

Artificial Intelligence for Citizen Services and Government

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INTRODUCTION

From online services like Netflix and Facebook, to chatbots on our phones and in our homes like Siri and Alexa, we are beginning to interact with artificial intelligence (AI) on a near daily basis. AI is the programming or training of a computer to do tasks typically reserved for human intelligence, whether it is recommending which movie to watch next or answering technical questions. Soon, AI will permeate the ways we interact with our government, too. From small cities in the US to countries like Japan, government agencies are looking to AI to improve citizen services.

While the potential future use cases of AI in government remain bounded by government resources and the limits of both human creativity and trust in government, the most obvious and immediately beneficial opportunities are those where AI can reduce administrative burdens, help resolve resource allocation problems, and take on significantly complex tasks. Many AI case studies in citizen services today fall into five categories: answering questions, filling out and searching documents, routing requests, translation, and drafting documents. These applications could make government work more efficient while freeing up time for employees to build better relationships with citizens. With citizen satisfaction with digital government offerings leaving much to be desired, AI may be one way to bridge the gap while improving citizen engagement and service delivery.

Despite the clear opportunities, AI will not solve systemic problems in government, and could potentially exacerbate issues around service delivery, privacy, and ethics if not implemented thoughtfully and strategically. Agencies interested in implementing AI can learn from previous government transformation efforts, as well as private-sector implementation of AI. Government offices should consider these six strategies for applying AI to their work: make AI a part of a goals-based, citizen-centric program; get citizen input; build upon existing resources; be data-prepared and tread carefully with privacy; mitigate ethical risks and avoid AI decision making; and, augment employees, do not replace them.

This paper explores the various types of AI applications, and current and future uses of AI in government delivery of citizen services, with a focus on citizen inquiries and information. It also offers strategies for governments as they consider implementing AI.

CITIZEN SERVICES IN THE MODERN ERA

Whether renewing a driver’s license, receiving health and human services support, or engaging with elected representatives, citizens routinely interact with 20th-century systems with their government while benefitting from 21st-century systems in their everyday lives. When it comes to federal, state, or local government providing benefits and services to citizens, and enabling citizen participation in democracy, the citizen experience can often be underwhelming and frustrating.

This lack of modernity, coupled with broader trends of political distrust and apathy, can translate into low citizen satisfaction. Citizens are less satisfied with state services than with private-sector services, ranking government services below the much-maligned cable TV customer services.¹ Meanwhile, citizen confidence in democratic representation is at an all-time low, with only 7 percent of citizens in a 2016 survey having “a great deal” of confidence in Congress.²

Artificial intelligence is an area of opportunity that government agencies can actively anticipate and plan for when upgrading their legacy systems.

While many systemic factors lead to both low citizen satisfaction and government’s 20th-century infrastructure, it is no surprise that the mechanisms to deliver and receive citizen services are antiquated. Of the \$90 billion the federal government spends on technology, 75 percent is spent on maintaining legacy systems.³ Outdated systems are matched with administrative burdens and backlogs across government. *Governing* magazine found that 53 percent of state and local officials surveyed had excessive paperwork burdens that impacted their ability to get work done.⁴ An aging population further burdens both the need for government services and the government

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1 “How US state governments can improve customer service,” McKinsey Center for Government, December 2014, <http://www.mckinsey.com/industries/public-sector/our-insights/how-us-state-governments-can-improve-customer-service>.

2 Confidence in Institutions, Gallup, June 1–5, 2016, <http://www.gallup.com/poll/1597/confidence-institutions.aspx>.

3 “Opening government’s digital playbook,” Danny Buerkli, Centre for Public Impact, July 22, 2016, <https://www.centreforpublicimpact.org/opening-digital-playbook/>.

4 “Is a 40-hour workweek enough in government?” Katherine Barrett and Richard Greene, *Governing*, July 21, 2016, www.governing.com/columns/smart-mgmt/gov-time-usage-survey-government.html.

workforce — fully one-third of the Social Security Administration total workforce of nearly 22,000 employees is expected to retire by 2022.⁵

Meanwhile, citizens want a more digital government. According to a survey by Accenture, only 27 percent of US citizens reported satisfaction with the current level of government digital offerings, and 92 percent said that “improved digital services would positively impact their view of government.”⁶ While there has been a rise in civic technology companies and squads working to fill the gaps, government agencies are typically playing catch-up to enter the current era instead of anticipating the next one. Artificial intelligence is an area of opportunity that government agencies can actively anticipate and plan for when upgrading their legacy systems.

