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ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING SOCIAL WELFARE DELIVERY IN INDIA

Mr. Ch Abhishek
Mr. V Sahith Kumar Reddy
Mr. E Rithvik Reddy
Mr. Ch Charan Teja
BS-CS, Vishwa Vishwani Institute of Systems and Management
Hyderabad, Telangana, India | Email: chegudiabhishek7@gmail.com | Mobile: 7842612335

ABSTRACT

Artificial Intelligence (AI) has emerged as an important tool that is influencing our day-to-day life in aspects of decision-making, education, business, social welfare and public administration. In India, our reliance on digital portals and online systems is increasing; however, the real and effective access to schemes remains uneven due to limited accessibility and fragmented information.

Governments are exploring AI applications in social security, taxation, public grievance redressal and citizen engagement. However, the adoption of AI also gives challenges relating to data privacy, digital exclusion and protection of human rights.

This paper proposes a science-oriented, AI-driven conceptual framework to improve the accessibility and reachability of social welfare schemes by optimizing the delivery of government services, identifying beneficiaries and enabling better decision-making to improve transparency and accountability.

AI can make social welfare and public administration more efficient and responsive. However, governments must protect citizens privacy, prevent discrimination, and maintain human supervision to ensure the technology service everyone fairly. AI helps the government to provide services faster, support people in need and manage public resources more effectively.

Keywords: Artificial Intelligence, Social Welfare, Public Administration, Privacy, Accountability, Transparency, Grievance Redressal, Citizen-Centered Governance and Social Security

1. INTRODUCTION

Social welfare programs and schemes are essential instruments for addressing poverty, unemployment, healthcare access, and social inequality. Governments and non-governmental organizations allocate significant resources to welfare schemes, yet many beneficiaries remain underserved due to inefficient identification mechanisms and delayed responses.

Traditional welfare systems rely heavily on manual processes, static eligibility rules, and historical data analysis. These approaches fail to adapt to dynamic socioeconomic changes and often result in inclusion and exclusion errors. Recent advancements in artificial intelligence (AI) and predictive analytics offer promising solutions to these challenges.

Artificial Intelligence (AI) is playing a crucial role in improving social welfare delivery in India. It offers innovative solutions to address these challenges by improving the efficiency, accuracy, transparency, and accessibility of public welfare services. AI technologies such as machine learning, data analytics, chatbots, and automated systems can help the government identify eligible beneficiaries, detect fraudulent claims, process applications faster, and deliver services more effectively and efficiently

In India, a majority of the population depend on government welfare schemes, the integration of AI into public administration has the potential to strengthen governance and promote inclusive development. It can support the implementation of schemes related to healthcare, education, agriculture, food security, and financial assistance. However, the use of AI also raises concerns regarding data privacy, algorithmic bias, digital literacy, and equal access to technology.

Therefore, this study focuses on the role of Artificial Intelligence in enhancing social welfare delivery in India, examining its applications, benefits, challenges, and potential to improve the lives of citizens through more efficient, transparent, and inclusive public service delivery.

2. RESEARCH OBJECTIVES

The study aims:

1. To examine the role of Artificial Intelligence in enhancing social welfare delivery in India.
2. To identify key applications of AI in welfare governance.
3. To analyse challenges associated with AI implementation in public welfare systems.
4. To propose an AI-driven framework for improving welfare accessibility, transparency, and efficiency.

3. RESEARCH QUESTIONS

- How can AI improve social welfare delivery in India?
- What are the major applications of AI in welfare governance?
- What ethical and technological challenges arise from AI adoption?
- How can AI be deployed while maintaining inclusiveness and accountability?

4. REVIEW OF LITERATURE

Author	Year	Findings
NITI Aayog	2018	AI can transform governance
UNESCO	2021	Ethical AI principles
OECD	2019	Transparency and accountability
World Bank	2022	Digital welfare systems improve outreach

5. RESEARCH GAP

Previous research has explored the use of data analytics in public policy and social welfare management. Studies have applied machine learning techniques for poverty prediction, welfare fraud detection, and healthcare demand forecasting. Logistic regression, decision trees, and neural networks have been used to classify beneficiaries and assess risk levels.

However, many existing solutions are limited to specific domains and lack integration across multiple welfare sectors, particularly within the Indian context. Additionally, critical challenges surrounding ethical considerations, explainability, real-time decision support, citizen rights, algorithmic accountability, and inclusive governance remain significantly underexplored. This research addresses these critical gaps by proposing a unified, explainable, and measurable AI-based welfare system.

