A Review on Artificial Intelligence in Public service

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ABSTRACT

Public administration is undergoing a transformation with the advent of artificial intelligence (AI) that provides new tools for improving the efficiency, accuracy and responsiveness of public services. It looks at the evolving role of AI in public service delivery, focusing on healthcare, education, tax administration and citizen-facing government services. It addresses the key advantages that come with the adoption of AI, such as better operational efficiency, data-driven and more accurate decision-making, increased automation of repetitive administrative tasks, better citizen services and resource optimisation in public services. The review also takes into account the ethical and governance issues that arise with the use of AI in government such as concerns regarding data privacy, algorithmic bias, lack of transparency, and loss of trust when AI systems are opaque or biased. The difficulties underscore current and emerging problems requiring responsible governance solutions to guarantee that AI systems are used fairly, transparently, and legally and ethically. The review also identifies areas for future research and development of AI in public administration, focusing on human-centred design, explainability, accountability and the creation of comprehensive public sector AI governance frameworks. The review finds that public administration's successful use of AI will require both technical capability and robust institutional protection of the rights of citizens and the maintenance of citizens' trust in government. Governments will need to continue to focus on responsible AI use to reap the benefits of digital transformation while keeping their public institutions accountable, fair, and trustworthy. This paper examines the role of AI in public administration and the creation of e-governments from the perspective of digital transformation. This paper explores the involvement of AI in public administration and the development of e-governments through the lens of digital transformation, while taking care to highlight potential algorithmic bias.

Keywords: Artificial Intelligence, Public Service, e-governance, Digital Transformation.

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INTRODUCTION

Artificial intelligence involves various types of computing technologies, including machine learning and natural language processing, that enable computers to execute tasks that typically involve human thinking, including recognizing patterns and making predictions, as well as understanding and interpreting language [1]. The techniques have developed over the last decade from research applications to practical tools that are used in many industries of the economy, including government. Across the globe, public administrations are looking into the opportunities of AI to enhance the efficiency and quality of public services in response to the chronic problems of scarce resources and growing citizens' needs. The use of AI in government is part of a larger journey towards digital transformation that is typically tied to the emergence of e-government platforms. Previous phases of digitalization were mainly about making existing administrative processes digital. AI takes this change a step further by allowing analytical and decision supporting tasks to be automated that would otherwise need to be done by hand. AI-powered systems can analyze vast amounts of administrative information to uncover patterns that guide policy-making, and can streamline service delivery and decision-making processes to reduce delays and errors.AI systems can digitize and analyze the pattern of paper-based processes, leading to quicker and more uniform service delivery and policy decisions. Several factors are driving the increasing significance of AI in public services. Public agencies often have limited budgets and staff, and thus a need for technologies that can automate repetitive administrative tasks. Meanwhile, people are demanding government services that are as timely and convenient as private electronic services[1]. AI can also provide governments with new ways to enhance public administration integrity, such as better identification of fraud and non-compliance in vast amounts of data, like tax records or benefit claims. While the area of AI in public administration has seen increasing interest, existing literature tends to be siloed, with individual studies focusing on a single application of AI without providing a comprehensive overview of the potential benefits, risks, and

governance considerations for public administration [2].

This review aims to fill this gap by summarizing the main uses and advantages of AI in public services, the main challenges and ethical issues of AI adoption, and the future trajectories that will influence the responsible governance of AI in the public sector. This review is intended to provide a clear summary of the opportunities and responsibilities of increasing government use of AI to researchers, policymakers, and practitioners [3].

Benefits of AI in public services.

The applications and benefits of AI in Public services. AI has been used in a variety of core areas of public administration, demonstrating a range of unique service delivery value-add opportunities. In public health care delivery, AI can aid in medical image analysis and the diagnosis process, help identify high-risk patients for disease progression, and assist with administrative tasks like hospital resource management and staff scheduling[4]. The applications can yield better accuracy and timeliness of decision-making in healthcare, but their performance will depend on the quality and representativeness of the data, as the models trained on unbalanced datasets will be prone to delivering biased clinical recommendations. In the field of education, AI can be used to create intelligent tutoring systems that customize learning material to meet the needs of each student, automated assessment systems, and predictive analytics that help identify students who are at risk of falling behind. While these applications have the promise of customizing instruction and allowing earlier interventions for students who need extra help, they need to be implemented carefully within current pedagogical practices and monitored by practitioners. Tax administration is another crucial domain where AI can be utilized[5]. To determine which cases will be audited, tax authorities are increasingly using machine learning models to review past filing information and detect patterns linked to non-compliance. Tax authorities are increasingly using machine learning models to analyze past filing information to detect patterns linked with non-compliance and allocate resources to audit higher-risk cases instead of randomly picking audit cases[6]. Natural language processing (NLP) systems, such as automated chatbots, also assist in processing common queries from taxpayers, making it more accessible while freeing up human resources for more complicated matters[6, 7]. In addition to these domains, AI is

increasingly becoming an enabler for more general public service delivery via a digital government platform[7]. Government websites use virtual assistants and chatbots to direct citizens through processes, update them on the status of their applications, and provide them with basic information without the need for human interaction. These instruments can help increase the hours available for services and decrease the load on service staff for routine citizen inquiries and thus increase the accessibility of public services[8].