AI TODAY

While AI has been around in various forms in niche pilots and applications for decades, it is only recently that it has been increasingly embedded throughout our physical and virtual environments. Recent advancements in AI have put it on a path to drive the future of our economy in an era of big data — Accenture estimates that AI has the potential to double economic growth rates by 2035.⁷

Artificial intelligence is the programming of computers to do tasks that would normally require human intelligence. This includes the ability to understand and monitor visual/spatial and auditory information, reason and make predictions, interact with humans and machines, and continuously learn and improve.

While big data and analytics can be used to complete some of the same tasks as AI, including automation, AI is not synonymous with these terms. AI becomes powerful with machine learning, where the computer learns from supervised training and

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5 Agency: Social Security Administration, Performance.gov, <https://www.performance.gov/content/cases-pending>.

6 “Accenture survey shows US citizens want more digital services from their government,” Accenture, December 8, 2015, <https://newsroom.accenture.com/news/accenture-survey-shows-us-citizens-want-more-digital-services-from-their-government.htm>.

7 “Artificial intelligence is the future of growth,” Accenture, September 28, 2016, <https://www.accenture.com/us-en/insight-artificial-intelligence-future-growth>.

inputs over time to improve responses. For example, translations, facial recognition, and targeted online ads could all be applications of machine learning. One scenario in which machine learning could become valuable in a government context is when there is a mass of data but not enough people to manage it or experts to analyze it. Another scenario would be routine processes that a machine can automate while improving over time. Through these applications, AI can reduce administrative burdens, help resolve resource allocation problems, and take on significantly complex tasks.

AI can . . .

- **Understand**
- **Monitor**
- **Reason**
- **Predict**
- **Interact**
- **Learn**
- **Improve**

Types of Government Problems Appropriate for AI Applications

| | |
|-----------------------------|--|
| Resource Allocation | <ul style="list-style-type: none"> • Administrative support is needed to speed up task completion • Inquiry response times are long due to insufficient support |
| Large Datasets | <ul style="list-style-type: none"> • Dataset is too large for employees to work with efficiently • Internal and external datasets can be combined to enhance outputs and insights • Data is highly structured with years of history |
| Experts Shortage | <ul style="list-style-type: none"> • Basic questions can be answered, freeing up time for experts • Niche issues can be learned to support experts in research |
| Predictable Scenario | <ul style="list-style-type: none"> • Situation is predictable based on historical data • Prediction will help with time-sensitive responses |
| Procedural | <ul style="list-style-type: none"> • Task is repetitive in nature • Inputs/outputs have binary answer |
| Diverse Data | <ul style="list-style-type: none"> • Data includes visual/spatial and auditory/linguistic information • Qualitative and quantitative data needs to be summarized regularly |

“AI certainly has a role to play in service delivery and helping people triage work,” says David Eaves, a lecturer in public policy and program manager of Digital@HKS at Harvard Kennedy School. AI applications for citizen services could also reduce costs. Deloitte estimates that automation of federal government employee tasks could save

between 96.7 million and 1.2 billion hours annually, with potential savings between \$3.3 billion and \$41.1 billion, respectively.⁸

AI is not new to government. While its application has been most prevalent in defense and intelligence, it has also been used to reduce burdensome tasks. In the late 1990s, machine vision methods were used to recognize handwriting on envelopes to automatically route letters. Variations of this once cutting-edge method now sort more than 25 billion letters a year, estimated to save hundreds of millions of dollars for the US Postal Service.⁹ More recently, AI was the subject of two in-depth reports published under President Barack Obama and of a US Senate hearing on potential applications of AI, its impact on the economy, and competitiveness. “AI will be used to solve the world’s most pressing challenges,” explains Andrew Onda, a former manager in Market Development & Insights at IBM. These challenges range from “remotely managing chronic diseases, reducing pandemics, and improving food security and sustainable agriculture, to increasing public safety through monitoring infrastructure and providing services to take care of elderly populations.”