6. CHALLENGES FACED BY CITIZENS

Despite vast capital investments in public welfare programs, state departments continue to struggle with distributing benefits equitably. The continued reliance on manual verification and rigid eligibility metrics prevents traditional distribution networks from responding to rapid, real-time socioeconomic changes. This operational rigidity leads to severe misidentification, resulting in errors where benefits are given to ineligible individuals and vulnerable, eligible citizens are denied aid. On top of that, current administrative systems lack proactive forecasting capabilities, making public interventions reactive rather than preventative. As a result, critical

support during sudden economic shocks, public health crises, or localized agricultural failures is often delayed.

The result is heavily siloed, compartmentalised, autonomous citizen data scattered across disconnected public institutions, preventing holistic cross-analysis and data-driven policymaking. The lack of a unified data pipeline leads to inefficient use of resources, leakages in the systemic welfare mechanism and compromised regulatory compliance. Manual auditing mechanisms are inherently incapable of tracing sophisticated, anonymous discrepancies in large and highly variant data-sets. The lack of algorithms' transparency and ability to implement audit mechanisms prevents state accountability and public faith in governance machinery. The pressing need is for a scalable, intelligent, and human-centred ethical AI mechanism that unifies disparate state data repositories, deploys predictive analytics for ensuring protection to vulnerable populations, automatically neutralizes the threat by local interventions and guarantees data privacy.

7. METHODOLOGY

The proposed intelligent AI-based system for enhancing social welfare adopts a systematic and data-driven methodology to ensure accurate predictions, efficient resource allocation, and transparent decision-making. The methodology consists of multiple interconnected stages, each designed to address the limitations of traditional welfare system.

7.1 Data Collection and Integration:

7.1.1 Multi-Source Aggregate: Connects massive, diversified data sources from government census bureau, employee, and income registry, healthcare, and education MIS (Management Information System) and geographer / environmental data sources.

7.1.2 DPI Interoperability: Connects the data through Aadhaar authentication, eKYC, and database of the beneficiaries from the state for a complete view of the household.

7.2 Data Preprocessing and Feature Engineering:

7.2.1 Data Cleaning & Standardization: Handles missing data, structural noise, duplicate/ghost entries (e.g. deceased beneficiaries, overlapping ration cards) via automated data pipelines.

7.2.2 Socioeconomic Feature Extraction: Derives predictive indices including those for income stability, dependency ratios, and health risk scores, as well as employment vulnerability scores.

7.3 Algorithmic Targeting and Predictive Analytics:

7.3.1 Proactive Inclusion (Finding the Missing): Employs civic-tech/multilingual/voice-enabled AI-enabled tools on a cloud platform to profile citizens and then cross-matches it with

thousands of scheme criteria, alerting all those eligible households who have not been reached about what they can avail of (PM-KISAN and MGNREGA).

7.3.2 Fraud Detection and Leakage Reduction: Uses machine learning models (like anomaly detection algorithms) to identify suspicious or fraudulent transaction patterns in real time across DBT disbursements.

7.3.3 Risk & Demand Forecasting: Uses predictive modelling to forecast localized shocks (like agricultural crises, food security risks, or health care demands) and pre-allocate resources.

7.4 Real-Time Authentication and Deployment:

7.4.1 Multimodal Verification, Aadhaar: Uses digital authentication services that employ an authentication method like facial recognition based on Aadhaar or a voice-based interface in programs such as the Poshan Tracker or PDS.

7.4.2 Last-Mile Delivery Support: Uses AI chatbots and localised digital assistants to guide marginalised communities through bureaucratic processes and access welfare support services.

7.5 Monitoring, Evaluation, and Feedback Loops:

7.5.1 Ongoing Impact Evaluation: Taps dashboards and real-time governance metrics (via new initiatives like the India AI Mission) to assess the impact of schemes, monitor differences across districts, and inform the design of policies**.**

7.5.2 Correction and Human Intervention: It includes controls and offline options to lessen algorithmic bias and, authentication failures due to environmental factors, or internet disconnections.

This study adopts a qualitative and conceptual research design based on secondary data collected from government reports, policy documents, academic literature, and international institutional publications.

8. APPLICATIONS AND USE CASES:

8.1.1. Identification and targeting of beneficiaries:

Artificial Intelligence can analyse welfare data to support government departments in targeting beneficiary households, recognise unmet needs and gaps in social services, and address shortcomings in targeting**.**

Application: Pension, scholarships, housing assistance, and other welfare schemes' beneficiary targeting.

8.1.2. Efficient delivery of welfare benefits:

Artificial Intelligence can help to ensure that welfare benefits are delivered efficiently by detecting delayed payments or failed transactions, understanding the underlying problems, and informing government departments on workload projections.

Application: Enhancing Direct Benefit Transfer (DBT), pension, scholarships, and other forms of financial assistance.