Applications of Artificial Intelligence in Public Service

Artificial Intelligence (AI) is now a game-changer that improves public service delivery in terms of efficiency, responsiveness, and quality. AI is being widely adopted by governments around the globe to streamline administrative workflows, empower evidence-based decision-making, better allocate resources, and enhance citizen engagement. By leveraging AI-powered systems, public organizations can handle vast amounts of structured and unstructured data, enabling governments to detect patterns, predict service needs and tailor services to individual citizens' requirements[9]. These capacities are part of a more proactive, transparent and citizen-centric governance. AI is also being used in various areas of the public sector such as healthcare, education, taxation, public safety and smart city management to optimize the delivery of services. Moreover, public officials get assistance from AI to reduce repetitive administrative tasks, allowing them to concentrate on complex tasks that demand human judgment. However, several key principles of AI must be followed to ensure successful implementation, including transparency, accountability, fairness, privacy protection, and human oversight[5]. The public's trust in government services powered by AI remains impacted by worries about algorithmic bias, cybersecurity, data governance, and digital exclusion. Researchers therefore stress the need to prevent AI from overtaking human decision-making, concluding that technological innovation should improve public value while not jeopardizing citizens' confidence in public institutions[9].

Healthcare Services

Healthcare is one of the most advanced sectors for AI use in the public domain. In healthcare, AI technologies can aid in disease diagnosis, patient prognosis, medical imaging analysis, and personalized

treatment[10]. Together with medical expertise, machine learning algorithms can be used to accurately identify conditions like cancer, cardiovascular diseases and diabetic complications. Furthermore, AI plays a role in hospital management by optimizing the use of resources, scheduling patients, and predicting patient needs through the use of predictive analytics. In times of global public health crises, AI has been used to track disease outbreaks, predict infection trends and help inform public health policies. However, ethical issues must be addressed when introducing AI into the healthcare sector, such as privacy, informed consent, data security, algorithmic fairness, and transparency[11]. International organizations have stressed that AI should complement rather than supplant clinical judgment and ensure the safety of patients and equitable access to health care services[11, 12].

Education Services

AI is making a significant impact on public education by implementing smart tutoring systems, customized learning platforms, automated grading, and administrative assistance. AI is making significant strides in public education, with intelligent tutoring systems, personalized learning platforms, automated grading, and administrative support[13]. AI is used in e-learning to analyze student learning behaviors, detect gaps in knowledge, and suggest personalized learning paths to help improve academic outcomes. Automated grading systems can help alleviate teachers' administrative burden, giving them more time to focus on teaching and student learning[14]. AI chatbots can also help students with ongoing academic support and addressing common administrative questions. Furthermore, predictive analytics can help educational institutions recognize pupils who are at risk of failing or dropping out of school, allowing for proactive measures to be put in place. Even with these benefits, there are concerns about the privacy of the data, algorithmic bias, digital technology inequity, and the ethical use of student data. As such, the researchers call for responsible governance of AI, which should involve neither neglecting nor ignoring the importance of human-centered approaches for teaching and learning, yet also prioritizing them alongside technological innovation to guarantee equitable and inclusive educational outcomes[15].

Public Safety

Public safety groups are increasingly turning to AI to enhance their crime prevention efforts, disaster response, emergency management, and law enforcement operations. AI systems are used to analyze vast amounts of data from surveillance cameras, emergency communications, and environmental sensors to detect any potential threats and assist in swift decision-making [15]. Predictive analytics help law enforcement allocate police resources more efficiently, and computer vision technologies improve their ability to detect suspicious activity in public places. AI is also used to predict the risk of flooding, wildfires, earthquakes, and other natural disasters from real-time data about the environment for disaster management purposes. Furthermore, intelligent emergency dispatch systems improve emergency service (ambulance/fire service) deployment, minimizing response time in critical situations. But there are serious ethical issues regarding privacy, mass surveillance, discrimination, and accountability issues that arise with AI applications in public safety[16]. The scholars also stress the need to create clear and transparent regulations with human oversight to avoid misuse of AI technologies and uphold civil liberties and trust in society[16].

Tax Administration

The use of AI in tax administration is growing globally to enhance taxpayer services, select audits, detect fraud, and monitor compliance. The algorithms run machine learning models on vast amounts of financial and transactional data to uncover anomalies, “red flags,” and “hot spots” for tax evasion and flag them for investigation[17]. AI-driven chatbots and virtual assistants can also enhance the experience for taxpayers by giving immediate answers to common questions and making it easier to access government services[18]. In addition, predictive analytics can aid in revenue forecasting and help policymakers analyze tax strategies. According to the OECD, AI can help tax authorities manage their resources more effectively, and decrease administrative costs for governments and taxpayers. However, effective implementation requires high-quality data, effective cyber security, transparency in automated decision making and legal protection of taxpayer rights. In the context of digital taxation, responsible AI governance is fundamental to uphold fairness, accountability, and trust within the tax administration system [19, 20].