While more research needs to be done to improve the capabilities of AI and explore its role in citizen services, there are areas where AI could be immediately beneficial.

AI FOR CITIZEN SERVICES USE CASES

Across the globe, government offices are testing applications of AI. The prevailing citizen services use cases relate to citizen inquiries and information. For example, when a citizen has a question, they are usually relegated to long hold times on calls, in-person visits, or scouring websites and third parties for answers. AI can drastically improve citizen access to real-time answers, and could even be used to formulate and fill out

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8 “AI-augmented government: Using cognitive technologies to redesign public sector work,” William D. Eggers, David Schatsky, Dr. Peter Viechnicki, Deloitte University Press, <https://dupress.deloitte.com/dup-us-en/focus/cognitive-technologies/artificial-intelligence-government.html>.

9 “Reflections on the status and future of artificial intelligence,” Eric Horvitz, Hearing before the Committee on Commerce Subcommittee on Space, Science, and Competitiveness, United States Senate, November 30, 2016, http://erichorvitz.com/Senate_Testimony_Eric_Horvitz.pdf.

documents, especially for routine tasks. Many AI case studies in citizen services fall into five categories: answering questions, filling out and searching documents, routing requests, translation, and drafting documents.

While applications of AI in government work has not kept pace with the rapid expansion of AI in the private sector, the potential use cases in the public sector mirror common applications in the private sector. AI only works in many of these scenarios if it is constantly learning. AI applications that aim to simply replace interactive voice response systems on customer service calls, or automate basic computer tasks, will not be as transformational as applications that learn and improve over time. AI will also have more impact if it is truly reducing administrative burdens and augmenting human experience, as opposed to replacing workers. If applied strategically, these applications of AI can more efficiently deliver citizen services while potentially reducing costs and increasing citizen satisfaction and engagement. Hollie Russon Gilman, a lecturer at Columbia SIPA and fellow at New America, sees a future in which “these applications of AI could enable more direct two-way interaction between citizens and the state.”

AI is increasingly being applied to citizen inquiries and information initiatives, represented in select use cases below. While these use cases primarily make up pilots and early stages of AI applications, and may not apply the full capabilities of AI and machine learning, they illustrate how AI is reshaping this type work for the future.

AI Use Cases for Citizen Inquiries and Information

Answering questions

- In a North Carolina government office, chatbots — auditory or textual computerized conversational systems, which are frequently AI-based — free up the help center operators’ line, where nearly 90 percent of calls are just about basic password support, allowing operators to answer more complicated and time-sensitive inquiries.¹⁰
- The government of Singapore worked with Microsoft to create chatbots for select citizen services. These chatbots are intended to function as digital representatives.
- New York City is planning to work with IBM’s AI platform, Watson, to build a new customer-management system to speed up the time and process of answering questions and complaints about city services on their 311 platform. This is similar to work in Surrey, British Columbia, where IBM Watson helped power the MySurrey app to quickly answer citizen questions. The app is used to address 65 percent of questions that already have answers on city websites. Watson, which learns over time, studied over 3,000 documents about 16 city services, and can answer 10,000 questions.¹¹
- In the future, AI could also be used for sentiment analysis of requests and conversations to better understand citizen inquiries and feedback.

Filling out and searching documents

- A free chatbot lawyer app helps refugees seeking asylum in the US answer a series of questions to determine which application to fill out and whether they are eligible for protection. With the required information, the bot helps auto-populate the form and provides the applicant with instructions for next steps. The bot has an added benefit of asking the questions in a straightforward way for forms that would otherwise be confusing for non-experts and non-native speakers.
 - AI can quickly categorize and search a range of documents and images. One state government in the US is using AI to help citizens search documents on over 1 million pages, while saving tens of thousands of dollars that would have otherwise been spent in upgrades.¹²
 - In the legal profession, AI is being used to scan advanced legal documents and find related case laws.
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¹⁰ “Artificial intelligence will help create a more responsive government,” Stephen Goldsmith, Government Technology, January/February 2017, <http://www.govtech.com/opinion/Artificial-Intelligence-Will-Help-Create-a-More-Responsive-Government.html>.

