AI Based Financial Scheme Recommendation Using Demographic and Economic Data

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Abstract— **Government welfare programs are created to support people from different sections of society. However, many individuals find it difficult to identify which scheme is most suitable for them due to the lack of proper guidance systems. To address this issue, this project presents a web-based application that uses demographic information along with basic machine learning techniques to suggest relevant financial schemes. The system works with district-level population data and applies the** K-Means clustering algorithm **to group people into categories such as youth, women, children, and senior citizens.Based on these groupings, the application provides scheme recommendations through a simple and easy-to-use interface. It also checks whether a user is eligible by using inputs like age and gender, so that the suggestions are more relevant. In cases where users are not eligible for certain schemes, a complaint module is provided to allow them to raise requests or seek support.In this project, Django is used for backend development, while MySQL is used to store and manage the data. Visualization tools are included to better understand population distribution and patterns. The results show that this approach helps users find suitable schemes more easily and reduces the effort required to search manually.The system can be further improved by adding updated datasets and better models in the future. Overall, this application makes it easier for users to access information about government schemes and helps connect people with the benefits they are eligible for in a more organized way.**

Index Terms— **Artificial Intelligence, Machine Learning, K-Means Clustering, Recommendation System, Demographic Analysis, Government Schemes, Financial Inclusion, Data Mining, Predictive Analytics, Django Framework, Data Visualization.**

INTRODUCTION

In recent years, governments around the world have introduced a wide range of financial welfare schemes to improve the socio-economic conditions of citizens. These schemes are designed for specific groups such as youth, women, children, and senior citizens, providing benefits in areas like savings, insurance, education, and social security. However, a large section of the population remains unaware of the schemes they are eligible for. This gap mainly exists due to the lack of systems that can guide users based on their personal details and demographic characteristics.

Traditional methods of accessing government schemes rely on manual searching, static information sources, or administrative support. These approaches are often time-consuming, less efficient, and do not provide personalized

results. As a result, users may miss out on useful schemes or apply for programs for which they are not eligible. This creates a need for an automated system that can analyze available data and provide accurate recommendations.With the availability of large-scale demographic data, it is possible to design systems that can process this information and extract meaningful insights. Clustering techniques such as the K-Means algorithm can be used to group regions based on similarities in population characteristics. This helps in identifying dominant population categories within each region and supports better decision-making in recommending suitable financial schemes.

The proposed system, titled Financial Scheme Recommendation System Using Demographic Analysis, addresses this issue by combining data analysis techniques with demographic information. The system studies district-level data, including the distribution of youth, female population, children, and senior citizens. Based on these attributes, districts are grouped into clusters representing dominant population categories. Each cluster is then linked to financial schemes that are most relevant to that population group.

In addition to demographic analysis, the system also considers user-specific inputs such as age, gender, and district to determine eligibility for the recommended schemes. This ensures that the suggestions are both relevant and applicable to individual users. Furthermore, the system includes a complaint and support feature that allows users to raise concerns if they are not eligible or need assistance.The system follows a structured design that manages data processing, clustering operations, and user interaction efficiently. A database is used to store demographic information, user details, and complaint records, ensuring organized data handling and quick access. Visualization techniques such as pie charts are included to represent demographic distributions, making it easier to understand how recommendations are generated.

Overall, this project aims to reduce the gap between citizens and government welfare schemes by providing a simple and scalable recommendation system. By using data analysis and structured processing, the system improves awareness, enhances accessibility, and supports better decision-making in selecting appropriate financial schemes.

LITERATURE SURVEY

In recent times, the use of technology in areas like finance, healthcare, and government services has increased a lot, especially with the help of Artificial Intelligence and Machine Learning. These technologies are being used to make systems smarter and more useful for people. Earlier, recommendation systems were mostly used in platforms like online shopping or movie suggestions, where the system recommends items based on user interests or past behavior. But this type of approach is not very suitable for government services, because here the recommendations depend more on eligibility rules and personal details rather than user preferences. Because of this difference, researchers started focusing on other methods that can handle structured data more effectively. One such method is clustering, where data is grouped based on similarity. The K-Means algorithm is commonly used for this purpose, and it helps in identifying patterns in large datasets such as population details, income levels, and regional characteristics. By grouping similar data, it becomes easier to understand which type of schemes may suit a particular category of people. Some earlier systems tried to solve this problem using simple rule-based methods, where user details are checked against fixed conditions. While this works to some extent, it is not flexible and needs frequent updates whenever new schemes are introduced. Also, it cannot identify hidden patterns in data, which limits its effectiveness. Later, more advanced methods were introduced using machine learning models that can analyze data and make better predictions. These models can classify users into categories and provide more accurate suggestions. However, many of these systems mainly focus on individual data and ignore regional factors like district-level population trendsAt the same time, web technologies have made it possible to build applications that are easy to use and accessible to everyone. Frameworks like Django and Flask allow developers to connect data processing with user-friendly interfaces, so users can interact with the system without any difficulty. Even with all these developments, there is still a gap because most systems either focus only on checking eligibility or only on analyzing data, but not both together in a single system. This project tries to overcome that limitation by combining demographic analysis with a recommendation system. It uses clustering to understand population patterns and also considers user inputs like age and gender to provide better and more relevant suggestions. Overall, the idea is to create a system that not only analyzes data but also helps users directly by giving useful recommendations in a simple way, making it easier for people to find and use government schemes without confusion or unnecessary effort.

