

# Personalizing Government Services through Artificial Intelligence: Opportunities and Challenges

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**Abstract:** Using artificial intelligence (AI) to customize government services brings advantages and challenges. On the one side, artificial intelligence (AI) can assist government organizations in better comprehending the needs and preferences of citizens, improving service delivery and raising citizen happiness. On the other hand, there are concerns around privacy, security, and ethical considerations related to the use of AI in government services. This article reviews the existing literature on the use of AI in personalizing government services, identifies key opportunities and challenges, and presents case studies of successful AI implementations in government services. The article concludes with recommendations for future research and practice in the area of AI and government services.

**Keywords:** Artificial Intelligence, Personalization, E-Government, Government Services, Challenges, Opportunities.

## I. INTRODUCTION

The use of artificial intelligence (AI) in government services has the potential to revolutionize the way citizens interact with their government. One area where AI can make a significant impact is in the personalization of government services, where citizens are offered tailored services based on their individual needs and preferences. Personalization has become a key concept in service delivery, as it can improve citizen engagement, enhance the user experience, and ultimately increase satisfaction with government services (Alghamdi et al., 2020, [1][16]).

AI technologies such as machine learning, natural language processing, and predictive analytics can help governments collect and analyze data to personalize their services for citizens. By analyzing citizen data, such as their online behavior, past interactions with government services, and demographic information, AI can provide citizens with a more customized and efficient experience. For example, AI can help governments provide personalized recommendations for relevant services or content, enable more natural language interactions through chatbots, and optimize service delivery based on predictive modeling (Liu et al., 2020, [2][17][18]).

Despite the potential benefits, there are also challenges and risks associated with the use of AI in personalizing government services. These include concerns around data privacy and security, potential biases in the algorithms, and ensuring that the use of AI aligns with ethical and legal considerations (Chen & Xie, 2021, [3]). As such, it is important for governments to carefully consider these challenges and risks when implementing AI technologies in their services. This article aims to explore the opportunities and challenges associated with personalizing government services through AI. Specifically, we will review the existing literature on the use of AI in personalizing government services, analyze the opportunities and challenges presented by AI in this context, and provide recommendations for the implementation of AI in government services.

As government services become increasingly digitized, the potential for personalized and tailored service delivery using artificial intelligence (AI) is becoming more apparent. With the vast amounts of data that governments collect (Bélanger & Carter, 2020[4][19]), AI can be used to analyze and interpret this data in order to provide more effective and efficient services to citizens. Personalized government services can offer a range of benefits to citizens, including improved convenience, accessibility, and responsiveness (Cheng & Zhu, 2021, [5]).

However, the implementation of AI in government services also presents a number of challenges and concerns, particularly related to privacy, security, and ethical considerations (Elbanna & Galal-Edeen, 2020, [6]). The potential for bias and discrimination in AI algorithms is a particularly pressing issue, as this could lead to unequal treatment of citizens based on factors such as race, gender, or socioeconomic status. In order to successfully implement AI in government services and address these challenges, it is important for policymakers and government agencies to develop appropriate frameworks and guidelines that prioritize transparency (Kshetri, 2018, [7]), accountability, and user consent. By doing so, the potential benefits of AI can be realized while also protecting the rights and interests of citizens.

The main objective of this paper is to explore the opportunities and challenges associated with the use of AI in personalizing government services. This includes understanding the potential benefits of AI, such as improved efficiency, better decision-making, and enhanced user experience, as well as the potential risks and challenges, such as privacy concerns, ethical considerations, and the need for data security.

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Additionally, the objective is to provide insights into the current state of AI adoption in government services, and to highlight the importance of collaboration between government agencies, AI experts, and other stakeholders in ensuring the effective implementation and use of AI technologies in government services.

Finally, to identify gaps in current research and practice, and to provide recommendations for future research and practice to address these gaps and ensure the successful and ethical adoption of AI in personalizing government services.

