RESEARCH ON ARTIFICIAL INTELLIGENCE FOR CITIZEN SERVICES AND GOVERNMENT

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Abstract— *The main aim of this paper was to review how artificial intelligence works in improving Citizen Services and Government. Several government agencies throughout the world are experimenting with artificial intelligence applications (AI). The most common use cases for citizen services are inquiries and information [1]. This article examined the many forms of artificial intelligence applications, as well as the existing and prospective software solutions of AI in the delivery of citizen services by the government, with a particular emphasis on citizen queries and information. It also provides solutions for governments considering the use of artificial intelligence. Most artificial intelligence (AI) published studies in citizen services now fall into the following categories: responding to inquiries, filling out and finding papers, routing requests, translating documents, and generating paperwork, among others [1]. These technologies have the potential to increase the efficiency of government operations while also providing personnel with more time to create stronger ties with residents. Artificial intelligence (AI) may be one solution to bridge the gap between the dissatisfaction of citizens with digital government products and enhancing citizen participation and service delivery [2].*

Keywords: *artificial intelligence, automation, citizen services, government services, AI systems*

I. INTRODUCTION

Education and healthcare institutions, as well as government agencies, are increasingly realizing that to satisfy the demands of their constituents, they must abandon outdated technology and instead invest in cutting-edge alternatives powered by AI [2]. The use of artificial intelligence (AI) is becoming increasingly commonplace, whether it's through internet services like Netflix and Facebook or chatbots like Siri and Alexa. Putting a computer through artificial intelligence (AI) training allows it to accomplish tasks that were previously handled by human cognition, such as recommending which movies to watch next or solving complicated technical questions. Artificial intelligence will soon permeate all aspects of our interactions with our government as well. Artificial intelligence is being used by government entities all around the globe, from small towns in the United States to whole countries like Japan, to improve the quality of citizen services. As a result, although future uses of artificial intelligence in governance are constrained by a number of factors, including government resources and the inventiveness and trust of individuals in their governments, the most obvious and directly favorable possibilities are those where AI can reduce administrative burdens, assist with allocation of resources challenges, and perform

extremely difficult tasks [2]. Most artificial intelligence (AI) research studies in citizen services now fall into the following categories: responding to inquiries, filling out and finding papers, routing requests, translating documents, and writing documents, among others. These apps have the potential to increase the efficiency of government operations while also providing personnel with more time to create stronger ties with residents. As people become dissatisfied with digital government products, artificial intelligence (AI) might help close the interaction and service delivery gap while also enhancing public participation. Notwithstanding the advantages, artificial intelligence (AI) will not be able to resolve fundamental challenges in governance and, if not used thoughtfully and purposefully, may exacerbate issues such as customer satisfaction, privacy, and ethical concerns[3]. Aspects of government transformation attempts in the past, as well as private-sector AI deployment, might be learned by agencies interested in applying artificial intelligence. Six ways for bringing artificial intelligence to government work should be considered: include AI into a goals-based, citizen-centric program; seek public input; build on current resources, be data-ready and sensitive to privacy concerns; limit ethical hazards and prevent AI decision making; complement personnel rather than replace them. Artificial intelligence applications in government service delivery are examined in this paper, with a focus on public inquiries and information, as well as current and future uses of artificial intelligence. These solutions may be used by countries who are contemplating the use of AI [3].

As they go about their daily lives, residents use 20th-century systems to communicate with their government while also benefiting from 21st-century systems, such as renewing their driver's license or obtaining health and human services assistance [4]. When it comes to federal, state, or local government providing welfare payments to citizens and encouraging public participation in democracy, it is typical for individuals to feel disappointed and dissatisfied. This lack of modernism, along with larger patterns of political skepticism and indifference, may result in low levels of citizen happiness in a given country or community. The public is less satisfied with public services than with private firms, even the often-maligned cable tv customer experience. Nevertheless, public confidence in representative governance is at an all-time low, and with only 7% of people trusting the Senate "a great deal" in 2016[5].

II. PROBLEM STATEMENT

The main problem that this paper will address is to review artificial intelligence in improving citizen and government services. Owing to a shortage of intelligence and premature most government and citizen services,

current technologies must cope with slow government operations. Some government organizations are resorting to service automation to relieve strain and improve the public experience as citizen participation becomes increasingly complex. As a cost-effective and efficient feature of service automation, artificial intelligence adoption is gaining traction — but it has also sparked concern in certain government sectors. Agencies are seeking for innovative approaches to promote public participation and satisfaction in light of today's fast pace of technology innovation and growing citizen expectations. Keeping up with the rapid expansion of channels and exchanges has become even more difficult. Incorporating chatbots and artificial intelligence (AI) into government interactions with people might be a game-changer.

