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Smart Beneficiary Schemes Mapping And Grievance Redressal System Using Machine Learning

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Abstract: Access to government welfare schemes is often hindered by a lack of awareness, complex eligibility criteria, and limited digital access, especially among marginalized communities. This project presents a user-friendly, intelligent software solution designed to bridge the gap between citizens and welfare schemes. The system maps relevant government schemes to beneficiaries based on socio-economic parameters such as income, education, and occupation.Utilizing a rule-based machine learning model, the system analyzes user data to recommend the most suitable schemes in real-time. The platform includes secure role-based authentication, allowing both users and administrators to interact with the system efficiently. Citizens can register, view eligible schemes, and submit grievances, while administrators can manage scheme data and respond to complaints through a dedicated dashboard.The solution ensures a citizen-centric design with a focus on accessibility, transparency, and accountability. By streamlining scheme access and grievance redressal, the project aims to improve the effectiveness of government welfare distribution and empower users with timely, personalized support.

Keywords: Rule-based Model, Scheme Eligibility, Role-based Access Control

I. INTRODUCTION

In India, a wide range of government schemes are launched every year to support various segments of the population, including economically weaker sections, students, farmers, senior citizens, and others. However, a significant number of intended beneficiaries remain unaware or are unable to access these schemes due to a lack of proper awareness, complicated eligibility criteria, and absence of a centralized platform for scheme discovery.This project aims to bridge that gap by developing an ML-driven web application that intelligently

maps available government schemes to eligible users based on their socio-economic background, such as income level, education, and occupation. The system not only recommends relevant schemes but also includes a grievance redressal mechanism where users can raise issues or complaints regarding the schemes. An admin panel is provided for managing the schemes and responding to user grievances in a timely and efficient manner. By leveraging technologies like React for the frontend, Node.js and Express for the backend, MongoDB for the database, and a rule-based AI system for recommendations, the application provides a robust, scalable, and user-friendly platform. The ultimate goal is to ensure that the benefits of government welfare schemes reach the right people at the right time, promoting transparency, accessibility, and citizen empowerment.

II. LITERATURE SURVEY

[1] Mishra, A., & Kumari, S. (2020). AI-driven approach for public service delivery: A study of smart governance in India. International Journal of E-Government Studies, 12(2), 55-65.

This paper presents a framework for enhancing public service delivery in India through the integration of artificial intelligence. It highlights how AI can be used to optimize operations in various public sectors, including welfare schemes, healthcare, and municipal services. The proposed system uses AI algorithms for citizen profiling, automated decision-making, and prioritization based on urgency and eligibility. The researchers developed a prototype that leveraged supervised learning models to cluster citizens based on their socio-economic characteristics and predict their service needs. Through pilot implementations in select urban municipalities, the AI model significantly reduced response time and improved the accuracy of service allocation. The study concludes that AI-based automation can transform bureaucratic systems into responsive, real-time governance platforms.

III. OBJECTIVE

- **Scheme Recommendation based on user's profile:**

To build an AI-driven recommendation engine that suggests relevant government schemes to users based on their income, education, and occupation.

- **Centralized platforms for citizens and admins:**

To create a single web-based portal where citizens can view eligible schemes, register complaints, and receive updates, while admins can manage scheme data and respond to grievances.

- **Grievance Redressal System**

To design a citizen-centric grievance submission and response system that ensures transparency and timely action from the administration.

- **Role-based Access Control**

To implement role-based login functionality distinguishing between regular users (citizens) and administrators, allowing appropriate access and controls.

- **Real-time Accessibility**

To ensure that the system is accessible in real-time and works efficiently on a variety of devices and network conditions, especially in rural or low-resource environments.

IV. EXISTING IDEA

The existing system for mapping government welfare schemes to citizens primarily relies on manual processes and traditional data collection methods. Most beneficiaries are expected to visit government offices or navigate complex government websites to check their eligibility for various schemes. These platforms often lack personalization and do not account for individual socio-economic backgrounds, leading to inefficiencies in scheme distribution. Furthermore, information is often scattered across multiple portals, with minimal integration or cross-referencing. In many rural areas, digital illiteracy and limited internet access further restrict people from availing available benefits. There is also limited use of advanced analytics or intelligent recommendation mechanisms in the current system, making it difficult to identify deserving individuals or prioritize those in urgent need. The absence of AI-based decision-making results in a one-size-fits-all approach, causing several eligible citizens to be overlooked while ineligible applications are sometimes approved due to data inconsistencies or human error.