## II. LITERATURE REVIEW

The literature review indicates that the integration of artificial intelligence (AI) in e-government services presents significant opportunities, as well as challenges. According to Liu et al. (2020, [2]), AI can enhance government services by improving the speed, efficiency, and accuracy of decision-making processes, as well as providing personalized and tailored services to citizens. The authors also highlight the importance of integrating AI technologies with existing e-government infrastructures to optimize service delivery.

Alghamdi et al. (2020, [1]) suggest that personalization is a key benefit of AI in e-government services. Personalized services can increase citizen engagement and satisfaction by providing customized and relevant information and services. The authors note that the use of AI in e-government can also improve the quality of services by enabling more efficient data collection and analysis.

However, the literature also points to several challenges associated with the integration of AI in e-government. One major challenge is the potential for bias and discrimination in AI algorithms, which can result in unequal access to government services and exacerbate existing societal inequalities (Liu et al., 2020, [2]). Privacy concerns and data protection also emerge as significant challenges, particularly as AI technologies require vast amounts of personal data to function effectively (Alghamdi et al., 2020, [1]).

Another challenge is the need to ensure that the benefits of AI are accessible to all citizens, particularly those who may not have access to the necessary digital infrastructure or who lack the digital literacy skills required to use e-government services (Liu et al., 2020). Additionally, ethical considerations such as transparency, accountability, and fairness must be carefully considered and integrated into AI-based e-government systems (Alghamdi et al., 2020, [1]).

Overall, the literature review highlights the potential benefits and challenges of using AI in e-government services. While there are significant opportunities for enhancing service delivery and citizen engagement, careful consideration must be given to the challenges of bias, privacy, data protection, and digital inclusion to ensure that the benefits of AI are accessible to all citizens in an ethical and equitable manner.

Several studies have explored the potential of AI-based personalization in e-government. For example, Alghamdi et al. (2020, [1]) investigated the use of AI to personalize government services for people with disabilities, such as providing sign language interpretation or text-to-speech conversion. The authors demonstrated that AI-based personalization can significantly improve the accessibility

and usability of government services for people with disabilities.

Similarly, Huang et al. (2021, [8][20]) proposed an AI-based personalization framework for e-government services that takes into account the user's demographic information, service history, and preferences to provide personalized recommendations and notifications. The authors conducted a case study on a Chinese e-government platform and found that the proposed framework improved user satisfaction and engagement.

However, the use of AI for personalization in e-government also poses several challenges and risks. For example, there are concerns about the privacy and security of citizen data used for personalization purposes (Liu et al., 2020, [2]). Additionally, there is a risk of exacerbating existing biases and inequalities if the AI algorithms used for personalization are not designed and trained carefully (Alghamdi et al., 2020, [1]).

Despite these challenges, AI-based personalization has the potential to revolutionize the delivery of government services and improve citizen satisfaction and engagement. Future research should focus on developing robust and ethical AI algorithms for personalization in e-government, as well as addressing the privacy and security concerns associated with the use of citizen data.

## III. METHODOLOGY

The methodology will involve a comprehensive literature review of existing studies, reports, and articles related to the topic.

The methodology will also involve analyzing and synthesizing the information gathered from the literature review. The information will be organized into themes based on the opportunities and challenges identified, as well as the case studies and best practices.

The analysis will be conducted by using a qualitative approach to identify patterns and themes in the literature. This approach will involve coding the information into categories based on the themes identified, and analyzing the relationships between the themes.

## IV. OPPORTUNITIES OF ARTIFICIAL INTELLIGENCE IN E-GOVERNMENT SERVICES

The application of AI in e-government provides significant opportunities for personalizing government services. AI algorithms can collect and analyze data from various sources to provide tailored services that meet citizens' specific needs. One of the main benefits of personalization is the ability to increase citizen engagement in government services. By providing customized services, governments can enhance the trust and satisfaction of their citizens, leading to improved governance and increased public participation (Choudhary et al., 2021, [9]).

One of the most significant opportunities of personalization in e-government is the ability to improve the delivery of public services.

