A REVIEW ON SMART AND INTELLIGENT E-GOVERNANCE

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ABSTRACT

The use of information and communication technologies (ICTs) in the delivery of government services to citizens is referred to as e-governance. The implementation of e-governance has the potential to improve service delivery, citizen participation, and transparency in government operations. Smart e-governance is a relatively new concept in, which artificial intelligence (AI), machine learning, and data analytics are used in government processes. Smart e-governance systems with AI and machine learning models have the potential to transform public service delivery, allowing governments to provide citizens with more efficient and personalised services. Machine learning models can analyse enormous volumes of data, producing predictions and providing insights that might assist governments in identifying and addressing problems before they become significant. The purpose of this research is to study smart e- governance systems utilising machine learning, AI and data analytics models and to assess its effectiveness in improving public service delivery.

Introduction

Globally, governing systems face difficulties posed by the digital revolution and must create plans to transform the current system in order to provide efficient, transparent, high-quality, and cost-effective services. E-government (e-Gov) is the use of advanced systems, information and communication technologies (ICTs), and other technologies to provide improved amenities for people and companies alike [1]. Since the mid-twentieth century, all governments have changed their administrative structures to adapt to the changing conditions imposed by the Information and Communication Technology (ICT) revolution [3].

The impact of globalisation, which has significantly affected the world socially, culturally, economically, and politically, is credited to the twenty-first century as we know it now.

Traditional administrative procedures and structures have been inadequate in providing proper services to citizens due to an excessive dependence on bureaucracy, hierarchy, guidelines, and norms. The concept and practise of redesigning government structures and procedures has received a lot of attention since the 1990s [4]. A World Bank report from 1989 introduced the notion of good governance to the world [2]. Since then, all governments have focused more on attaining good governance in different manners. One of the most important aspects of good governance is empowering citizens. Individuals and governance systems as a whole are now aiming to reap the benefits of improved access to information as well as services.

Intelligent e-governance is an innovative approach to governance that makes use of cutting- edge technology and intelligent systems to deliver more efficient and effective services to the public. This approach has grown in popularity in recent years as governments throughout worldwide have recognised the economic advantages of harnessing technology to improve governance. The use of machine learning (ML) [6], artificial intelligence (AI) [5], and data analytics [7] in governance processes and services to promote efficiency, effectiveness, and accountability is referred to as e-governance.

In brief, the use of ML, AI, and data analytics in e-governance has the possibility of modify public services and governance structures, resulting in more effective, efficient, and transparent governance. Governments must adopt these technologies and see to it that they are used in an ethical and responsible manner.

Goals of E-Governance

Automation	It can improve efficiency, reduce errors, and free up human resources for more complex tasks
Personalization	By analyzing data, governments can identify citizens' preferences and provide tailored services that meet their specific needs
Predictive Analytics	Predictive analytics can be used to identify areas of high demand for public services, such as healthcare or education, and allocate resources accordingly
Decision-making	By analyzing data, governments can identify patterns, predict outcomes, and make informed decisions that improve public services
Transparency and Accountability	By providing access to data and analytics, citizens can hold governments accountable for their decisions and actions.