III. LITERATURE REVIEW

A. Today's artificial intelligence

For decades, AI has existed in specialized experiments and applications, but lately, it has been more ingrained in our physical and virtual worlds. In the age of big data, recent breakthroughs in artificial intelligence have placed the technology on a trajectory to become the engine that propels our economy into the future. Accenture forecasts that AI can quadruple economic growth rates by 2035. AI refers to the development of computer programs that can do activities traditionally performed by humans but without the need for human intellect [7]. Understanding and monitoring visual/spatial and aural information involve the capacity to reason and forecast, to communicate with people and technology, and to constantly develop. There are jobs that big data and analytics can do that artificial intelligence cannot, including automation. Combining AI with machine learning makes it considerably more powerful. Machine learning can translate text, recognize faces, and target online ads. Automation in government may be especially useful when there is a surplus of data but not enough employees or skills to manage it [7]. Another example is routine operations that a machine may automate and enhance over time. These programs may help reduce administrative costs, help resolve resource allocation issues, and take on tasks that are more complex.

B. Case examples on Artificial Intelligence for Citizen Services

Government departments all across the world are experimenting with artificial intelligence applications. The most often seen citizen services use cases are those involving citizen inquiries and information. Whenever a citizen phones with a concern, they are often subjected to long wait periods, in-person visits, or the time-consuming task of searching through websites and third-party sources for answers. Because of AI's ability to expand citizen access to real-time replies, it may even be utilized in ordinary occupations to create and fill out paperwork [7]. For the most part, artificial intelligence (AI) published studies in services to the citizens fall into five broad categories: answering queries, filing out and locating paperwork, processing queries, interpreting paper work, and composing paperwork. In contrast to the commercial sector's rapid development, government AI applications have lagged behind. However, the public sector's potential use cases mirror the usual private sector uses. Artificial intelligence (AI) can only do its job successfully if it is constantly learning new things [7,8,9]. When it comes to customer service challenges, replacing augmentative communication systems with AI or automating fundamental computer procedures may not be as game-changing as AI systems which grow and continue to get better. If artificial intelligence is used to reduce

administrative hassles and enhance the human experience, rather than to replace employees, it will have a more positive influence. These artificial intelligence technologies, if carefully implemented, have the potential to improve the efficiency with which citizens get services while also possibly lowering costs and enhancing citizen happiness and involvement. Because of these machine learning algorithms, as per Hollie Russon Gilman, a professor at Columbia SIPA and fellow at New America, "the prospect will see more direct two-way communication between citizens and the government."[9].

New York Municipal intends to collaborate with IBM's artificial intelligence platform, Watson, to develop a new customer-management system that will reduce the time and effort required to respond to queries and complaints about city services sent via the city's 311 portal. This is comparable to the work done in Surrey, British Columbia, where IBM Watson was used to power the MySurry app, which allowed citizens to get answers to their inquiries promptly. Approximately 65 percent of queries are answered on municipal websites, and the app is utilized to handle those issues [9]. Watson, which learns as it goes along, has reviewed over 3,000 papers about 16 municipal services and is capable of answering 10,000 queries. Conversational agents (chatbots) free up the support center operators' phone lines, where around 90 percent of calls are for easy password assistance. This allows operators to address more challenging and time-sensitive issues [10].

It's possible that using AI to allow government personnel to spend more time on citizen needs can help humanize them and improve interactions between government officials and residents, even if they are virtual, according to Ben Hecht, CEO of Living Cities in New York. In certain circumstances, artificial intelligence (AI) might also be used to assist with in-person public interaction and service delivery. The Colorado Department of Human Services reported in 2014 that staff devoted 37.5 percent of the organizations on paperwork and administrative tasks, while just 9 percent of their time was spent interacting with children and families [10]. Automating some of their administrative tasks using artificial intelligence (AI) would allow them to spend more time building relationships with the community and dealing with problems in person.

By learning what individuals' value in their encounters with government, artificial intelligence may be able to match residents' levels of participation with those of their neighbors. As an example, if a constituent contacts their legislator about a bill, a bot may follow up with that constituent to let her know how many other constituents have done the same, while respecting the privacy of all citizen data. It may even follow up if there are any fresh developments or updates on the law or future involvement opportunities. Because so many individuals have previously taken action to improve their communities, there is something unique about enhancing one's participation. At Synthesis Corporation, Ari Wallach is looking beyond the immediate future to discover what more is possible in the industry [10]. The initial wave of artificial intelligence (AI) — which we are presently seeing — is based on tactical customer service use cases that are intended for interpreting and reacting to inquiries as well as fixing fundamental issues. In many aspects, Wallach predicts, the next generation of AI in citizen services will be more predictive. Using artificial intelligence (AI), the platform will be able to tell what the city is doing or asking, and push them to take action on certain concerns. It will take 10–15 years before AI for citizen services becomes significant predictors characterized by non, tasks, and other

sets of data (i.e., an innovative driver's license arrives at the attempt to show without the community member ever having to do anything). Wallach believes this will happen in the next 10–15 years but believes it will happen sooner rather than later. For Wallach, the future consists of a "direct and continual connection to a top government concierge who is always learning and developing while caring for 300 million people [11]. It is expected that these waves will reflect the growth of our interactions with artificial intelligence, such as the continued trend of user interfaces shifting away from keyboards in favor of voice and audiovisual inputs. Aside from responding to citizen inquiries and delivering information, AI offers many other possible prospects for service delivery, like emergency response, personalized and low-cost education, corruption and fraud detection, improved criminal monitoring, and the use of predictions to target and anticipate social intervention strategies [12].