¹¹ “Watson helps cities help citizens,” IBM Cognitive Business, January 31, 2017, <https://medium.com/cognitivebusiness/watson-assists-cities-with-311-3d7d6898d132>.

¹² “How 10 industries are using big data to win big,” Michael Belfiore, IBM, July 28, 2016, <https://www.ibm.com/blogs/watson/2016/07/10-industries-using-big-data-win-big/>.

Routing requests

- The Mexican government piloted an initiative to use algorithms to classify citizen petitions and route them to the correct office.
- Allstate Insurance is using Amazon’s Alexa chatbot with their customers to ask basic questions about their plan and payments, and provide them with the route to the nearest office.
- A telecommunications provider uses AI to search documents within minutes and give its 40,000 call center agents time to solve customer inquiries more quickly. This saved the company \$1 million a year, with \$1 for every second saved off the average call time.¹³

Translation

- Several services now enable more efficient translation of government information. For example, the PyeongChang Winter Olympics will be using AI-based real-time translation services.
- Unbabel combines crowdsourcing and machine learning to translate business operations into 14 languages. Using an algorithm to translate customer service e-mails and web pages, and a team of human editors to verify for accuracy, they complete this service at a much cheaper rate, \$0.02 per chat, than traditional translation services.¹⁴

Drafting documents

- Japan’s Ministry for Economy, Trade, and Industry is piloting a system to help parliament member offices respond to citizen questions by drafting answers using AI.
 - Drafting of documents can be done with Natural Language Generation (NLG) AI, which is already being used in dozens of newsrooms, including Bloomberg and the Associated Press, to mine data, create text for datasets, and write at a pace of 2,000 stories per second.¹⁵ In these scenarios, NLG can also help non-data science employees better and more efficiently understand the data.
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¹³ Ibid.

¹⁴ “The Promise of Artificial Intelligence,” Daniel Castro and Joshua New, Center for Data Innovation, October 2016, <http://www2.datainnovation.org/2016-promise-of-ai.pdf>.

¹⁵ “2017 Tech Trend Report,” Future Today Institute, December 2016.

Enabling government workers to spend more time addressing citizen needs with the help of AI could potentially help humanize the workers and foster a better relationship between government employees and citizens, even if it is virtual, says Ben Hecht, president and CEO of Living Cities. In some cases, AI could also help with in-person citizen engagement and service delivery. In a 2014 study, Colorado Department of Human Services workers spent 37.5 percent of their time on documentation and administration, compared to just 9 percent on contact with children and families.¹⁶ AI automation of some of their administrative tasks would free up time to build relationships and solve problems face-to-face with citizens.

Hecht surmises that AI could also make citizens feel like they are part of a larger community. As AI learns more about what is valuable to the citizen in their government engagements, it could share information about how that engagement compared to neighbors. For example, if a citizen contacts their representative about a piece of legislation, a bot could follow up letting them know the number of citizens that contacted the representative about the same issue, while keeping all citizen information private. It may even follow up when there's news or updates about the legislation or future engagement options. "Once you've self-selected yourself as an engaged citizen, there is something special about strength in numbers, and increasing your own engagement because so many people have already acted to make their communities better," explains Hecht.

Ari Wallach, CEO of Synthesis Corp., sees beyond the potential of the near future. The first wave of AI — what we're currently experiencing — is centered around tactical customer service use cases meant for understanding and responding to queries and solving basic problems. The next wave of AI in citizen services will be more predictive in many ways, explains Wallach. The AI platform will understand what the citizen is doing or asking, and will prompt to take action on specific issues (i.e., noting a new address and asking whether a new driver's license should be ordered). The third wave, still 10–15 years out, says Wallach, is when AI for citizen services is no longer predictive based on just queries but also based on non-queries, activities, and other datasets (i.e., a

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¹⁶ Colorado child welfare county workload study, Colorado Department of Human Services, August 2014, https://leg.colorado.gov/sites/default/files/13545_highlights.pdf.

new driver's license, if they even still exist in that form factor, shows up at the updated address without the citizen ever needing to act). "Imagine having direct and constant access to a high-level government concierge that is constantly learning and improving while working for 300 million people," says Wallach of the future. These waves will mirror the evolution of how we interact with AI, such as the continuing trend of user interfaces moving away from keyboards and towards voice and audiovisual inputs.

