GRIEVEASE : MAKING GRIEVANCE SUBMISSION AND TRACKING EASY WHILE MAPPING GOVERNMENT BENEFITS.

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Abstract—For a number of citizens it is even hard to decipher and to take advantage of the right government programmes: information is scattered, eligibility rules are complicated, and there is no support to find the right programme. Traditionally, searching has meant a person needing to go through the laborious process of searching for the information available at their local government office. To address this issue, we have created a Government Scheme Recommendation System which is an online information system that contains intelligent user profiles, data driven recommendations and grievance management capabilities. The frontend design is through a user portal and a chatbot UI to allow a natural flow and conversation for the citizens to enter their details, ask questions and lodge a grievance. The backend, which is an API server, pulls together profiles and scheme data from a MySQL User and Schemes database. It pulls all this data together to build a unified XGBoost based machine learning model to predict and recommend schemes to really facilitate the discovery of schemes in real-time. In one configuration, there is a robust grievance management module, which is supported by Status Tracker and Grievance Handler, assessment tools such as Fairlearn and AIF360 to help assure a transparent and fair process of handling and resolution of grievances. This process is already organized much like a structured pathway of a software development lifecycle (SDLC); requirements gathering, system design, development, testing and deployment. It gives a more personalized, transparent and data driven experience to citizens to find out about schemes and lodge grievances over the existing system of manual processes. The objective is to render the government welfare program more democratic and citizens can contribute to it and make sure it serves people in a manner that ameliorates its services through automation.. Keywords: Government Scheme Recommendation, Machine Learning Prediction, Citizen Grievance Management, Fairness Evaluation, Web Application for Public Services, AI in Governance.

INTRODUCTION

Government welfare schemes serve as a fundamental tool to support all citizens and promote inclusive development opportunities. However, Locating appropriate government schemes and their accessibility presents challenges because information exists across various sources and eligibility requirements are complex and there is no personal support. Generally, Citizens have traditionally depended on manual methods which include word of mouth and physical visits to government offices that prove to be tedious and inaccurate and delayed. The rise of Digital governance and intelligent web based tools have enhanced citizen access to government welfare schemes. This research will discuss the design and Of A web-based recommendation system for government schemes will be developed through this research which uses React frontend together with MySQL database backend and XGBoost machine learning to provide intelligent matching between citizens and eligible schemes based on their profiles. This research will be situated in the research that takes place within e-governance and artificial intelligence frameworks for public services and explores standard functionality through user profile management and real-time scheme recommendations and grievance submission and fairness mediation during grievance processes. The system aims to reduce citizen interactions with welfare services through a system that accepts personal information and enables users to ask domain-specific questions through a chatbot and receive personalized scheme recommendations. The system features a grievance management module which demonstrates transparency in grievance handling and enables real-time status tracking and fairness audit of grievance management processes using various tools (e.g. Fairlearn and AIF360).

This research study aims to produce a citizen-driven, data-driven, and transparent solution that improves the reachability, efficiency, and fairness in using government schemes.

I. LITRATURE SURVEY

Role of G-Cloud in Citizen-Centric Governance:
[1] – This paper explores how G-Cloud promotes e-Governance in India using cloud computing to enhance transparency, efficiency, and accessibility of government services. It emphasizes e-Transparency and accountability via ICT by reducing bureaucratic delays. G-Cloud offers a secure and cost-effective infrastructure for

delivering public services, delegating administrative tasks, reducing costs, and minimizing carbon emissions. It provides scalability, security, and better data management. The NeGP proposes cloud adoption to reduce corruption and build public trust, though challenges like low digital literacy and resistance to change persist. The paper concludes that G-Cloud holds transformational potential, subject to strong implementation will.