PROPOSED METHOD

The proposed system is designed to recommend suitable financial schemes by analyzing demographic data along with individual user details. Its main objective is to simplify the process of identifying relevant government schemes by using structured data and providing personalized suggestions.

Unlike traditional approaches that rely heavily on manual filtering, this system organizes and processes population data in a systematic way to identify useful patterns. It mainly considers district-level demographic information such as the proportion of youth, women, children, and senior citizens. This data helps in understanding regional characteristics and identifying the most appropriate category of financial schemes for each district.To analyze the demographic data, the system uses clustering techniques to group districts based on similarities in population distribution. This grouping helps in identifying dominant population categories within each district. For example, districts with a higher youth population are categorized differently from those with a larger senior citizen population. These groupings are then used to associate each district with financial schemes that best match its demographic profile.

In addition to district-level analysis, the system also provides personalized recommendations for users. Users are required to provide basic details such as age, gender, and district. Based on this information, the system evaluates their eligibility for different schemes. It applies predefined conditions to determine whether a user qualifies and displays the result clearly as “Eligible” or “Not Eligible.” This ensures that users receive recommendations that are both relevant and applicable.The system is structured in a layered manner. It includes components for handling user data, processing demographic information, and managing scheme details. A database is used to store user information, demographic data, and complaint records, enabling efficient data storage and retrieval.

An important feature of the system is the complaint management module. If users are not eligible for a particular scheme or face any issues, they can submit a complaint by providing a valid reason along with supporting proof. This feature improves transparency and provides a mechanism for addressing user concerns. The complaints can also be reviewed by administrators for better system management.

To improve understanding, the system includes a data visualization component that represents demographic distributions using graphical formats such as pie charts. These visual representations help users and administrators interpret the population structure of a district and understand the basis for scheme recommendations.

The overall workflow of the system begins with data input, followed by preprocessing and grouping of districts. The dominant population category is then identified, and relevant schemes are mapped accordingly. User details are used to refine these recommendations through eligibility checks, and the final results are presented along with visual insights and support options.The system integrates data processing, structured analysis, and user interaction into a single solution. By reducing dependency on manual methods, it improves efficiency, accuracy, and accessibility in identifying suitable financial schemes.

In conclusion, the proposed system provides a scalable approach to connecting citizens with government welfare programs. By combining demographic insights with individual eligibility, it ensures that users receive meaningful and relevant recommendations, thereby improving the utilization of available schemes.

RESULTS ANALYSIS

Fig. 4.1 Application Interface Home Page

Fig.4.2 Display of AI-based financial scheme identification categorized by population groups.

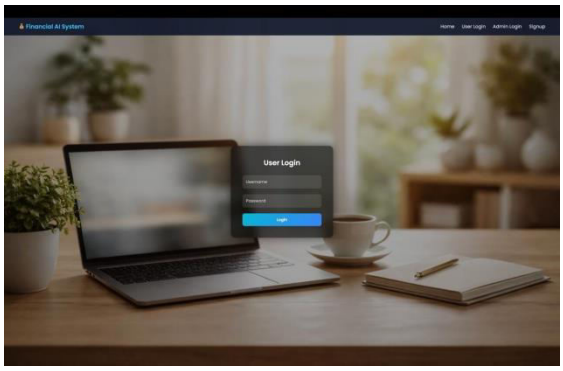

Fig. 4.3 User login interface for accessing personalized scheme recommendations.

Fig. 4.4 User login interface for accessing personalized scheme recommendations.