AI has numerous other potential futures for citizen services beyond citizen inquiries and information, including providing emergency response, enabling custom and low-cost education, detecting fraud and corruption, improving crime reporting, using prediction to target and preempt social services interventions, informing proactive repairs of infrastructure, and anticipating cyberattacks and personal information loss on public websites.

NAVIGATING AI IN GOVERNMENT

For many systemic reasons, government has much room from improvement when it comes to technological advancement, and AI will not solve those problems. In addition, there is hype around many modern tools, while most government offices are still trying to reach more basic modern operating standards. Nevertheless, there is benefit in preparing for the inevitable future, and making technology investments to keep pace with trends in how citizens prefer to engage with service providers. Governments can start thinking about implementing AI by learning from previous government transformation efforts and AI implementations in the private sector. Six strategies can help governments start off on the right foot with AI: make AI a part of a goals-based, citizen-centric program; get citizen input; build upon existing resources; be data-prepared and tread carefully with privacy; mitigate ethical risks and avoid AI decision making; and, augment employees, do not replace them.

Navigating AI in Government



Make AI a part of a goals-based, citizen-centric program. AI should not be implemented in government just because it is a new, exciting technology. Government officials should be equipped to solve problems impacting their work, and AI should be offered as one tool in a toolkit to solve a given problem. The question should not be “how will we use AI to solve a problem,” but “what problem are we trying to solve, why, and how will we solve it?” If AI is the best means to achieve that goal, then it can be applied, otherwise it should not be forced. If AI is the right tool, it cannot be a single touch-point for citizens. McKinsey recommends agencies consider a citizen’s end-to-end journey through a process. They report in their “Putting Citizens First” study that organizations that manage the entire customer journey from start to finish achieve higher levels of satisfaction and are more effective at delivery.¹⁷ Government offices can consider where and when AI can be a touchpoint, and what other technologies or human interaction touchpoints might be required in the citizen’s journey. In keeping with customer centricity, the technology also must be inclusive, with awareness for generational, educational, income, and language differences.

¹⁷ “Putting Citizens First: How to improve citizens’ experience and satisfaction with government services,” McKinsey Center for Government, November 2014.

Get citizen input. Citizen input and support for AI implementations will be essential. “Governments should enable a genuine participatory, grassroots approach to both demystify AI as well as offer sessions for citizens to create an agenda for AI while addressing any potential concerns,” suggests Russon Gilman. Wallach agrees: “There needs to be a conversation in society about AI — to educate everyone from citizens to policymakers so that they truly understand how it works and its tradeoffs.” With that level of education, citizens can then offer other ways to be engaged with AI, and even help co-create ethics and privacy rules for use of their data. When it comes to building and deploying AI platforms, user feedback is essential both from citizens and government employee users. Onda recommends designing systems “to provide the right level of insight, depending upon individual user preferences.”

Build upon existing resources. Adding the benefits of AI to government systems should not require building the systems from scratch. Though much evolution in AI has come from early government research, governments can also take advantages of the advances businesses and developers are making in AI. IT analyst firm IDC predicts that by 2018, 75 percent of new business software will include AI features.¹⁸ Nonprofits and research institutions offer the public access to world-class research and new releases of open-source machine intelligence programs allow users to inexpensively scale their use of AI. Implementations do not have to start only for entirely new programs or datasets either. One place to start would be integrating AI into existing platforms, like 311 and SeeClickFix, where there is existing data and engagement.