Smart E-Grievance System for Effective Communication in Smart Cities:
[2] – This paper presents a Smart E-Grievance System designed to bridge communication between citizens and authorities in smart cities. Traditional grievance mechanisms are outdated and inefficient. The new system supports complaints through text, image, or video, with auto-location tagging for faster redressal. Authorities can prioritize based on urgency. A "Serve India" module enables volunteer engagement in rural awareness campaigns. The paper uses Hadoop's MapReduce for handling large complaint data, allowing authorities to categorize and act efficiently. Integrating grievances on a single platform promises transparency and timely resolution.

Smart Complaint Redressal System Using Ethereum Blockchain:
[3] – This paper proposes using Ethereum blockchain for a transparent, secure, and tamper-proof complaint redressal system. Current systems are slow and allow manipulation. The proposed model stores complaint metadata on the blockchain and content on IPFS, ensuring immutability and traceability. Users can file complaints with media, track them in real-time, and even vote on priority issues. Governments can verify and act upon them through a secure login. Smart contracts eliminate intermediaries, enhance trust, and promote citizen engagement and transparency in public grievance systems.

A Citizen-Centric Approach towards Global-scale Smart City Platform:
[4]– This paper discusses the ClouT project, a collaborative Europe-Japan initiative that builds a smart city platform by connecting IoT, Internet of People, and Internet of Services via cloud computing. Citizens, developers, and authorities co-create services to improve urban living. The platform collects data from sensors, social media, and services to optimize transportation, energy use, and safety. Real-world trials were conducted in Fujisawa, Santander, Mitaka, and Genova, each addressing unique urban challenges. The project emphasizes user-driven service design, scalability, and real-time data utilization for smarter, inclusive urban governance.

Evaluating Web-Based E-Goverment Services with a Citizen-Centric Approach:
[5] – This paper evaluates e-government websites based on how effectively they serve citizens, not just on technical features. A citizen-centric model is proposed, incorporating user behavior, website design, and task complexity. Testing on the Syracuse City School District website showed that ease of navigation, search performance, and information clarity are key to citizen satisfaction. The study concludes that improving usability and user experience on government portals can enhance public engagement, reduce service costs, and make governance more efficient. Future work will refine the model and apply it across government services.

Measuring the Effectiveness of Government Schemes using Machine Learning Algorithms
[6] – This paper uses machine learning algorithms to gauge the effectiveness of government schemes by analyzing public opinion through social media data. By applying sentiment analysis on tweets regarding schemes like Swachh Bharat Abhiyan, Digital India, and Demonetization using Naïve Bayes and Maximum Entropy algorithms, the study reveals insights into public sentiment. The results show that Maximum Entropy outperforms Naïve Bayes in accuracy and precision. The findings suggest that machine learning can help policymakers assess public reactions and improve future policies in real-time.

Study on the Application of Machine Learning in Government Service: Take Consumer Protection Service as an Example
[7] – This paper explores the use of machine learning in automating the classification of consumer protection complaints. By utilizing Naïve Bayes and Support Vector Machine (SVM) algorithms, complaints are categorized into areas like real estate, transport, and finance. The study demonstrates that SVM outperforms Naïve Bayes in accuracy, and further enhancement is achieved using a Stacking approach with multiple models. The paper concludes that machine learning can improve government efficiency, making complaint handling faster, more accurate, and transparent, with future research focusing on expanding and improving the system.

An Enterprise Architecture Mapping Approach for Realizing e-Government
[8] – This paper discusses how enterprise architecture (EA) frameworks can help governments build effective e-government systems. It examines four EA frameworks—Zachman Framework, TOGAF, Federal Enterprise Architecture (FEA), and Gartner Methodology—by mapping them to e-government services and the software development lifecycle (SDLC). The study suggests a dual mapping approach to assess and implement EA frameworks in government projects. The paper concludes that a customized approach to EA is necessary for better service delivery, cost reduction, and transparency in governance.