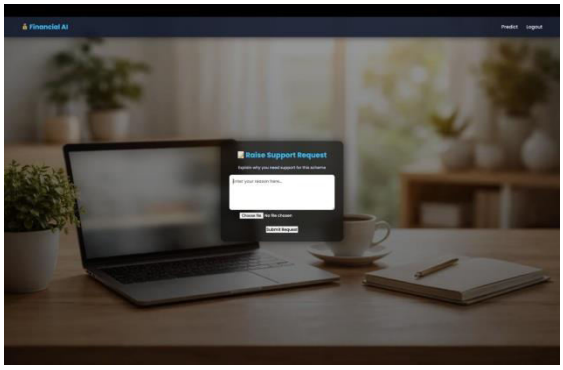

Fig. 4.5 Support request interface for
submitting complaints with reason and document proof.

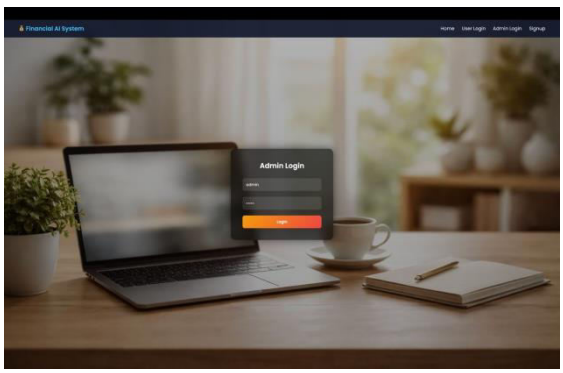

Fig. 4.6 admin login to access all data

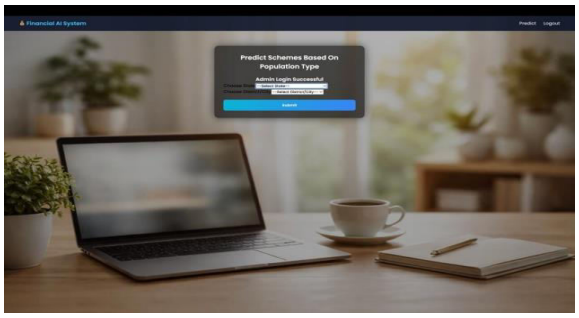

Fig. 4.7 Admin panel for selecting state and district to perform demographic-based scheme prediction.

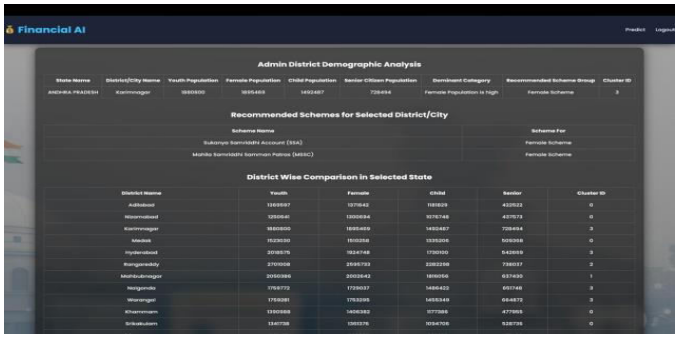

Fig.4.8a Admin panel for selecting state and district to perform demographic-based scheme prediction.

Fig.4.8b Admin panel for selecting state and district to perform demographic-based scheme prediction.

CONCLUSION

The proposed Financial System provides an effective solution for improving access to government financial schemes by using demographic data analysis and structured processing techniques. By combining user details such as age, gender, and district with population-level information, the system generates relevant and personalized scheme recommendations. This reduces the need for manual searching and helps increase awareness of suitable schemes among different groups of people.

The system uses clustering methods to group regions based on similar population characteristics. This helps in identifying dominant population categories within each district and linking them to appropriate financial schemes.

Such an approach improves the accuracy of recommendations and ensures they are aligned with actual demographic patterns. Additionally, the eligibility checking feature gives users immediate feedback by clearly indicating whether they qualify for a scheme, which improves usability and transparency.

Another key feature of the system is the complaint management module. This allows users to raise concerns if they are not eligible for a scheme or encounter any issues. By enabling users to submit their complaints along with supporting details, the system creates a communication channel between users and administrators. This helps in improving system reliability and user trust. Furthermore, graphical representations such as charts are used to display demographic data, making it easier to understand population distributions and support better decision-making.From a technical point of view, the system follows a modular and scalable design. It includes components for handling user information, processing demographic data, and managing scheme details. A database is used to store and retrieve all necessary information efficiently. The interface is designed to be simple and easy to use, ensuring that people from different backgrounds can access the system without difficulty.

In conclusion, the proposed system offers a practical approach to connecting citizens with government welfare schemes. It simplifies the process of identifying suitable schemes while improving transparency, accuracy, and user interaction. Future improvements can include the use of updated data sources and expanding the system to reach a larger audience.

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