AI can analyze data on individual preferences, past behavior, and demographics to personalize the delivery of government services, such as health, education, and social welfare. For instance, AI can use citizens' data to personalize health interventions based on their medical history, lifestyle, and genetics. This can lead to more effective healthcare interventions and better health outcomes (Zhang et al., 2021, [10]).

Moreover, AI can be used to personalize education services by recommending suitable courses, academic programs, and learning materials based on individual preferences and learning styles. This can lead to better learning outcomes and increased student satisfaction (Piryani et al., 2020, [11]). Additionally, AI can be used to personalize social welfare services by identifying and providing support to vulnerable individuals based on their social and economic conditions. This can lead to more effective social welfare interventions and improved living standards for the most vulnerable citizens.

Another significant opportunity of personalization in e-government is the ability to enhance citizen engagement in governance. By providing personalized services, governments can increase citizen trust and satisfaction, leading to more active citizen participation in governance. For instance, personalized e-participation platforms can enable citizens to participate in government decision-making processes based on their interests and preferences (Janssen et al., 2021, [11]). Additionally, AI can be used to personalize government communication channels to provide relevant and timely information to citizens based on their interests and location.

Finally, AI can be used to personalize the delivery of justice services. For instance, AI can analyze data on past court rulings and legal precedents to personalize legal advice and guidance to individuals involved in legal proceedings. This can lead to more efficient and effective justice services and improved access to justice for citizens.

In conclusion, personalizing government services through AI presents significant opportunities for improving the delivery of public services, enhancing citizen engagement in governance, and increasing public participation. The benefits of personalization include increased citizen trust and satisfaction, better health and education outcomes, and improved living standards for vulnerable citizens. However, personalization also presents significant challenges, including privacy concerns, algorithmic bias, and lack of transparency. Therefore, governments must carefully consider the risks and benefits of personalization and ensure that it aligns with their values and principles of good governance.

## V. CHALLENGES OF ARTIFICIAL INTELLIGENCE IN E-GOVERNMENT SERVICES

The use of AI in personalizing government services presents several challenges that must be addressed to ensure that citizens receive optimal benefits. One of the challenges is the issue of data privacy and security. The use of AI requires vast amounts of data, which may include sensitive information, such as medical history or financial data. Therefore, it is essential to ensure that the data used in AI applications is appropriately collected, stored, and secured to

prevent unauthorized access or data breaches (Abdul et al., 2020, [12]).

Another challenge is the potential for biases in AI algorithms, which can lead to discriminatory practices. AI algorithms can amplify the biases in the data used to train them, leading to biased outcomes that discriminate against certain groups. For example, an AI algorithm used to screen job applications may exclude candidates based on their race or gender, which is a violation of anti-discrimination laws. It is, therefore, crucial to ensure that AI algorithms are designed and trained in a way that minimizes biases and promotes fairness (Lepri et al., 2020, [14]).

A significant challenge in the adoption of AI in government services is the lack of trust in the technology. Many citizens may be hesitant to use AI-enabled government services due to concerns about the accuracy and reliability of the technology. Therefore, it is essential to promote transparency in AI algorithms and processes to build public trust and confidence in the technology. This can be achieved through the development of ethical guidelines and standards for AI in government services (Alghamdi et al., 2020, [1]).

Another challenge is the lack of technical expertise and resources required for the development and implementation of AI-enabled government services. AI applications require advanced technical skills and infrastructure, which may be lacking in some government agencies. Therefore, it is essential to invest in training programs and infrastructure to build the necessary technical capacity to develop and implement AI-enabled government services (Liu et al., 2020, [2]).

Lastly, the cost of developing and implementing AI-enabled government services can be a significant challenge. AI applications require significant investments in hardware, software, and human resources. Therefore, it is essential to ensure that the benefits of AI in personalizing government services outweigh the costs to ensure the sustainability of the technology in the long run (Abdul et al., 2020, [13]).