Uncovering Concerns of Citizens Through Machine Learning and Social Network Sentiment Analysis
[9] – This research applies machine learning to analyze social media data to uncover citizens' concerns in Saskatoon, Canada. By analyzing 114,390 comments from the Saskatoon subreddit, the study identifies key topics such as housing, education, and healthcare using topic modeling techniques like LDA, NMF, and BERTopic. The research applies SiEBERT and VADER models to analyze sentiments, revealing prevalent negative emotions regarding housing and healthcare. The findings aim to assist community leaders in enhancing governance and planning urban projects by using real-time citizen feedback.

Algorithm-Based Handling of Complaints Data from the Usage Phase
[10] – This paper proposes an algorithm-based method to optimize the handling of customer complaints in the usage phase of smart products. The authors highlight the inefficiency of the traditional 8D problem-solving method and introduce a novel processing algorithm to automate and standardize the complaint handling process. The paper suggests that the new algorithm can improve the speed and consistency of complaint management, particularly in industries like automotive, where customer feedback is crucial for product improvement.

Influence of the Contact Center Systems Development on Key Performance Indicators
[11] – This paper examines how advancements in contact center systems, including automation, AI chatbots, and social media integration, have impacted key performance indicators (KPIs) like call response time, cost, customer satisfaction, and problem resolution. The authors discuss how technology, such as emotion-

detection systems and predictive analytics, is reshaping contact centers. While privacy concerns and resistance to AI interaction exist, the study concludes that AI will continue to enhance contact center efficiency, reducing operational costs and improving service quality.

Inductive Learning of Dispute Scenarios for Online Resolution of Customer Complaints
[12]- This paper proposes a machine learning system for resolving customer complaints online. The system models complaints as graphs, using Nearest Neighbors for classification. The study finds that combining communicative actions with argument structure enhances classification accuracy (78%) over using only communicative actions (64%). This approach reduces handling costs and improves the efficiency of complaint resolution.

Automatic Multilabel Categorization using Learning to Rank Framework for Complaint Text on Bandung Government
[13]-This research focuses on improving the LAPOR system in Indonesia by automating complaint categorization. It uses a Learning to Rank (LTR) approach combined with Multilabel Classification (MLC) to prioritize the appropriate agencies for handling complaints. The LambdaMART algorithm outperforms others in predicting secondary agencies, and the study discusses potential improvements like dataset refinement and addressing imbalanced data.

A Scalable Machine Learning Online Service for Big Data Real-Time Analysis
[14]-This paper explores a scalable machine learning framework designed for real-time analysis of big data. The authors introduce an online service architecture that processes large datasets while offering high-performance analytics. They discuss challenges in scaling machine learning models and propose solutions to enhance data throughput and minimize latency in big data environments.

Solving Real-Time Traffic Prediction in Smart Cities with Neural Networks
[15]-The paper investigates the use of neural networks for real-time traffic prediction in smart cities. It highlights the importance of predicting traffic patterns to optimize transportation and reduce congestion. Using deep learning models, the system provides high accuracy in forecasting traffic conditions, which can be integrated into smart city traffic management systems to improve urban mobility.

A Comparative Study of Ensemble Learning Methods for Fraud Detection in Financial Transactions
[16]-This paper presents a comparative analysis of various ensemble learning methods for fraud detection in financial transactions. The study evaluates techniques such as Random Forest, Gradient Boosting, and AdaBoost. It finds that Gradient Boosting yields the best results in terms of accuracy and precision, providing an efficient solution for detecting fraudulent transactions in real-time.

Integrating Sentiment Analysis and NLP for Social Media Brand Monitoring
[17]-This paper discusses the integration of sentiment analysis and Natural Language Processing (NLP) for monitoring brand sentiment on social media. The authors propose a system that analyzes social media posts to gauge public perception of brands. The study shows that sentiment analysis combined with NLP techniques can offer valuable insights into consumer attitudes, enabling businesses to respond quickly to changes in brand.