C. Navigating artificial intelligence in government

For a variety of structural reasons, the government has a lot of space to grow when it comes to technical innovation, and artificial intelligence will not fix any of those concerns. Additionally, many current tools are surrounded by a great deal of publicity, whereas the vast majority of government offices are still striving to attain more basic modern technical specifications in their daily operations. However, preparing for the inescapable future and making technological investments to remain on top of changes in how citizens like to connect with service providers are also excellent strategies to employ. Governments may begin to consider integrating artificial intelligence by taking lessons from prior government transformation projects as well as AI deployments in the business sector. Six techniques might assist governments in getting off to a good start with AI: include AI into a goals-based, public program; solicit public input; use existing resources; prepare data and exercise caution with privacy; reduce ethical concerns and prevent AI decision making; and complement, not replace, employees [12].
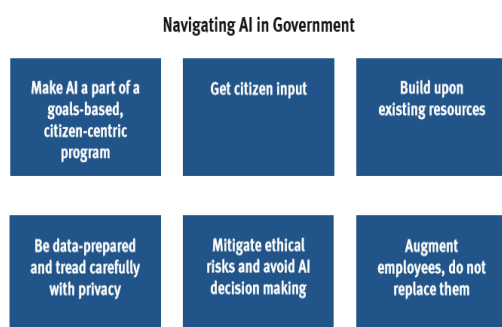
Navigating AI in Government

Fig i: A navigation of government through AI
Artificial intelligence (AI) should not be employed in governance just because it is a fresh and exciting technological advancement. To be effective in their jobs, government officials need to be prepared to deal with challenges that arise. Artificial intelligence (AI) should be one tool in a toolbox that may be used to deal with a particular situation. When it comes to attaining that goal, mandating artificial intelligence should only be done if it's the most effective method. It is not possible to deploy artificial intelligence as a single point of contact with humans, even if it is the appropriate tool. Companies should consider the end-to-end experience of a citizen via the use of a process [13], as per McKinsey & Company. Their "Putting Citizens First" study discovered that companies that manage the whole user experience from

start to end gain a higher level of customer satisfaction and are more effective at providing services to their customers. As part of the citizen's journey, government offices might assess where and when artificial intelligence (AI) can be a touchpoint, as well as what additional technology or human engagement touchpoints may be necessary. In line with customer centricity, technology must also be inclusive, taking into consideration disparities in generational, educational, socioeconomic, and linguistic backgrounds [13].

Obtain feedback from the general public. Citizen involvement and support will be critical for the successful application of artificial intelligence. In the words of Russon Gilman, "Governments should allow a truly participatory, grassroots approach to both demystify AI and give opportunities for individuals to define an agenda for AI while also addressing any possible concerns. Similarly, Wallach thinks that society should engage in a "conversation about artificial intelligence" in order "to enlighten everyone from people to legislators so that they understand how things work and the compromises it entails." [14] When humans have a sufficient level of understanding, they may offer alternative means of interacting with ai technologies, and they can even engage in the co-creation of confidentiality and environmental rules for the use of their personal data. Users' input, including that of both people and government personnel, is crucial when it comes to the development and implementation of artificial intelligence systems. AI systems should be built "to convey the right quantity of information to each individual user in accordance with their preferences [14].

Make use of the resources that are already available. Adding the advantages of artificial intelligence to government entities should not necessitate the creation of new systems. Although most of the advancement in artificial intelligence has come from early government-funded research, governments may also benefit from the gains being made by corporations and entrepreneurs in the field. According to the IT research company IDC, by 2018, artificial intelligence (AI) will be integrated into 75 percent of new corporate software [15]. Nonprofits and academic institutes provide the public with access to world-class research, and recent releases of open-source machine intelligence applications enable users to expand their usage of artificial intelligence on a budget by using open-source software. Implementations do not have to begin with whole new programs or datasets to be successful. To begin, consider incorporating artificial intelligence into current systems like 311 and SeeClickFix, which already have extensive data and user interaction.