Smart Cities

AI is pivotal to smart cities, contributing to better urban governance, infrastructure management, transportation, environmental monitoring, and public services[18]. ITMS optimizes traffic flow and enhances mobility by analyzing real-time traffic data. AI can help optimize energy use via smart grids, manage waste effectively with predictive collection systems, and track air quality and resource usage for environmental sustainability[18]. AI tools are increasingly being used by public authorities to bring together information from a variety of urban systems to inform evidence-based urban planning and efficient use of municipal resources. Implementing AI-powered smart cities, however, requires digital infrastructure, good governance, citizens' engagement and robust legal and policy structures that manage privacy, cyber security, and digital inclusion. Based on the current literature, it is suggested that the implementation of AI should be part of a wider perspective on sustainable urban development, combing technological innovation with social equity and environmental responsibility[21].

The use of automation and AI-powered service tools also helps to improve citizen services by cutting down on wait times, increasing information availability, and personalizing citizen-gov relationships. AI systems can also enhance the transparency and accountability of public administration when implemented correctly by creating structured and traceable records of administrative decisions, which is more systemized than informal or undocumented decision-making processes. All these benefits provide valuable evidence of the increasing importance of AI in public administration's digital transformation, while their achievement hinges on data quality, institutional capabilities, and governance frameworks in which AI systems are embedded[17].

Future Directions

However, the rollout of AI in public administration faces ethical and governance hurdles that need to be addressed to ensure responsible usage. One of the most significant concerns is data privacy, as numerous AI tools and applications need to use a large amount of personal data, such as health records and tax information[22, 23]. In the study of privacy decision-making, there is evidence that people's attitudes toward sharing personal information depend on their perceived trustworthiness of the institutions involved and the design of the systems used to collect personal information; and that people's stated privacy

preferences do not always align with their actual data sharing practices[18]. This highlights the need to take a pragmatic approach to data governance, in public agencies, that goes beyond formal data consent procedures and takes into account the actual experience citizens have with digital systems[19, 24-26].

Another major issue is algorithmic bias, which occurs when AI models are based on past administrative data and may perpetuate patterns of unequal treatment among population groups. If left uncorrected this bias can lead to systematically unfair treatment, which means that the key tenant of public administration, equal treatment, is violated. To combat algorithmic bias, it is crucial to pay particular attention to the representativeness of training data, as well as to continuously monitor the outputs of the AI system and to define ethical guidelines and staff training programs[27, 28].

The topic of transparency is closely related to these concerns. One of the issues with many AI systems, however, is that they can generate answers that are hard to understand for both the administrators and the citizens themselves, which is commonly known as the black-box problem. The absence of interpretability is a significant challenge for the responsible use of AI in public administration, as well as a continuing challenge for developing interpretability techniques that can make algorithmic decisions more comprehensible[29].

In sum, these challenges impact the degree of public trust in government systems powered by AI. When users can clearly see how AI enhances service outcomes and have clear systems in place to hold developers accountable for their work, their trust is more likely to be strengthened. Trust is far more likely to be undermined when algorithmic bias, data breaches, or lack of transparency in decision-making processes come to light. Civil society trust is assured not just by the technical competence of AI systems, but also by the presence of governance structures, such as independent oversight and opportunities for citizens to challenge or appeal AI decisions.

These are just a few of the issues that will continue to be a focus of responsible and human-centered AI governance in the coming years. Responsible AI is about designing and implementing AI solutions that align with fairness, accountability and transparency, while human centred AI is about prioritising the needs and welfare of the citizens and public servants who interact with the AI tools, ensuring that automation

complements human decision-making in meaningful decision-making situations. To realize these goals, robust AI governance frameworks need to be established in public institutions, with established regulations for data security, fairness assessments, and regular performance tracking, backed by adequate institutional autonomy and power to regulate adherence. Supporting staff in the public sector to build technical and analytical skills to help ensure that AI is used meaningfully and not blindly in tools that they lack insight into. Further research and policy-making in these areas are opportunities for enhancing the responsible use of AI in public administration[30].

CONCLUSION

This review has explored the increasing use of artificial intelligence in public administration, including its uses in healthcare, education, tax administration and other service delivery. AI has significant potential to enhance efficiency, decision-making and citizen involvement in government, but also poses key challenges on data privacy, algorithmic bias, transparency and public trust. The evidence examined shows that these benefits do not simply occur, but require a high level of quality of underlying data, robustness of institutional oversight, and human judgment and accountability to be retained in addition to automation.

Thus, the responsible adoption of AI in public administration goes beyond just the technical aspect. It demands long-term investment in governance structures, transparency and fairness frameworks and institutional capacity to protect citizens' rights. Human-centric and accountable AI governance will be vital to making sure that the use of technology enhances, not undermines, the fairness and trustworthiness of public administration, as governments continue to expand their use of AI.

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