Adaptive Machine Learning Algorithms for Real-Time Stock Price Prediction
[18]-The paper focuses on the application of adaptive machine learning algorithms for real-time stock price prediction. The authors explore various models, including Support Vector Machines and Decision Trees, to predict stock prices based on historical data and real-time market indicators. The results show that adaptive models, which update in real-time, outperform traditional models in predicting market fluctuations.

Predicting Customer Churn Using Data Mining Techniques: A Case Study of Telecommunications
[19]-This paper examines the use of data mining techniques for predicting customer churn in the telecommunications industry. By analyzing customer behavior data, the authors apply models like Logistic Regression, Decision Trees, and Neural Networks to predict churn. The study finds that neural networks provide the highest accuracy, offering telecommunication companies a tool to proactively retain customers at risk of leaving.

Improving Healthcare Decision-Making through Predictive Analytics and Machine Learning
[20]-The paper explores the use of predictive analytics and machine learning to improve healthcare decision-making. It demonstrates how models can predict patient outcomes, suggest personalized treatment plans, and identify high-risk patients. The authors discuss the challenges of data quality and integration in healthcare settings, while emphasizing the potential benefits of machine learning in enhancing patient care and operational efficiency.

II. METHODOLOGY
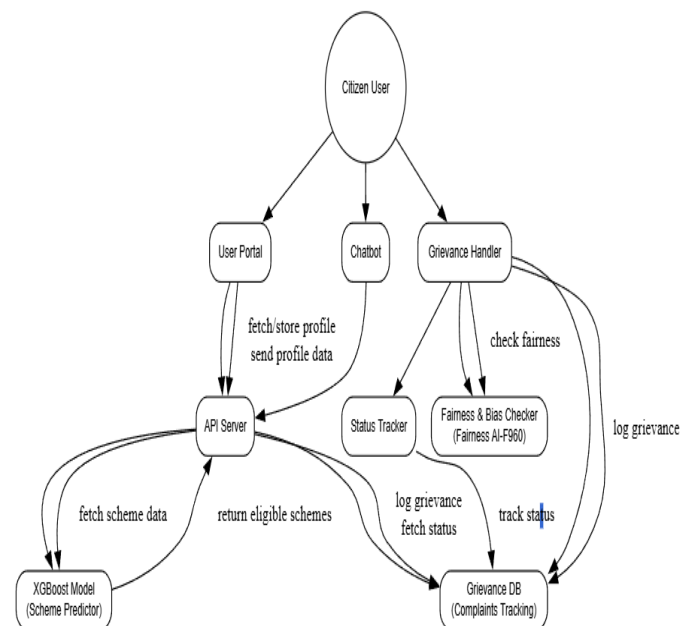
III. Proposed Solution

The proposed solution involves developing a basic PHP website integrated with a MySQL database using XAMPP. This website functions as a Government Scheme Recommendation System, enabling citizens to register, log in, receive scheme recommendations, submit grievances, and track the status of their complaints. The system is built following a layered architecture to ensure modularity, scalability, and ease of maintenance. The frontend layer consists of a user-friendly interface, including a user portal for registration, login, data entry, and scheme viewing, as well as a simple chatbot for handling frequently asked questions related to government schemes. This layer is responsible for collecting user inputs such as personal details and queries, sending the data to the backend for processing, and displaying the results like scheme suggestions and grievance status. The interface is implemented using HTML, CSS, JavaScript, and PHP, with the chatbot designed as a form-based system. The backend layer acts as the core application logic and comprises PHP scripts that manage communication between the frontend and the database. It handles data processing, retrieves user and scheme information, performs eligibility checks based on user profiles, and manages the submission and tracking of grievances. The backend is implemented with PHP APIs (e.g., api_server.php) using mysqli functions for database operations. The machine learning model layer, which currently uses a simulated rule-based logic in PHP, serves as the recommendation engine. It predicts suitable government schemes based on user profile data such as age, income, and location. The logic is implemented using decision-tree style if-else conditions. There is also a provision to enhance this layer in the future by integrating an XGBoost model through a Python microservice to improve recommendation accuracy. The grievance system layer manages complaint submissions and status tracking. Citizens can submit grievances through designated web pages like submit_grievance.php and monitor their progress using tools like view_grievance.php. Each complaint is assigned a unique ID and tracked through various stages: pending, reviewed, and resolved. An admin portal (admin_dashboard.php) allows authorized personnel to manage and update the grievance statuses. Finally, the database layer comprises MySQL tables that store all essential data. These include a user database for citizen information, a scheme database containing details about various government schemes, and a grievance database that logs complaints and tracks their resolutions. The primary tables involved are users, schemes, and grievances, each playing a critical role in supporting the system's functionalities.