V. DISADVANTAGES

1. **No unified platform**: Information about government schemes is scattered across various portals, requiring users to search multiple sources..

2. **Lack of personalization**: Existing government portals often do not personalize scheme recommendations based on an individual's socio-economic background.

3. **Manual processes**: In many cases, eligibility checks and application processes are still manual, leading to delays and human errors.

4. **No AI/ML integration:** Existing systems do not use machine learning or AI to suggest schemes intelligently or learn from user data over time.

5. **Inefficient Grievance Handling:** Grievance redressal mechanisms are slow, non-transparent, or require in-person follow-up, discouraging users from reporting issues.

VI. PROPOSED APPROACH

The proposed system is an intelligent, **user-friendly software** solution that leverages machine learning to recommend suitable government welfare schemes based on a citizen's socio-economic profile. This system automates the process of beneficiary identification and scheme mapping by analyzing key parameters such as income level, education, and occupation. By using a rule-based or trained **ML model**, it predicts the most **appropriate schemes** for each user with greater accuracy and speed than traditional methods. The system includes a secure registration and login module for both users and administrators, allowing citizens to access scheme recommendations and submit grievances, while enabling admins to manage scheme data and address complaints. A centralized dashboard offers real-time access to applications, eligibility tracking, and grievance management. The platform is designed to be accessible and easy to use, with a clean interface, responsive design, and support for multilingual content, ensuring inclusivity for people from diverse backgrounds. Overall, this AI-enhanced system aims to enhance transparency, reduce manual errors, improve targeting efficiency, and ensure that every eligible citizen gets access to the benefits they deserve.

VII. PROPOSED ARCHITECTURE

1. **Register& Login:** Users and admins start by registering and then logging in through their respective login portals.

2. **User/Admin Login Flow:** Upon successful login, users are directed to the **User Dashboard**, while admins access the **Admin Dashboard**.

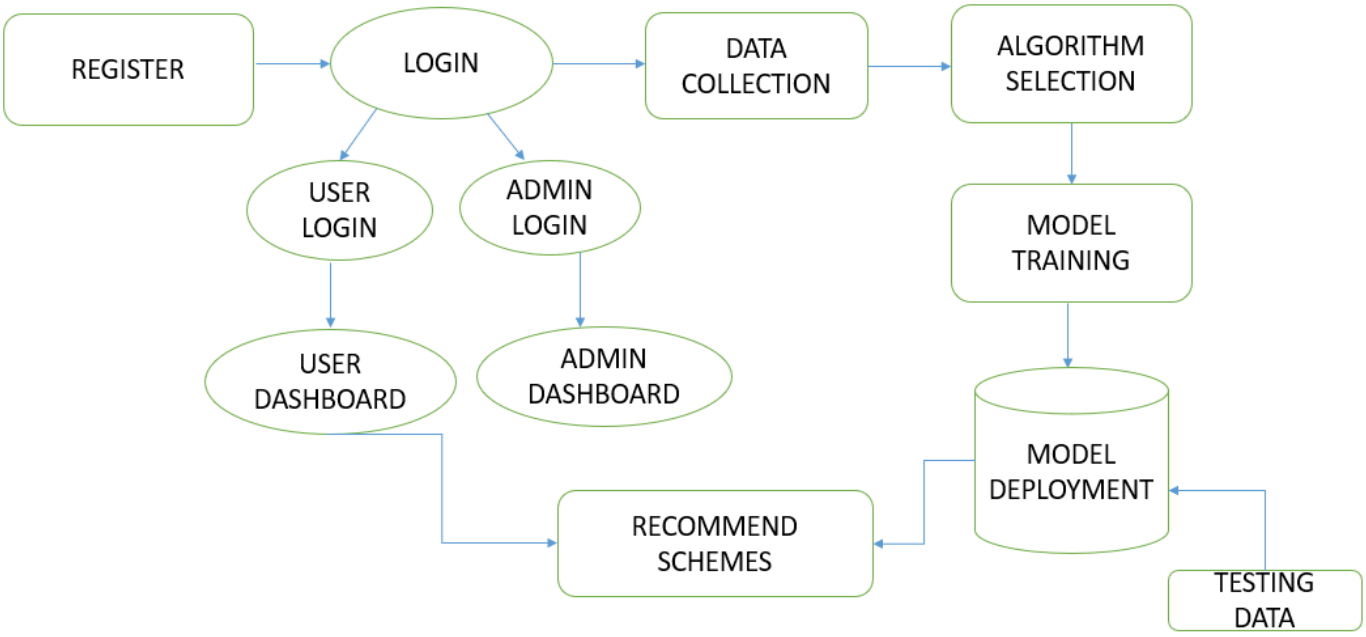
3. **Data Collection:** After user registration, socio-economic data (income, education, occupation) is collected for use in scheme recommendation.