8.1.3. Food security and public distribution:

Artificial Intelligence can help to analyse consumption and stock trends to advise on food-grain procurement and distribution, and detect suspicious activity in ration card transactions.

Application: Improving the Public Distribution System (PDS) and addressing avoidable shortages.

8.1.4. Healthcare welfare services:

Artificial Intelligence can improve the targeting of healthcare benefits, support disease screening and surveillance, inform healthcare workers of patients in need, and resource allocation for public health.

Application: Enhancing the Ayushman Bharat and National Health Mission's public health services.

8.1.5. Educational welfare and scholarships:

Artificial intelligence can help to identify learning difficulties, recognise students' attendance patterns, and help operate educational welfare schemes. Further, it can help provide information in multiple languages regarding scholarships, eligibility, and other requirements.

Application: Increasing access to scholarships, educational welfare benefits, and ensuring education for disadvantaged groups.

8.1.6. Grievance resolution and complaint processing:

Natural language processing and chatbot applications can help address citizen grievances, identify complaints, and route them to the relevant government departments.

Application: Processing complaints and grievances about pensions, ration cards, scholarships, and other welfare benefits.

8.1.7. Monitoring, evaluation, and auditing of welfare schemes:

Artificial Intelligence can analyse government data to identify and detect inefficiencies in welfare scheme implementation, detect inter-district disparities, and advise on corrective measures.

Application: Monitoring and evaluating welfare schemes to improve the efficiency of service delivery.

8.1.8. Error detection in processing and financial irregularities:

Artificial Intelligence can detect payments or other benefits that appear to be irregular or inappropriate, helping to ensure financial integrity and accountability.

Application: Detecting, investigating, and eliminating errors in processing benefits and financial mismanagement.

8.1.9. Rural development and employment welfare:

Artificial Intelligence can analyse rural employment trends to aid the identification of underserved areas, detect irregularities in project implementation, and identify concerns that need further government investigation.

Application: Monitoring and evaluating the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and other rural development welfare schemes.

8.1.10. Ensuring accessibility and inclusiveness of welfare services:

Voice AI, speech recognition, and chatbot applications can help to provide accessible welfare services and support persons with disabilities, older persons, and those with low literacy levels.

Application: Increasing rural residents', older persons', persons with disabilities', and low-literate citizens' access to government welfare schemes.

9. SUGGESTIONS FOR IMPROVING SOCIAL WELFARE DELIVERY:

- Adopt a human-centred approach to ensure that human actors are in control of high-risk decisions.
- Do not let beneficiaries of social welfare programmes who are entitled to a benefit be deprived of it due to an algorithmic error.
- Ensure accessibility to remedy and redress complaints and correction of wrong data or decisions.
- Develop systems that have been tested for fairness across diverse groups, including women and men, across caste, disability, language, regions, and income, where relevant and feasible.
- Ensure robustness and security of algorithms in relation to data privacy, use of personal information, and protection against discrimination and bias.
- Make services accessible in multiple languages and formats, including voice-based, and respond to the needs of persons with disabilities.
- Promote awareness and capacity-building among public officials and front-line workers about AI/technology and its limits.
- Carry out independent assessments and publish results on metrics such as accuracy, fairness, quality of service, and cost-benefit analysis.
- Ensure offline options and assisted service centres for those who are unable to use technology-enabled services.
- Test and pilot before scaling up and phasing out AI technologies and systems when they cause significant harm.

The primary goal of policies should be to ensure that AI works to make it easier for people to claim their rights and entitlements rather than making them dependent on technology to get access to welfare services.

10. CONCLUSION:

AI has the potential to strengthen the schemes and services to citizens in India by taking care in improving administrative efficiency, healthcare accessibility, educational support, food distribution planning and rural life. It can help the government to analyse and process the complex data and can ensure that the only eligible beneficiaries receive welfare benefits.

However, the success of AI is conditional upon factors beyond technology, including the availability of reliable data and digital infrastructure, human capacity and capabilities, protection of privacy, transparency in outcomes, and accountability in case of mishaps. Furthermore, the research literature on India's digital welfare systems and the case studies presented also highlight the risk that technology can create new forms of exclusion if they are not designed with sufficient awareness of the local context in which they will operate and the needs of the people who will use them.

Therefore, India should take up a responsible, inclusive and human centred approach towards developing AI. It is necessary to make sure that the artificial intelligence complements existing welfare institutions and ensures accountability of the system as well as ensure that the entitled citizens are provided with their due without any discrimination and hurdles.

The study contributes to the growing discourse on AI-enabled governance by proposing a citizen-centric framework for equitable welfare delivery. The framework emphasizes transparency, accountability, inclusiveness, and ethical deployment of AI technologies within public administration.

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