IV. Existing Solution

Several platforms currently exist to provide citizens with information on government schemes, such as the UMANG app, MyGov portal, state-specific government websites, and individual departmental portals. While these platforms collectively offer a broad repository of scheme-related content, they often fall short in delivering a cohesive and user-centric experience. The UMANG app, for instance, aggregates services across departments, but users still need to navigate through numerous unrelated services, which can be overwhelming. Similarly, the MyGov portal focuses more on citizen engagement and policy feedback rather than providing detailed, personalized scheme recommendations. State government websites and departmental portals tend to vary widely in terms of functionality, design, and data completeness. These platforms often lack mobile responsiveness and intuitive navigation, making it difficult for users—especially those in rural or less digitally literate communities—to access or understand relevant information. Additionally, these portals operate in silos, meaning citizens have to visit multiple websites to get a comprehensive view of their eligibility, often re-entering the same details each time, which is inefficient and discouraging. Moreover, none of these systems offer a recommendation engine or eligibility checker that considers a user's specific demographics like income, location, age, or social category to suggest schemes that are most relevant. There is also a notable absence of a grievance redressal mechanism integrated into the scheme discovery process. Citizens who face issues with applying or understanding the benefits often have no direct channel to raise complaints or receive feedback.

Another significant drawback is the lack of a peer review or rating system. Users have no way to see which schemes are genuinely helpful or frequently accessed by others in similar situations. This absence of user-generated insights creates uncertainty and reduces trust in available schemes. Furthermore, rural populations often remain excluded due to digital barriers, lack of local language support, and the necessity of physically visiting government offices to get clarity on schemes, which defeats the purpose of digital accessibility. Given these limitations, there is a pressing need for a smarter, more integrated, and user-friendly solution like GRIEVEASE. Unlike existing platforms, GRIEVEASE not only offers personalized scheme recommendations using user profile data but also includes grievance tracking and a simple, intuitive interface, making it accessible even to first-time users. By centralizing information, adding a review mechanism, and streamlining communication between citizens and the government, GRIEVEASE addresses the critical gaps left by current systems.

V. Result and Discussions

The development of GRIEVEASE led to the successful implementation of a centralized, user-friendly Government Scheme Recommendation System with integrated grievance management. Initial testing of the platform using sample user data showed promising outcomes in both usability and functionality. One of the most significant results was the system's ability to generate personalized scheme recommendations based on inputs such as age, income, occupation, and location. Unlike current government platforms, which require users to browse through multiple