4. **Algorithm Selection& Model training**: Split the annotated dataset into training, validation, and testing sets. Use the training set for model learning and the validation set to fine-tune hyperparameters.

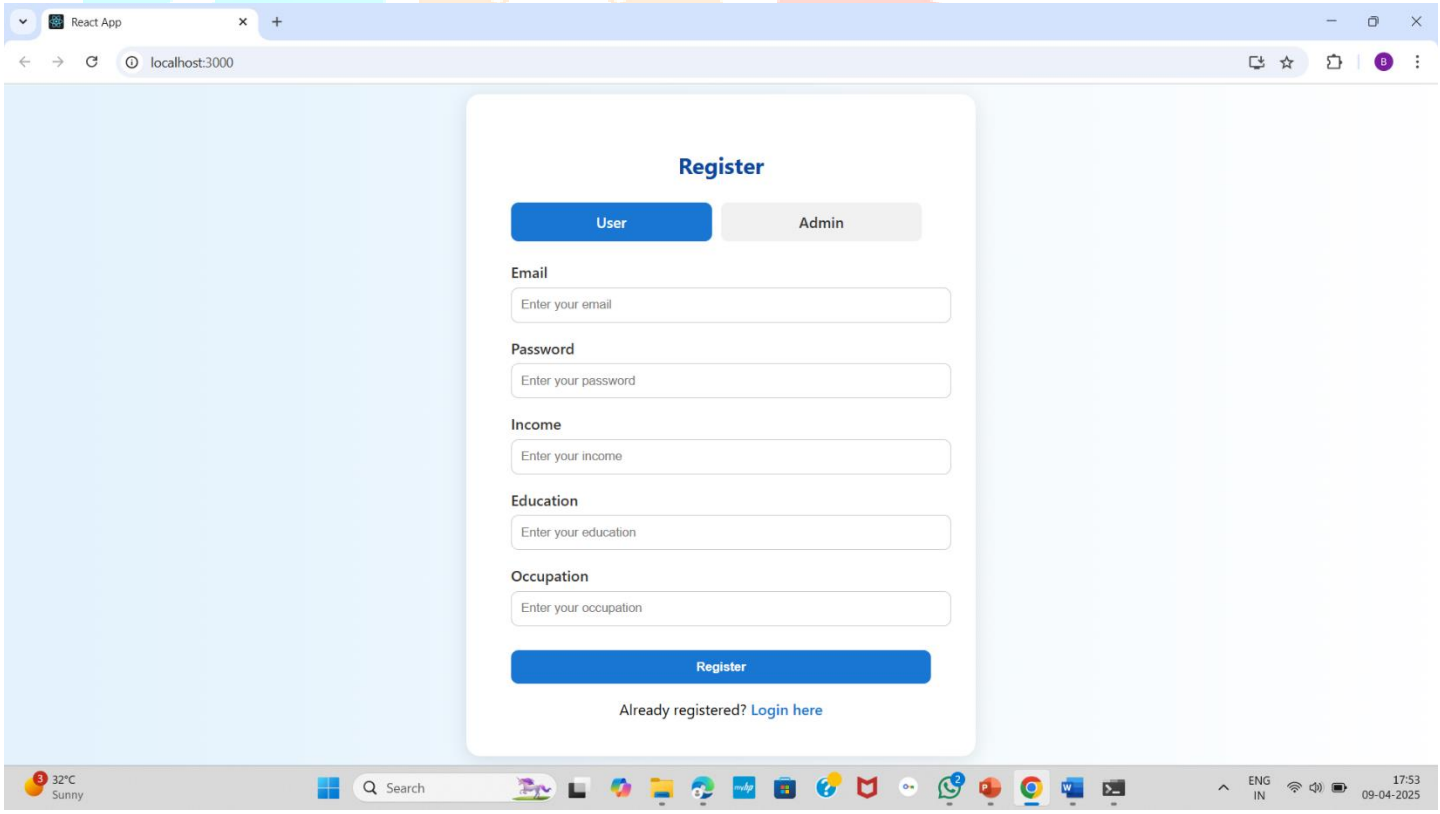
5. **Model Deployment**: The trained model is deployed and integrated into the system to offer real-time scheme recommendations.