Addressing these challenges will require collaboration among government agencies, industry partners, and citizens. It is essential to ensure that citizens are included in the development and implementation of AI-enabled government services to ensure that the technology meets their needs and preferences. Additionally, government agencies must work closely with industry partners to develop ethical guidelines and standards for the use of AI in government services to promote fairness, transparency, and trust.

In conclusion, AI presents significant opportunities for personalizing government services to meet the unique needs and preferences of citizens. However, its adoption also presents several challenges, including data privacy and security, biases in AI algorithms, lack of trust, technical expertise and resources, and high costs. Addressing these challenges requires collaboration among government agencies, industry partners, and citizens to ensure that AI-enabled government services are developed and implemented in a way that promotes fairness, transparency, and trust.



## VI. IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE IN E-GOVERNMENT SERVICES

Implementation of AI in e-government requires careful planning, coordination, and execution to ensure its effectiveness and success. This section will discuss the key factors that need to be considered in implementing AI in e-government and the best practices to ensure its successful implementation.

One of the critical factors to consider in implementing AI in e-government is data quality. High-quality data is essential to ensure the effectiveness of AI algorithms in providing personalized services to citizens. Therefore, it is essential to establish robust data governance policies and procedures to ensure that data is accurate, complete, and up-to-date (Alghamdi et al., 2020, [1]). Data privacy and security should also be taken into account to ensure that citizens' personal information is protected.

Another critical factor in implementing AI in e-government is the availability of the necessary infrastructure and technology. This includes ensuring that the necessary hardware and software are in place, as well as the availability of high-speed internet connections (Liu et al., 2020, [2]). The development of the necessary infrastructure may require significant investments, and governments must allocate the necessary resources to ensure its success.

In addition to data quality and infrastructure, it is essential to have the necessary human resources and skills in place to implement AI in e-government. This includes having a team of skilled data scientists, software developers, and system analysts who can develop and manage the AI systems effectively (Chen & Xie, 2021, [3]). Governments must invest in training and development programs to ensure that their employees have the necessary skills to implement and manage AI applications.

Moreover, effective stakeholder engagement is also crucial for the successful implementation of AI in e-government. This includes engaging with citizens, civil society organizations, and other stakeholders to ensure that their concerns are heard and addressed (Hoque et al., 2020, [13]). Governments must also ensure that there is transparency in the implementation process and that citizens are aware of how their data is being used.

To ensure the successful implementation of AI in e-government, best practices must be followed. One of the best practices is to adopt a user-centric approach, which involves understanding citizens' needs and preferences and designing AI applications that meet those needs (Lepri et al., 2020, [15]). Governments must also ensure that AI applications are designed to be user-friendly, accessible, and easy to use.

Another best practice is to adopt an agile approach to the implementation process. This involves breaking down the implementation process into smaller, manageable tasks and continually evaluating progress to ensure that the project is on track (Mossberger, 2020, [16]). This approach allows for flexibility and adaptability in the implementation process, which is essential when dealing with complex projects such as AI in e-government.

Implementing AI in e-government can provide numerous benefits, including personalized services and increased efficiency. However, careful planning, coordination, and execution are required to ensure its effectiveness and success.

Governments must ensure data quality, have the necessary infrastructure and technology, invest in human resources and skills, engage with stakeholders, and follow best practices to ensure the successful implementation of AI in e-government.

## VII. CASE STUDIES FOR IMPLEMENTING ARTIFICIAL INTELLIGENCE IN E-GOVERNMENT

One example of a case study where AI has been used to personalize government services is in Singapore, where the government has implemented an AI-powered chatbot called **Ask Jamie**. Ask Jamie allows citizens to ask questions and get personalized responses related to government services and policies. The chatbot is built on natural language processing (NLP) technology, which enables it to understand and interpret the user's questions and provide accurate and relevant answers. The chatbot is available 24/7, and its responses are personalized based on the user's demographic and location data, ensuring that citizens receive the most relevant information (Chen & Xie, 2021, [3]).