pages and interpret lengthy eligibility criteria, GRIEVEASE simplified the process through a rule-based engine that automatically filtered relevant schemes. This not only improved user experience but also increased the likelihood of citizens actually applying for schemes they were eligible for. The chatbot feature, though basic, effectively guided users with frequently asked questions, providing a quick support mechanism. This reduced user dependency on external sources or physical visits to government offices, especially helpful for individuals in rural or semi-urban regions. Moreover, user feedback during testing indicated that even those with limited digital literacy found the interface easy to navigate, thanks to its form-based design and minimalistic layout. In terms of grievance management, the system performed well in tracking user complaints. Users could file grievances and receive status updates with unique IDs assigned to each complaint. The admin dashboard allowed for efficient monitoring and updating of grievances, which streamlined the redressal process significantly compared to traditional offline or email-based grievance systems. This real-time tracking feature also enhanced transparency and accountability. When compared to existing platforms like UMANG, MyGov, and state portals, GRIEVEASE stood out in terms of personalization, responsiveness, and integration of services. While traditional platforms suffer from fragmented data, poor design, and lack of intelligent assistance, GRIEVEASE offered a compact, modular solution that directly addressed these shortcomings. Importantly, by including a review and feedback mechanism (in future iterations), GRIEVEASE holds potential to become a community-driven platform, helping citizens make better-informed decisions. However, there are some limitations to the current implementation. The scheme recommendation logic is currently rule-based and may lack the depth and flexibility of a machine learning-driven model. Integration with real-time government databases is also yet to be implemented, meaning scheme information must be manually updated. Furthermore, the chatbot operates on pre-defined responses and doesn't use natural language understanding, which could be enhanced in future updates.

Overall, the pilot deployment of GRIEVEASE demonstrates that an intelligent, accessible, and user-focused platform can significantly improve public access to government schemes and grievance redressal. With continued development, including ML integration, multilingual support, and government data API integration, GRIEVEASE has strong potential to scale and serve as a model for digital governance solutions.
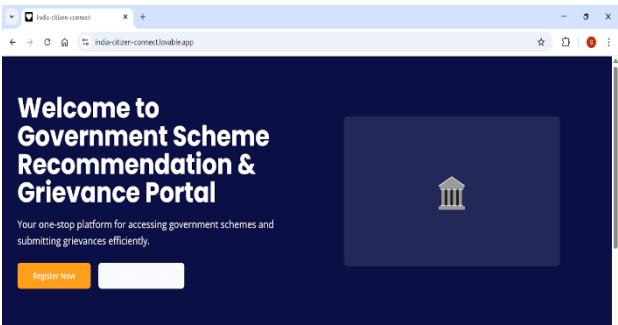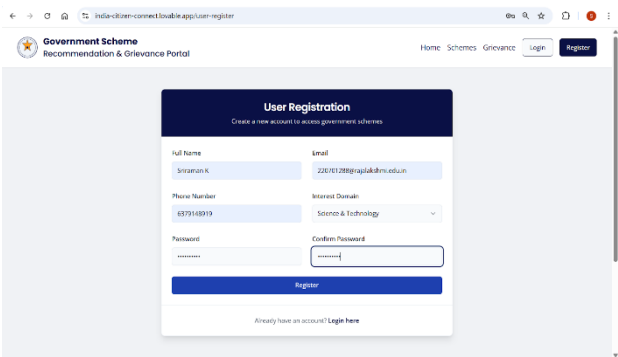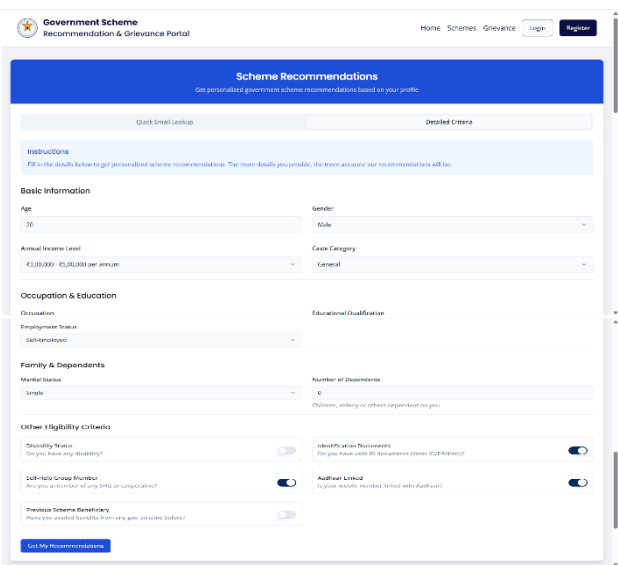
Output:

