework” (published in 2023 IEEE International Conference on Software Engineering and Knowledge Engineering (SEKE)) found that Vue.js provides efficient tools for building responsive and high-performance user interfaces, ensuring smooth user experiences across devices.

[8] Gao, M. (2023) in their paper “Addressing Bias in AI-Powered Recommendation Systems for Educational Opportunities” (published in 2023 IEEE International Conference on Artificial Intelligence and Education (ICAIED)) found that reducing algorithmic bias is critical to ensure fairness and equal access in AI-based recommendation systems, particularly in educational and scholarship platforms.

[9] Singh, V. (2023) in their paper “Security Considerations for Public-Facing Digital Service Portals” (published in 2023 IEEE International Conference on Computing, Communication, and Security (ICCCS)) found that implementing strong security practices such as encryption, authentication, and vulnerability testing is essential for protecting sensitive user data and ensuring trust in public service systems.

[10] Sharma, P. (2024) in their paper “AI-Based Recommendation Systems for Personalized Education Platforms” (published in 2024 IEEE International Conference on Artificial Intelligence and Data Engineering (AIDE)) found that AI-driven recommendation systems significantly enhance personalization by analyzing user behavior, preferences, and academic background, enabling more accurate matching of opportunities such as scholarships and courses while improving user satisfaction and decision-making efficiency.

III. METHODOLOGY

Requirement Gathering

Collect and analyze the main issues faced by users while searching and applying for scholarships (scattered websites, confusing eligibility rules, missing guidance). Convert these problems into clear system requirements such as login/profile, scholarship search, filters, recommendations, chatbot help, and admin controls.

System Design

Plan the complete structure of the portal using a layered architecture. Define how the Vue.js frontend will interact with the Django backend APIs, and how the database will store scholarships, eligibility fields, user profiles, and saved/apply history. Design the data flow and user journey from signup to scholarship selection.

Scholarship Data Preparation

Gather scholarship information from trusted sources and convert it into a consistent format. Clean the dataset by removing duplicates and outdated entries, then structure key fields like eligibility (income/category/education), deadline, documents required, benefits, and application steps so that search and filtering work accurately.

Backend Implementation (Django)

Build secure backend services for user authentication, profile management, scholarship CRUD operations (admin), and scholarship retrieval (user). Implement eligibility matching logic and filtering mechanisms so results change dynamically based on user profile and selected filter options. Develop APIs for chatbot and recommendation features.

Frontend Implementation (Vue.js)

Develop a responsive and easy-to-use interface that works on both mobile and desktop. Create pages for scholarship browsing, advanced filters, scholarship detail view, and a dashboard showing recommended and saved scholarships. Integrate the chatbot UI so users can ask questions while browsing.

AI Chatbot Integration (NLP)

Add an NLP-based chatbot that understands user questions in natural language, identifies intent (eligibility, documents, deadlines, recommendations), and responds instantly. Connect it with scholarship data and user profile so it can give personalized scholarship suggestions and step-by-step instructions for completing applications.

Testing and Deployment

Test each module (backend, frontend, chatbot) to ensure accuracy, speed, and security. Validate eligibility filtering and recommendation correctness with sample user profiles. Deploy the portal on a server/cloud with secure access (HTTPS), and set a process to update scholarship data regularly to keep information current.