Prepare your data ahead of time, and use caution when it comes to privacy. Data management is critical for AI applications, and many organizations may be missing in this area. This data deficiency might make it difficult to train and begin deploying AI systems. Government offices are improving their data collection and administration, but best practices for the types of data that will be utilized and gathered will become more important for future usage with artificial intelligence (AI). To be successful, Onda believes that "collecting and pooling the appropriate type of data" is essential. When it comes to data, administrations should consider the sort of data they want, how long the data will be retained (it has a shelf life), as well as how the data will be consolidated to offer context for a particular person." [15] Citizens must have confidence in the systems with which they engage and have visibility into the use of their data." Governments should be completely honest about the data they gather which should provide individuals with the

option to opt-in when their data is utilized. The usage of just data that has previously been supplied to the government by individuals may result in fewer privacy issues (such as IRS data) [15]. According to Eaves, privacy problems become significant when individuals have not supplied permission or when external datasets are combined with government sources, among other things. When data is erroneous, the utilization of such data becomes a source of worry. As the data flows across the network, this might have a cascade impact [15,16]. As a result, the consequences for representative government and guaranteeing fairness in the government service are very high.

D. Ethical concerns

Ethical concerns AI is prone to bias as a result of how it is developed and/or taught, as well as if the data inputs are distorted at the time of training. Best practices for reducing prejudice include using interdisciplinary and diverse teams in all AI activities, as well as including ethicists in the process. A new public policy profession specializing in artificial intelligence and data science ethics has also been suggested by US Department of State AI expert Matt Chessen [16]. The Asilomar AI Guidelines and the Partnership on AI are instances of shared code of integrity for artificial intelligence produced by engineers working collaboratively. Given the ethical considerations regarding AI and the increasing developments in machine learning approaches, AI should not be tasked with making important government decisions impacting humans. A risk-scoring algorithm in criminal sentencing and related artificial intelligence applications in the criminal justice system are examples of blatantly biased practices with significant implications for those penalized. It is important to prevent such occurrences. Google and Microsoft are heavily investing in machine learning.

IV.   FUTURE IN THE U.S

AI is increasingly being applied to citizen inquiries and information initiatives, represented in select use cases. They may not fully use AI and machine learning's powers, but these use examples show how AI is transforming this sort of employment for the future. To better comprehend citizen feedback and queries, AI may be employed in the future for sentiment analysis of demands and conversations. Government digital transformation is a current focus of Intel research. For instance, federated learning enabled by Intel® Software Guard Extensions (Intel® SGX) enables collaboration across many universities on projects without disclosing sensitive data. In the end, artificial intelligence is a journey for every company. However, AI provides several advantages for governments and the public sector, allowing them to do more, please workers and people, and make incredible achievements [18]. With the support of technology and deployment professionals, organizations can plan each step meticulously and ensure success. In the public sector, AI is still in its infancy, so now is the time to start laying the groundwork. The time has come for the future to arrive.

V.   ECONOMIC BENEFITS

There are many various economic benefits of this research to the U.S government. The federal governments must closely monitor the numerous issues posed by AI as it is used by the government and the business. The workplace, housing, healthcare, and financial sectors will all benefit from AI applications in the future. More than seventy-five percent of the federal government's $90 billion annual technology budget goes toward repairing aging infrastructure. Administrations throughout the country

have outdated systems and administrative overhead. According to Governing magazine, 53% of state and local officials questioned reported being overburdened by paperwork, impeding their capacity to complete tasks. It's predicted that by 2022, around a third of the Social Security Administration's entire staff of about 22,000 people would retire, putting even more pressure on government services. Artificial intelligence (AI) will only benefit society as a whole if federal action and investment are made [18]. For the most part, artificial intelligence (AI) is poised to make government-funded and delivered services more widely accessible. An estimated $3,3 billion to $41.1 billion may be saved annually by automating ordinary federal government jobs. These releases both resources and personnel time to focus on more important duties. An increase in funding is required for all of the following: research and development, digital infrastructure, education and training, and economic and social assistance programs. As economies migrate to digital industries and more automation, tax revenues will fall. This is because the United States' tax code taxes capital far less than labor [18,19].

VI.   CONCLUSION

The focus of this research was to discover how artificial intelligence (AI) can improve citizen services and government operations. According to the study's findings, artificial intelligence has the potential to have a significant influence on people's perceptions of and interactions with the government. While artificial intelligence isn't a panacea for all of the government's ills, it may be a useful tool for making the government-run more smoothly. Using AI in citizen services might be a sign of how the public sector can employ other new digital technologies in the future. Artificial intelligence (AI) poses issues such as privacy, the rapid adoption of digital technologies, and whether humans will be able to keep up with automation throughout time. Early use of artificial intelligence (AI) — beginning with low-risk applications in service delivery — might pave the way for public input and involvement on these and other problems about new digital capabilities. As individuals get more comfortable interacting with AI and modernization initiatives, government service delivery may begin to resemble how people use technology in their personal life in the future.

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