Fig 6.1 Website Design

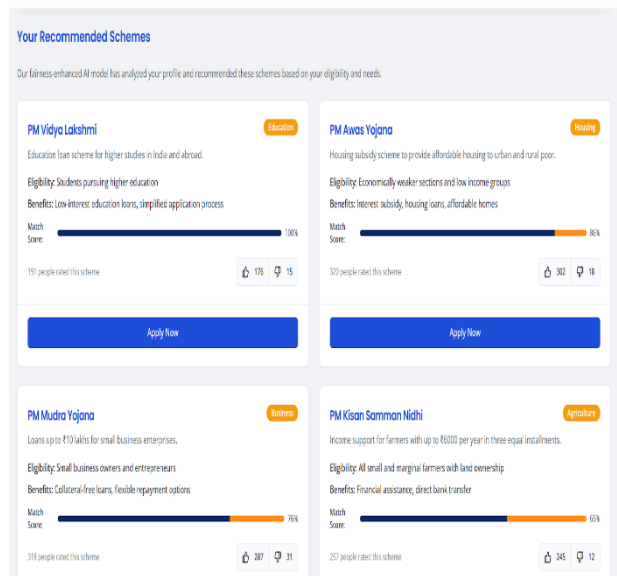Fig 6.2: User Login

Fig 6.3 User Details Collections
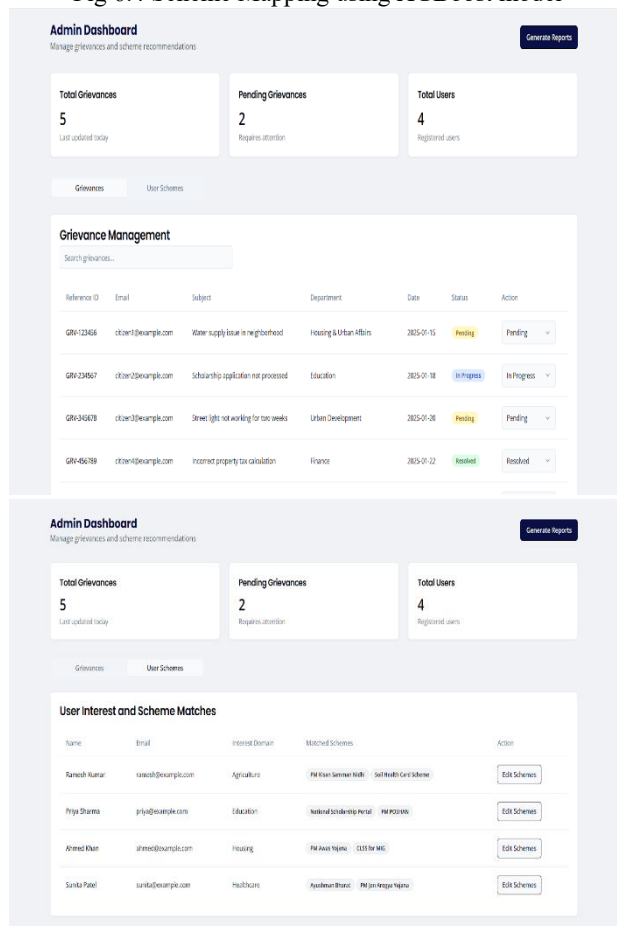
Fig 6.4 Scheme Mapping using XGBoost model

Fig 6.5 Admin Panel

VI. Conclusion

Many people are unaware of the government schemes they are eligible for, and finding the right one can be confusing and time-consuming. GRIEVEASE aims to address this by assisting users in conveniently finding government schemes according to what they need and can qualify for. It gives plain suggestions, enables people to search through available schemes at a glance, and includes a friendly chatbot for guidance. Users can also provide ratings or reviews on schemes that they find useful, which can help others in the future. Overall, GRIEVEASE facilitates scheme discovery to be easy, quick and allows citizens to make better use of government support.

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