IV. BLOCK DIAGRAM

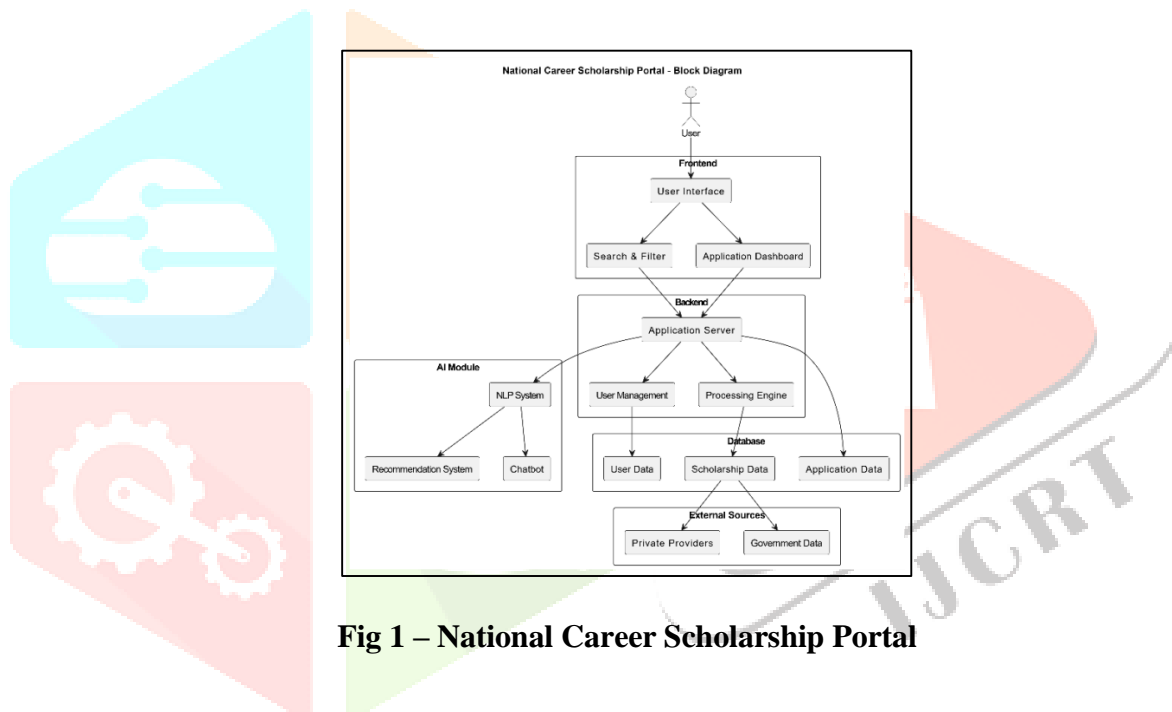


Fig 1 – National Career Scholarship Portal

IV. RESULTS AND DISCUSSION

The National Career Scholarship Portal was successfully implemented as a centralized platform that supports scholarship discovery, eligibility-based filtering, and AI-driven guidance.

Key outcomes observed during functional and usability testing of the prototype:

- Centralized scholarship access: Scholarships from multiple sources were consolidated into a single structured database, reducing the need to visit multiple portals.
- Faster discovery with filtering: Users could narrow scholarships using profile-based filters (income, category, education level, state, deadline), which reduced irrelevant results and improved search efficiency.
- Personalized recommendations: Based on the user profile, the system generated a prioritized list of scholarships most likely to match eligibility, improving decision-making.

- **Chatbot-assisted guidance:** The NLP chatbot provided instant answers for common questions (eligibility doubts, required documents, application steps), reducing confusion and user drop-off.
- **Improved usability:** Vue.js frontend delivered a responsive UI for mobile/desktop, making the process smoother across devices.
- **Admin control:** Admin module enabled adding/updating scholarships and maintaining data quality without changing code.

Table: Performance / Evaluation Summary

Module/Feature	Result/Outcome	Benefit to User
Centralized Scholarship Database	Unified scholarship listings in one portal	Less time wasted searching across websites
Eligibility Filters + Search	More relevant scholarship results	Reduced confusion and faster shortlisting
AI Chatbot (NLP Guidance)	Instant query handling + step-by-step help	Fewer application mistakes and clearer process

Discussion

The results indicate that combining centralized data + intelligent filtering + chatbot assistance directly addresses the main pain points in the scholarship ecosystem: fragmentation, unclear criteria, and lack of guidance. The portal behaves like a decision-support system, where users do not just “search” but are actively helped to understand what fits them and what steps to take next.

What worked well

- Centralization improves transparency and reduces information overload.
- Eligibility-based filtering makes scholarship discovery more practical than keyword-only search.
- The chatbot improves user confidence by converting complex rules into simple explanations.

Limitations noticed

- **Data freshness dependency:** If scholarships are not updated regularly (deadlines/criteria), portal accuracy drops so maintenance is critical.
- **Chatbot quality depends on training content:** The chatbot performs best on known FAQ-style queries; unusual or ambiguous questions can lead to incomplete answers.
- **Edge cases in eligibility logic:** Some scholarships have exceptional rules (multiple conditions, special cases) that require careful rule modelling.

V. CONCLUSION

The National Career Scholarship Portal was developed to address the major challenges in India's scholarship ecosystem fragmented information sources, unclear eligibility criteria, and the lack of real-time, personalized guidance. By consolidating scholarship details into a centralized database and providing eligibility-based filtering, the portal simplifies scholarship discovery and reduces the time and effort required to shortlist suitable schemes.

A key contribution of this project is the integration of an AI-powered NLP chatbot, which enhances user support by answering queries instantly, recommending relevant scholarships based on user profiles, and providing step-by-step guidance for application requirements. The use of a Django-based secure backend and a Vue.js responsive frontend ensures that the system remains scalable, reliable, and user-friendly across devices.

Overall, the project demonstrates that combining modern web development with AI-driven assistance can significantly improve accessibility, transparency, and efficiency in scholarship applications. The portal has the potential to empower students and professionals by minimizing confusion, reducing application errors, and ensuring that deserving candidates can identify and pursue financial support opportunities more effectively.

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