Related Work

The academic research that is now available indicates that AI, ML, and data analytics possess the potential to revolutionise e-governance by increasing public engagement, efficiency, and transparency. To fully understand the potential of these technologies and to overcome the difficulties in their application, such as worries about data privacy and security, additional research is nonetheless required.
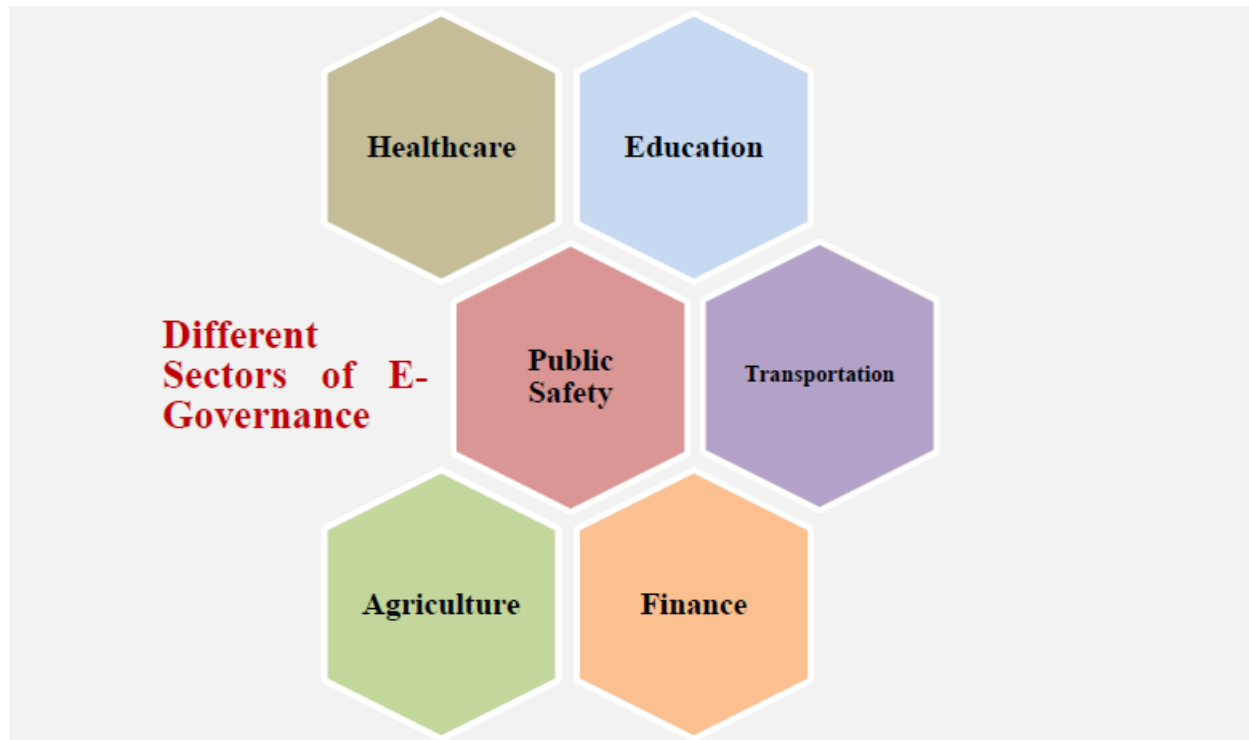
By strengthening decision-making procedures, enhancing service delivery, and boosting public participation, AI and ML have the ability to revolutionise e-governance. The authors point out that AI and ML may be used to analyse vast amounts of data, spot trends, and forecast outcomes, empowering decision-makers in policy to do so. Additionally, ordinary operations can be automated using AI and ML, allowing up government employees to concentrate on more complicated problems [8].

This study investigates India's e-Governance and the usage of AI and ML in it. The authors point out that by automating procedures like document verification, data analysis, and customer support, AI and ML can be utilised to increase the effectiveness of government services. The authors contend that by enabling citizens to track the status of their applications and granting access to government data, AI and ML may also be used to improve openness in governmental procedures [9].

In light of the COVID-19 epidemic, this study looks at the potential of AI, ML, and data analytics in e-governance. The authors point out that AI and ML may be used to analyse pandemic data, including the prevalence of infections and the availability of hospital beds, to help make policy decisions. The authors also contend that data analytics might be used to pinpoint resources more precisely and identify vulnerable people [10].

