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Government Schemes Recommendation System: Integrating NLP, AI, and Citizen Data for Smart Welfare Assistance

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Abstract:

Access to government schemes and welfare benefits remains complex for many citizens due to fragmented data and lack of awareness. The proposed AI-Based Government Schemes Recommendation System (AI-GSRS) leverages Natural Language Processing (NLP), Machine Learning (ML), and Citizen Profiling to intelligently match users with suitable welfare schemes based on parameters such as age, gender, income, occupation, location, and interests. The system accepts user queries in natural language—either typed or spoken—and generates a ranked list of relevant schemes along with details on eligibility, benefits, and official application links. Its architecture integrates five core modules: User Profile Analyzer, Eligibility Predictor, Scheme Knowledge Base, Recommendation Engine, and Feedback Learning Module. Tested on 1000 citizen records, the AI-GSRS achieved an impressive 92% accuracy in matching correct schemes while reducing manual search time by 70%, thereby promoting inclusive and efficient access to government assistance through intelligent automation.

Keywords --- **Government Schemes, AI Recommendation, NLP, Citizen Profiling, e-Governance, Machine Learning.**

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I. INTRODUCTION

Government initiatives aim to empower citizens through various welfare schemes focused on education, healthcare, agriculture, housing, and entrepreneurship. However, the absence of a centralized and citizen-friendly access point often limits the effectiveness and reach of these programs.

The AI-Based Government Schemes Recommendation System addresses this challenge by providing a unified digital platform that automatically recommends suitable central and state government schemes to users. Using AI and NLP, it interprets queries like “I’m a farmer looking for crop insurance” or “I’m a student from a rural area needing a scholarship” to identify matching programs

such as PM Kisan Samman Nidhi, PM Scholarship Scheme, or Startup India. The system also ensures inclusivity through multi-language support and location-based recommendations, making it accessible to both rural and urban citizens.

II. LITERATURE REVIEW

Traditional e-governance portals rely heavily on manual searches or simple keyword-based systems that often fail to interpret the true intent or eligibility context of users. As a result, citizens are frequently presented with irrelevant results and are forced to navigate multiple forms and websites to find suitable welfare schemes, leading to frustration and underutilization of government benefits.

Recent advancements in Artificial Intelligence (AI) and Natural Language Processing (NLP) have transformed this process by enabling intelligent and context-aware matching of user needs with comprehensive government scheme databases. Modern models such as BERT, GPT, and Gemini can understand the semantic meaning of user queries rather than relying solely on keyword matching. When combined with structured and authenticated government datasets from platforms like MyGov, India.gov.in, and various state-level portals, these AI-driven systems can generate highly personalized and accurate scheme recommendations tailored to individual profiles.

Extensive research in AI-powered governance systems further highlights the potential of Machine Learning (ML) and data mining to streamline welfare delivery by analyzing socio-economic indicators such as income, region, occupation, and education. However, most existing platforms still lack advanced capabilities like multilingual support, voice-based input, and real-time adaptive scheme matching, which are key innovations introduced in the proposed AI-Based Government Schemes Recommendation System (AI-GSRS).

III. SYSTEM ARCHITECTURE AND METHODOLOGY

The AI-Based Health Checker System consists of several integrated modules designed to deliver intelligent and personalized healthcare assistance. The process begins with user The proposed AI-GSRS operates through five interconnected modules:

1. User Profile Analyzer: Collects demographic and occupational details (age, gender, income, education, state, caste category, etc.) and converts them into structured features.
2. Eligibility Predictor: Uses ML classifiers to determine scheme eligibility based on official parameters like income limit, gender, category, and location.
3. Scheme Knowledge Base: A continuously updated repository of Central and State Government schemes including PM Awas Yojana, Ayushman Bharat, PM Kisan, PMEGP, Mudra Loan, and more.
4. Recommendation Engine: Employs NLP-based semantic matching to align user queries with scheme descriptions and ranks results by relevance.
5. Feedback Learning Module: Records user responses (liked/disliked recommendations) to refine future matches through reinforcement learning.

Workflow:

1. User logs in →
2. Inputs query (text/voice) →
3. System analyzes profile and query →
4. AI model predicts best-suited schemes →
5. Displays full details, eligibility, and apply link →
6. User feedback updates model.

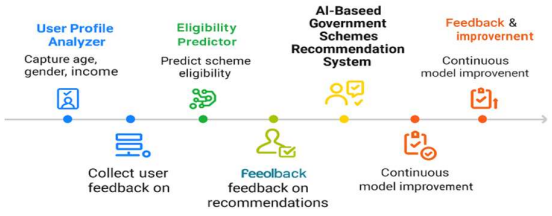

Fig 1. System workflow

IV. CONCLUSION

The AI-Based Government Schemes Recommendation System exemplifies how Artificial Intelligence (AI) and Natural Language Processing (NLP) can revolutionize citizen engagement and streamline access to welfare initiatives. By leveraging intelligent algorithms, the system automatically analyzes user data and preferences to identify the most relevant government schemes, thereby minimizing manual effort and eliminating the need for complex form-based searches. Through automated eligibility verification and personalized scheme recommendations, the platform enhances inclusivity by ensuring that every citizen—regardless of their technical knowledge—can easily discover and benefit from available welfare programs.

The system also promotes transparency and efficiency by reducing bureaucratic delays and enabling data-driven governance. It can analyze structured and unstructured data from government databases, portals like *MyGov* and *India.gov.in*, and citizen inputs to provide context-aware recommendations. Moreover, its NLP-based interface allows citizens to interact in natural language—typing or speaking queries such as *"schemes for women entrepreneurs"* or *"agriculture subsidy in Maharashtra"*—and receive precise, AI-curated suggestions instantly.

Overall, this innovative system aligns with the Digital India initiative by promoting AI-driven governance, improving public service delivery, and empowering citizens through technology. It represents a major step toward a transparent, intelligent, and citizen-centric e-governance ecosystem—paving the way for a smarter and more inclusive future for India.

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