6. **Recommendation System:** From the User Dashboard, the deployed model processes user data to **recommend relevant government schemes**.

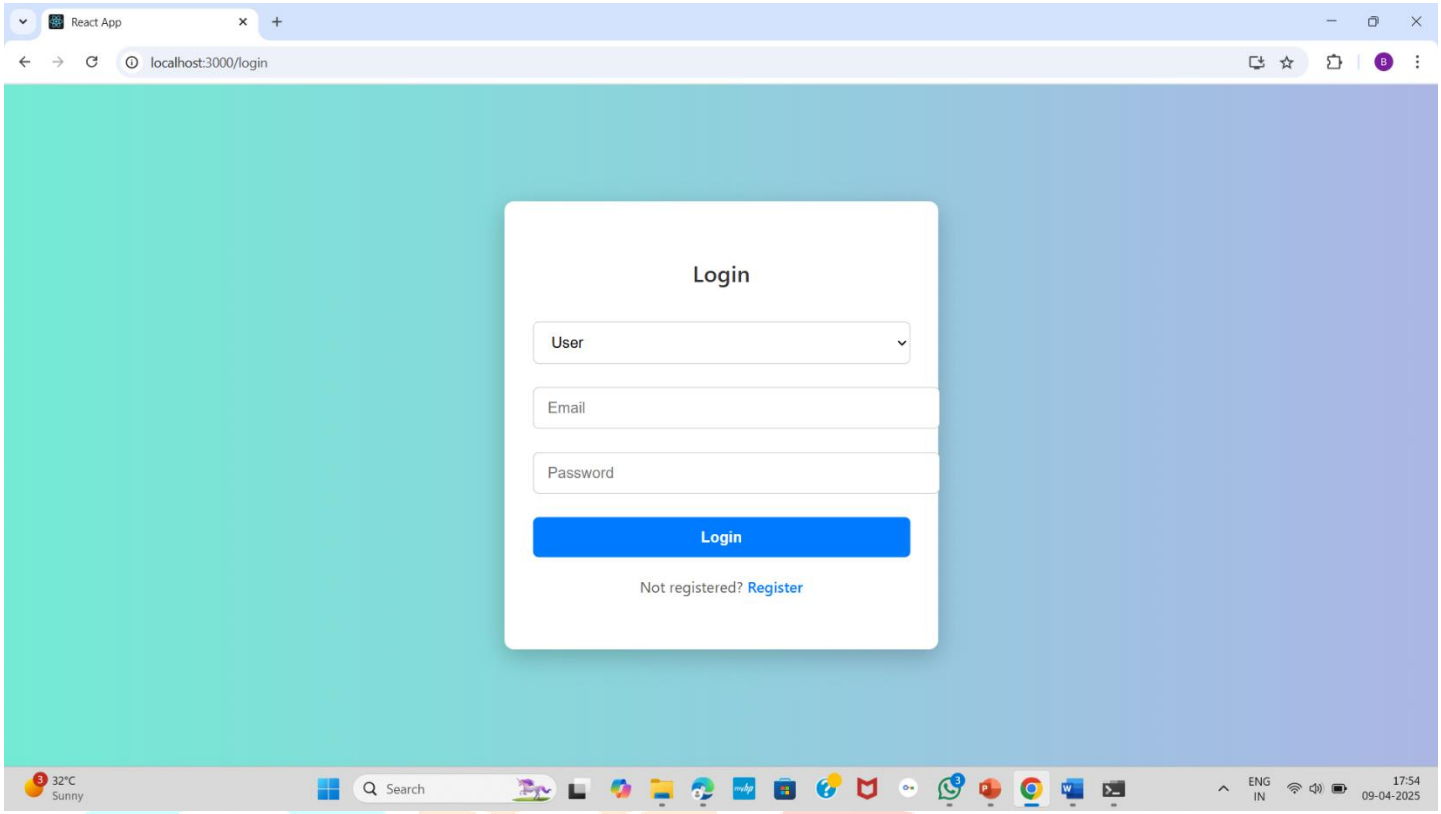
7. **Testing Data:** Separate test data is used to validate the model before full deployment, ensuring it provides accurate and reliable suggestions.