Be data-prepared, and tread carefully with privacy. Many agencies will not be at the level of data management necessary for AI applications, and many may be lacking the significant amount of data needed to train and start using AI. But as government offices improve their data collection and management, best practices about the type of data that will be used and collected will be critical for future use with AI. “Collecting and aggregating the right type of data is critical for success,” says Onda. “Governments must think about the type of data they need, when the data expires (it has a shelf life),

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¹⁸ “IBM gives Watson a new challenge: your tax return,” Steve Lohr, *New York Times*, February 1, 2017, <https://www.nytimes.com/2017/02/01/technology/ibm-watson-tax-return.html>.

and how the data will be aggregated to provide context for a specific individual. Citizens must be able to trust the systems they are interacting with and know where their data is going.” Governments should be very transparent about the data collected and give citizens the choice to opt in when personal data will be used. There may be fewer privacy concerns if the only data being used is already provided to the government by citizens (such as IRS data). The privacy concerns become relevant when citizens have not provided consent or external datasets get mixed with government sources, explains Eaves. Data use also becomes concerning when the data is inaccurate. This can lead to a cascading effect as the data travels. “Transparency isn’t enough if the data is already off,” explains Russon Gilman, because “the algorithms and learning systems can be hidden, so the stakes are very high for democratic governance and ensuring equity in the public sector.”

Mitigate ethical risks and avoid AI decision making. AI is susceptible to bias because of how it is programmed and/or trained, or if the data inputs are already corrupted. A best practice for lessening bias is to involve multidisciplinary and diverse teams, in addition to ethicists, in all AI efforts. In addition, Matt Chessen, an AI researcher with the US Department of State, has recommended a new public policy profession that specializes in machine learning and data science ethics.¹⁹ Governments can also leverage the work of groups of technologists who have come together to create common sets of ethics for AI, such as the Asilomar AI Principles and the Partnership on AI. Given the ethical issues surrounding AI and continuing developments in machine learning techniques, AI should not be tasked with making critical government decisions about citizens. For example, the use of a risk-scoring system used in criminal sentencing and similar AI applications in the criminal justice system were found to be biased, with drastic repercussions for the citizens sentenced. These types of use cases should be avoided. Companies like Google and Microsoft are actively trying to improve machine learning models to prevent or correct bias, and have internal ethics boards that consider new algorithms — government offices should uphold a similar

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¹⁹ “Encoded laws, policies, and virtues: the offspring of artificial intelligence and public-policy collaboration,” Matt Chessen, March 31, 2017, <https://medium.com/artificial-intelligence-policy-laws-and-ethics/encoded-laws-policies-and-virtues-the-offspring-of-artificial-intelligence-and-public-policy-3dfb357faf9>.

practice. Until machine learning techniques improve, though, AI should only be used for analysis and process improvement, not decision support, and human oversight should remain prevalent.

Augment employees, do not replace them. Research highly varies in determining the threat of AI to jobs over the next two decades — from 9 to 47 percent — according to the 2016 White House report on automation and the economy.²⁰ In some cases, AI may instead lead to increased and new employment directly and indirectly related to AI development and supervision. While job loss is a legitimate concern for civil servants, and blue and white collar workers alike as the technology evolves, early research has found that AI works best in collaboration with humans. Any efforts to incorporate AI in the government should be approached as ways to augment human work, not to cut headcount. Governments should also update fair labor practices in preparation for potential changes in workplaces where AI systems are in place.²¹

With these strategies, governments can approach the use of AI in citizen services with a focus on building trust, learning from the past, and improving citizen engagement through citizen-centric goals and solutions.

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²⁰ “Artificial Intelligence, Automation, and the Economy,” Executive Office of the President, December 2016, <https://www.whitehouse.gov/sites/whitehouse.gov/files/images/EMBARGOED%20AI%20Economy%20Report.pdf>.

²¹ AI Now conference summary report, September 22, 2016, https://artificialintelligencenow.com/media/documents/AINowSummaryReport_3_RpmwKHu.pdf.

CONCLUSION

AI has the potential to have a great impact on the way citizens experience and interact with their government. While AI is not a solution to government problems, it is one powerful tool to increase government efficiency. Implementation of and use of AI in citizen services may also become an indicator of how the public sector can leverage other emerging digital tools. AI raises questions around privacy, the accelerating pace and adoption of digital tools, and whether humans can keep pace with the rate of automation overtime. Earlier use of AI — starting with low-risk applications in service delivery — could pave the way for citizen feedback and engagement on these and other questions about emerging digital tools. With increased interaction with AI, and by building upon existing modernization efforts, government delivery of citizen services could soon mirror the ways citizens interact with technology in their personal lives.

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