E-Governance in Different Sectors

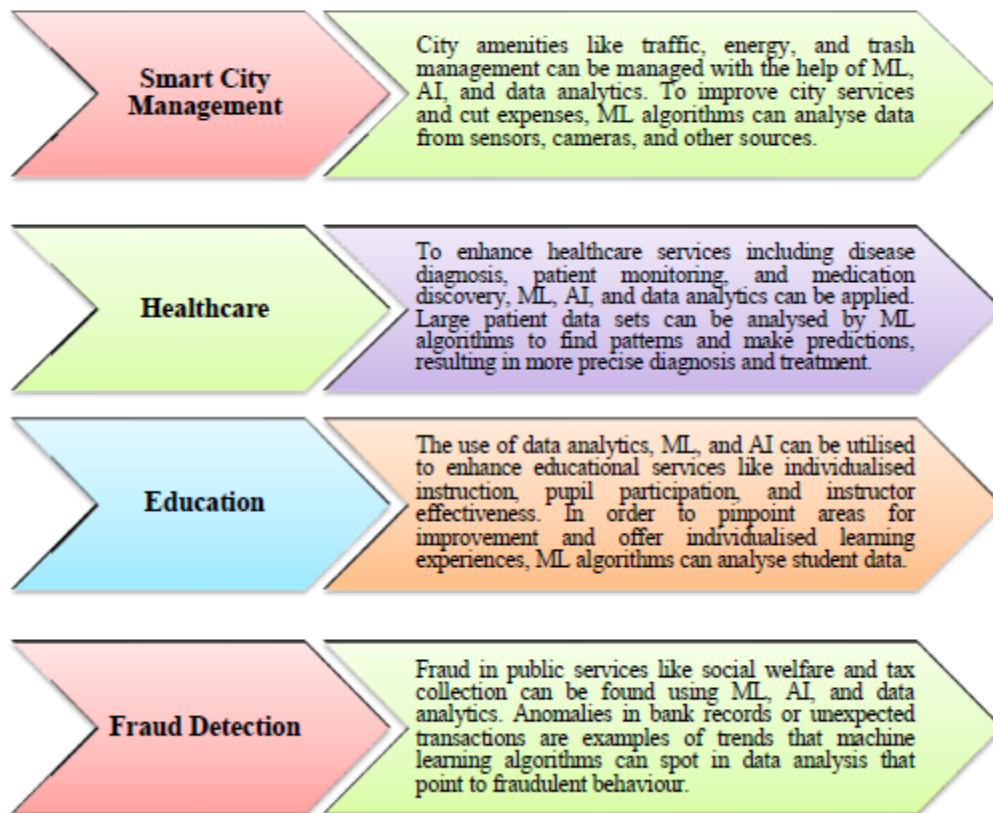E-governance can be used in many areas of government service, including:

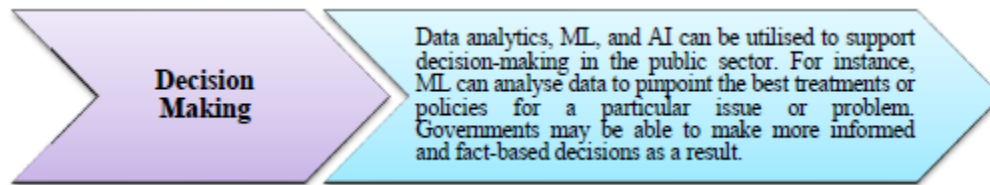| Healthcare	Online scheduling of appointments, telemedicine services, and electronic health records are all examples of healthcare e-governance. E-governance can assist increase individuals' access to healthcare services, cut down on wait times, and enhance their health results.
Education	Online student registration and test systems, digital libraries, and e-learning platforms are some examples of e-governance in the education sector. E-governance can extend access to education for underserved communities while also enhancing educational quality and easing administrative costs on teachers and administrators.
Transportation	Online vehicle registration, e-ticketing for public transit, and real-time traffic management systems are some examples of e-governance in the transportation sector. E-governance can aid in easing traffic congestion, enhancing public transportation, and boosting traffic safety.
Finance	Digital payment platforms, e-procurement systems, and online tax filing and payment systems are examples of e-governance in the financial sector. E-governance can minimise corruption, raise revenue for governments, and assist make financial transactions more efficient and transparent.
Agriculture	Digital land records, online crop insurance programmes, and e-marketing tools are some examples of ag-related e-governance. E-