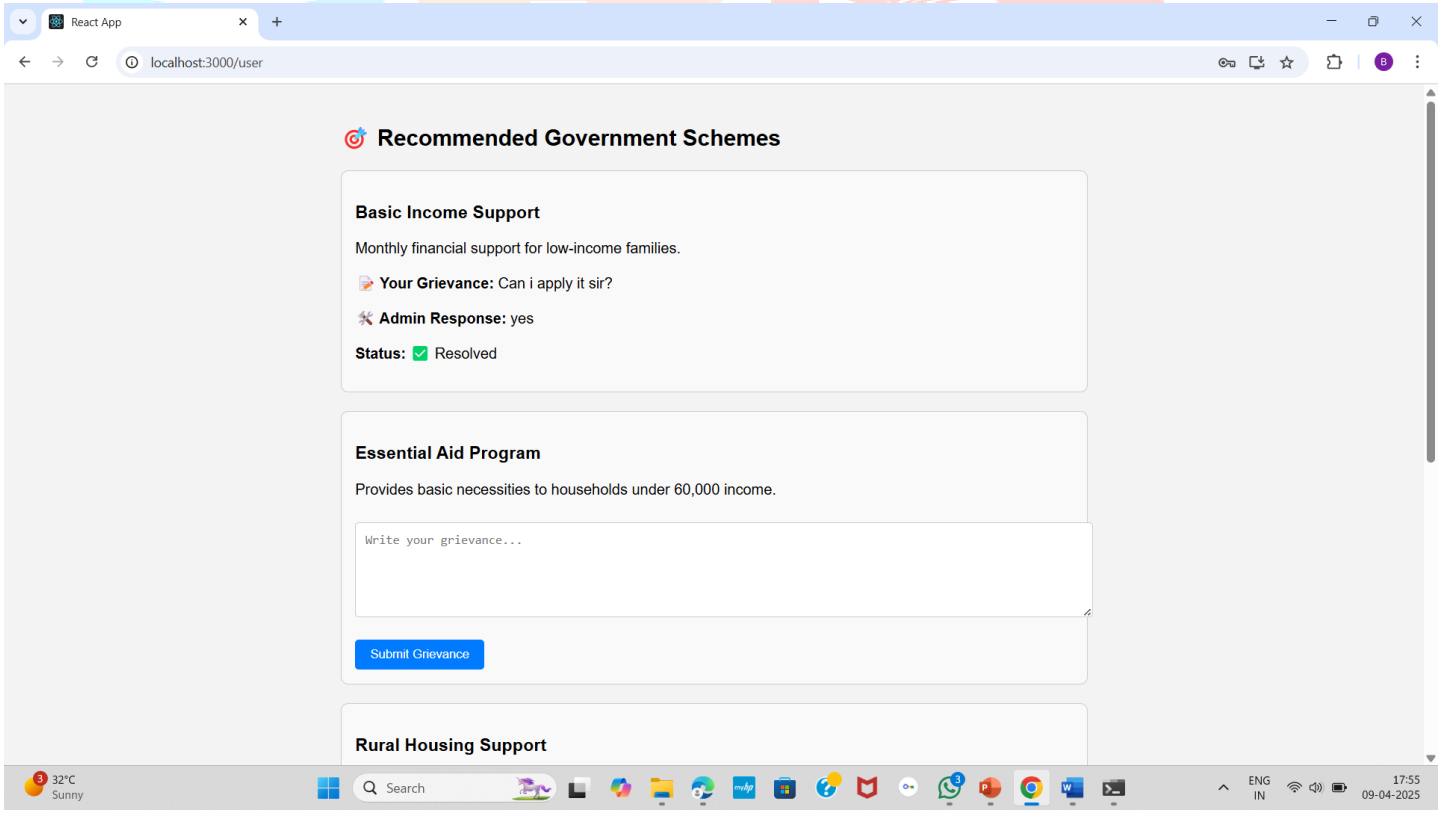
VIII. REGISTER PAGE



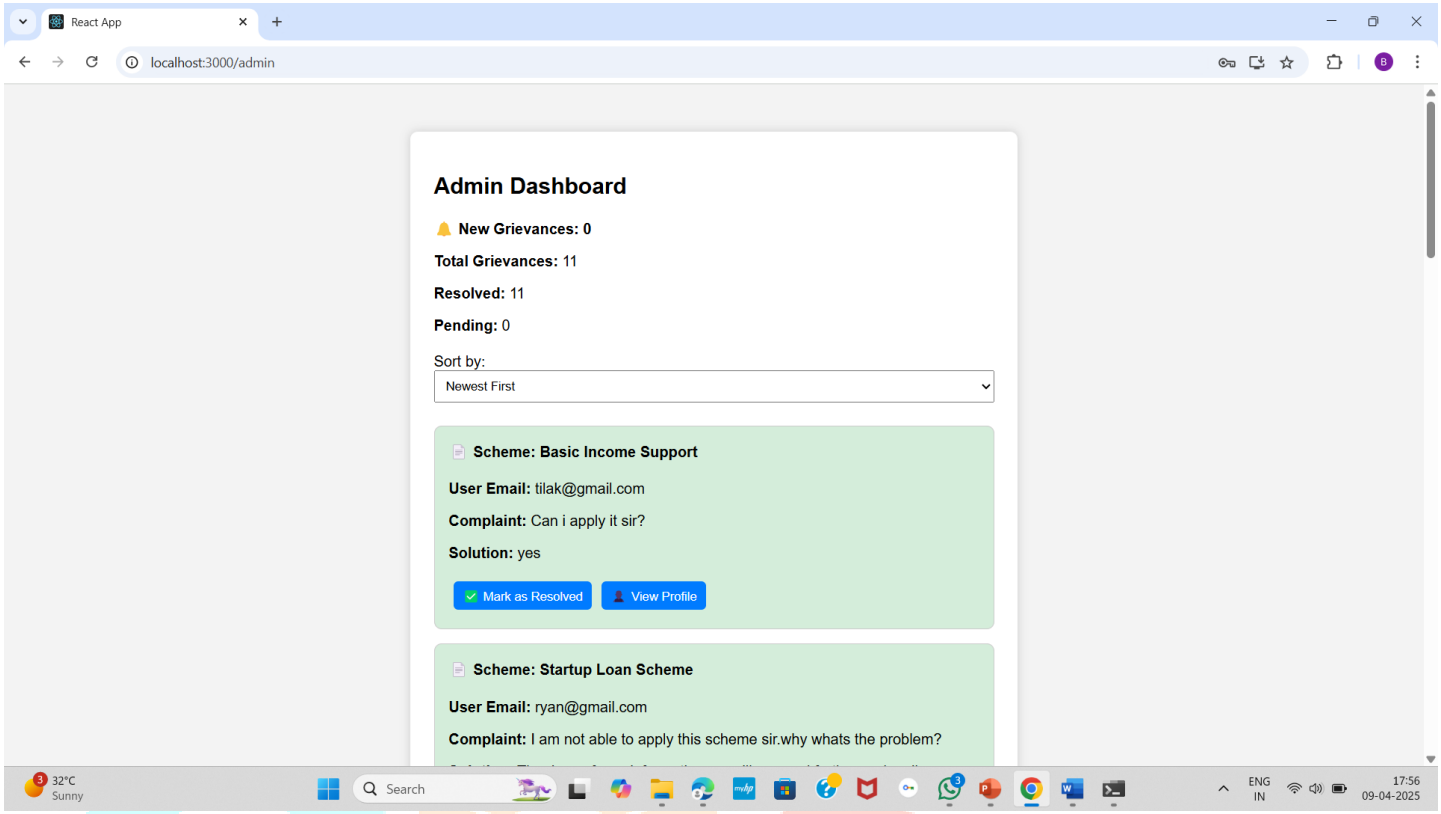
IX. LOGIN PAGE



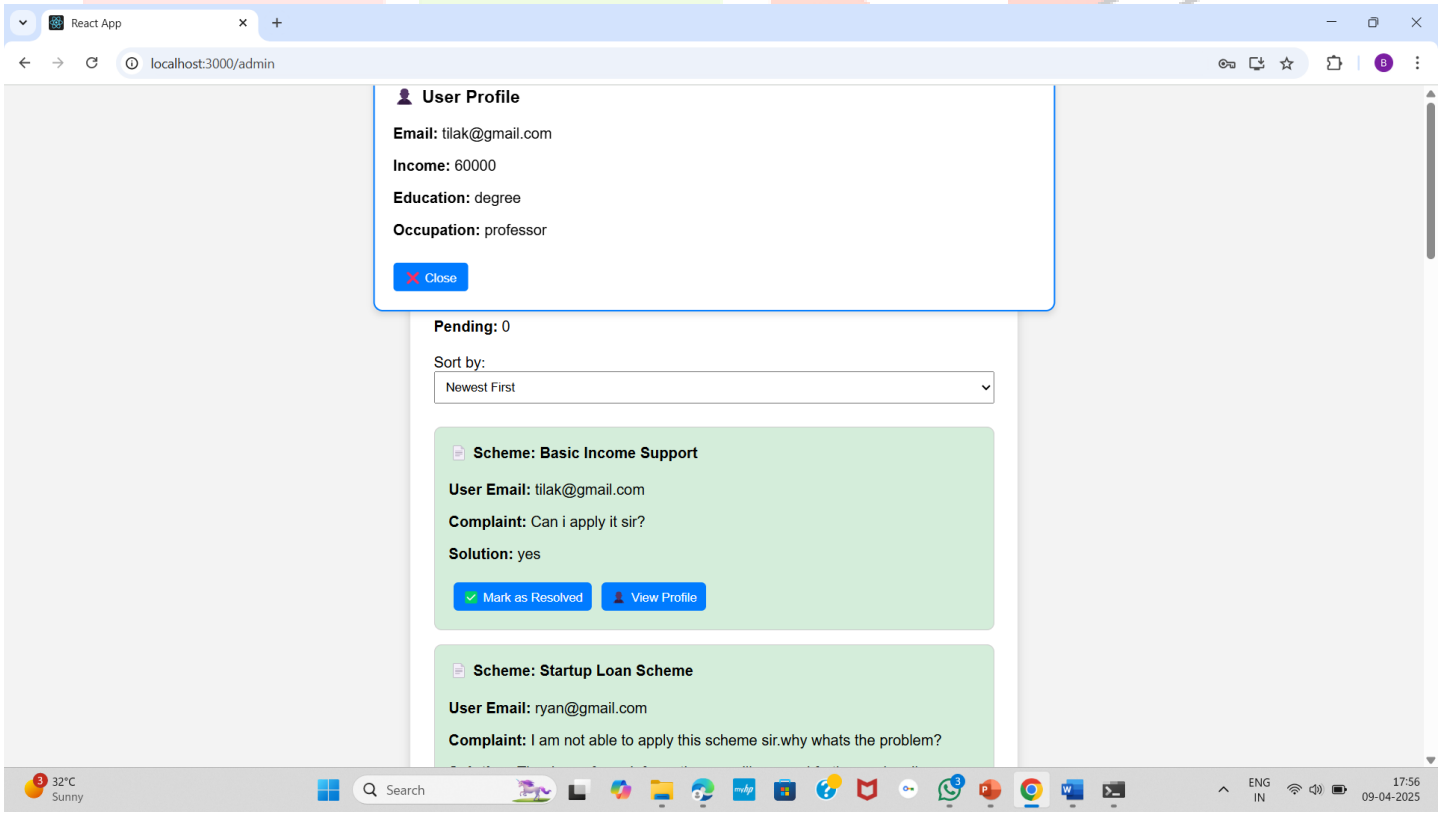
X. USER DASHBOARD & SCHEME RECOMMENDATION



XI. ADMIN DASHBOARD



XII. VIEW PROFILE



XIII. CONCLUSION

The developed system successfully addresses the core challenge of mapping government welfare schemes to eligible beneficiaries based on their socio-economic background. By integrating AI-driven recommendation logic, the platform offers personalized scheme suggestions using parameters such as income, education, and occupation, thereby improving accessibility and awareness among citizens. The user-friendly interface ensures a seamless experience for both users and administrators, while the built-in grievance redressal mechanism promotes transparency and accountability. Overall, this solution empowers citizens with real-time access to government benefits and provides administrators with efficient tools to manage schemes and resolve issues, ultimately contributing to more inclusive and responsive governance.

XIV. REFERENCES

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