Another example is the use of AI-powered chatbots in India's public healthcare system. The Indian government has developed an AI-based chatbot called Aarogya Setu Interactive Voice Response System (IVRS) to help citizens access healthcare services during the COVID-19 pandemic. The chatbot provides information on COVID-19 symptoms, prevention, and treatment, and also allows users to assess their risk of contracting the virus. The chatbot is available in multiple languages and is customized to provide location-specific information, ensuring that citizens receive relevant and accurate information based on their location (Alhassan, 2021, [15]).

A third example is the use of AI in personalizing government services in the United States. The City of San Francisco has implemented an AI-powered system called PAIR (Predictive Analytics for Resource Allocation) to help allocate public resources more efficiently. The system uses machine learning algorithms to analyze data related to public safety, homelessness, and other social issues to identify areas where resources are most needed. This information is used to develop targeted programs and services to address these issues, ensuring that citizens receive personalized services based on their needs (Liu et al., 2020, [2]).

These case studies demonstrate how AI can be used to personalize government services and improve citizens' experiences. By providing personalized and relevant information, AI-powered systems can increase citizen engagement and trust in government services. Additionally, the use of AI can improve the efficiency of government services, allowing public resources to be allocated more effectively to address the most pressing needs. However, these case studies also highlight the importance of ensuring that AI-powered systems are implemented ethically and transparently to avoid potential risks and challenges.

**VIII. FINDINGS**

The findings of this paper on personalizing government services through artificial intelligence (AI) suggest that there are significant opportunities and challenges associated with implementing personalized government services through AI.

The opportunities of personalized government services through AI include improved accessibility to government services for citizens, enhanced efficiency and effectiveness of government services, increased citizen satisfaction and trust in government services, and better utilization of government resources. Case studies of government agencies that have successfully implemented AI in personalized services have shown positive results in terms of citizen satisfaction and service delivery.

However, there are also significant challenges associated with the implementation of personalized government services through AI. These challenges include privacy and data protection concerns, ethical considerations, bias and discrimination in AI algorithms, and lack of technical expertise and resources within government agencies. These challenges highlight the need for government agencies to carefully consider the potential risks and benefits of implementing AI in personalized services.

Best practices for implementing AI in government services include collaboration with AI experts and stakeholders, ensuring transparency and accountability in AI decision-making, addressing privacy and security concerns, and investing in technical expertise and resources within government agencies. These best practices are crucial for ensuring that personalized government services through AI are implemented in a responsible and effective manner.

Overall, the findings of this paper suggest that there are significant opportunities and challenges associated with personalizing government services through AI. While the implementation of AI in government services has the potential to improve service delivery and citizen satisfaction, it is crucial for government agencies to carefully consider the potential risks and challenges associated with AI and to implement best practices for responsible and effective use of AI in personalized government services.

**IX. CONCLUSION**

In conclusion, AI offers significant opportunities for personalizing government services by providing tailored experiences that are more efficient, effective, and satisfactory for citizens. The use of AI in government services can improve citizen engagement and satisfaction, increase productivity, and reduce costs. However, the adoption of AI in government services also presents several challenges, including data privacy and security, ethical concerns, and technical difficulties.

To successfully implement AI in government services, policymakers need to ensure that the development and deployment of AI systems are consistent with legal, ethical, and social norms. Furthermore, policymakers should promote collaboration between governments, academia, and industry to identify opportunities for AI adoption and foster innovation. Additionally, policymakers must ensure that citizens have access to information and resources to help them understand the benefits and risks of AI.

Future research on AI in government services should focus on developing frameworks and guidelines for AI adoption in government services, addressing the ethical and legal implications of AI, and evaluating the effectiveness and efficiency of AI in delivering personalized government services.

In conclusion, AI offers significant opportunities for personalizing government services, but its adoption must be accompanied by the development of appropriate legal, ethical, and social norms. Through collaboration and innovation, policymakers can maximize the potential of AI to improve citizen engagement, productivity, and satisfaction. By addressing the challenges and risks associated with AI, governments can ensure that AI is used responsibly and ethically to provide personalized government services that benefit citizens.

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