	governance can lower transaction costs, boost farmer access to markets, and improve agricultural output.
Public Safety	Emergency response platforms, crime mapping platforms, and online reporting systems are examples of e-governance in public safety. E-governance can enhance public security, lower crime rates, and boost citizens' feelings of security.

E-governance can be used to enhance efficiency, effectiveness, and accountability across a range of government functions. E-governance can assist governments deliver better services toresidents and raise everyone's quality of life by utilising technology and digital platforms.

E-Governance using Machine Learning, Artificial Intelligence and Data Analytics

Public services and governance procedures can be significantly improved by implementing ML, AI, and data analytics in e-governance. But it also has drawbacks, like the requirement for qualified employees, moral issues, and concerns about data privacy and security. Governments should support the advancement of these technologies and make sure that when designing and implementing e-governance systems, ethical and privacy issues are taken into account.

Smart City Management
City amenities like traffic, energy, and trash management can be managed with the help of ML, AI, and data analytics. To improve city services and cut expenses, ML algorithms can analyse data from sensors, cameras, and other sources.

Healthcare
To enhance healthcare services including disease diagnosis, patient monitoring, and medication discovery, ML, AI, and data analytics can be applied. Large patient data sets can be analysed by ML algorithms to find patterns and make predictions, resulting in more precise diagnosis and treatment.

Education
The use of data analytics, ML, and AI can be utilised to enhance educational services like individualised instruction, pupil participation, and instructor effectiveness. In order to pinpoint areas for improvement and offer individualised learning experiences, ML algorithms can analyse student data.

Fraud Detection
Fraud in public services like social welfare and tax collection can be found using ML, AI, and data analytics. Anomalies in bank records or unexpected transactions are examples of trends that machine learning algorithms can spot in data analysis that point to fraudulent behaviour.

Decision Making — Data analytics, ML, and AI can be utilised to support decision-making in the public sector. For instance, ML can analyse data to pinpoint the best treatments or policies for a particular issue or problem. Governments may be able to make more informed and fact-based decisions as a result.

Challenges of E-Governance

1. The digital divide is one of the main issues. Not all residents have access to the technology needed to use e-governance services, including the internet. This may lead to unequal service delivery and reduced citizen involvement in political processes. To guarantee that e-governance is available to all citizens, governments must address these discrepancies.

2. The requirement for qualified staff to create and manage e-governance systems is another difficulty. Systems for e-governance involve knowledge in a variety of domains, including public administration and information technology. The required skills to create and manage these systems must be developed through government investment in training programmes.

3. Concerns about privacy and security present another difficulty for e-governance. Access to personal information like names, addresses, and social security numbers is necessary for e-governance systems. For the purpose of preventing unauthorised access to this data, governments must put in place the necessary security measures.

Future of E-Governance

The prospect for the future of e governance is bright. Innovations in technology like blockchain and artificial intelligence, machine learning, data analytics etc present prospects for better e-governance systems. Blockchain technology, for instance, can be used to build secure, decentralised databases that let people access government services and information directly without the use of middlemen.

Conclusion

Smart and intelligent e-governance systems improve the administration of public goods and services, boost accountability and openness, and encourage citizen engagement and involvement, all of which are important benefits for citizens, governments, and other stakeholders. The difficulties of designing, building, and maintaining these systems, as well as those of guaranteeing data privacy and security and accessible for all citizens, must all be addressed if these advantages

are to be fully realised. To guarantee that e-governance systems remain efficient and advantageous for all stakeholders as they develop, it is crucial to keep researching and improving these systems.

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