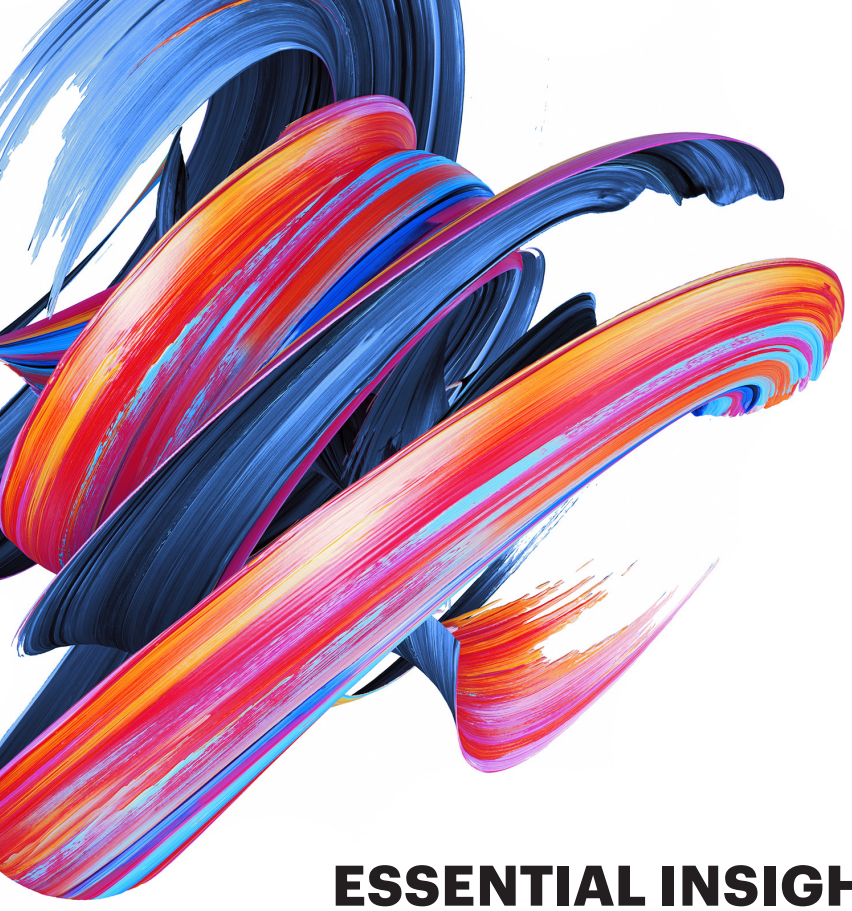

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ESSENTIAL INSIGHTS

ARTIFICIAL INTELLIGENCE UNLEASHED

How agencies can use AI to automate & augment operations to improve performance

Accenture Federal Services

Backlogs are the bane of government. Delays of weeks, months or even years are too often incurred in executing a number of everyday tasks, including adjudicating claims, scheduling appointments, hiring new employees, procuring services, conducting investigations and approving applications.

Few agencies are exempt from these challenges, and the resulting costs are both financial and reputational, as their inability to deliver core services in a timely manner directly impacts their ability to execute the mission. However, for those people whom agencies serve, the stakes are even higher, as delays can have livelihood, peace of mind, or even life and death consequences.

Broadly speaking, these backlogs happen for two reasons: an overreliance on ad hoc, manual processes that create operational inefficiencies and/or a need for subjective, often specialized assessment or adjudication that exceeds capacity. Underlying issues can include poor access to decision making evidence and information, and fluctuating demand with frequent or unpredictable spikes.

Artificial Intelligence (AI) solutions are ideally suited for these types of situations. They can automate low-value, repetitive tasks, executing them more efficiently and accurately than humans, freeing individuals to play higher-level roles requiring greater empathy, cognitive analysis and more strategic thinking. AI can also improve the speed and quality of decision making, allowing for better navigation of increasingly complex and massive amounts of data; allowing us to more consistently arrive at the best possible outcome.

In commercial markets, AI is being used to streamline and optimize operations and provide more personalized customer service. Think of an insurance company that approves a claim with just a photo from your smartphone. Within the federal government, it has been used widely in the national security and cybersecurity realms to detect patterns of anomalous behavior, predict where bad actors might strike, and take anticipatory measures to thwart the attack. Using these same methods, AI is also now being used to detect fraud, improve health outcomes, predict crop yields and approve claims.

Using AI Across the Public Sector

This report highlights five ways agencies can use AI to solve some of the toughest, most complex issues facing the federal government. This is not some futuristic vision, but a call to action as the capabilities described here are already planned or in use in the public and private sectors. According to the research conducted for the Accenture Federal Technology Vision 2018, over two-thirds of U.S. federal agencies plan to make investments in AI technologies in the next year. Additionally, 82% of federal executives agreed within the next two years "AI will work next to humans in my organization, as a co-worker, collaborator, and trusted advisor."

These findings demonstrate that federal agencies are ready and willing to employ AI within their operations. Based on the success that we have seen in the commercial sector, this should have a meaningful impact on customer service and mission delivery, as government talent is able to spend greater time and attention addressing more complex issues and challenges.

AI: A Brief Introduction

Enabled by the scale cloud computing offers and the increasing availability of data, AI is a combination of technologies that allow smart machines to extend human capabilities. It uses massive processing power, intelligent algorithms, and huge data sets to mimic human cognitive abilities such as **sensing** the immediate environment, **comprehending** what's happening, **acting** on this information and **learning** through experience. Autonomous vehicles are the best example of AI using these human-like abilities to accomplish a complicated task that requires constant assessment and recalibration in real time.

AI encompasses a variety of technologies that are often combined to address specific enterprise needs. These broader solutions and applications include robotic process automation (RPA) and intelligent automation, chatbots, sentiment analysis, biometric identification, cybersecurity threat detection, and autonomous vehicles and robotics.

Core AI technologies include:

AI

KNOWLEDGE

Models for detecting latent or conceptual relationships within information and generating logical inferences. These technologies are often used in knowledge management, expert systems and intelligent search.

REPRESENTATION PATTERN RECOGNITION & PREDICTION

Techniques like data classification, correlation and extrapolation that facilitate automated reasoning and problem solving. Examples include categorizing email as spam or creating dynamic business rules for process automation.

LANGUAGE PROCESSING

Facilitating more seamless human/machine interactions via more natural interfaces—for example, those that support speech, gesture, handwriting and/or multilingual input—and more contextual computer-generated communications. Examples include conversational interfaces like Amazon's LEX as well as automated summarization used in news reporting.

IMAGE RECOGNITION

The ability for software to detect and identify objects, places, people and text characters within digital imagery. Examples include optical character recognition (OCR), facial recognition and automated license plate readers.

COMPUTER VISION

Using image recognition techniques with live and recorded video to extract insight and knowledge by detecting events and patterns. This is critical to enabling computers to navigate the physical world, such as with self-driving cars.

MACHINE LEARNING

Underpins many of these approaches and is often viewed as synonymous with AI. Instead of relying on explicit programming, computers use machine learning to independently analyze large datasets (either targeted training data or unlabeled operational data) to develop a knowledgebase or comprehension. Deep learning strives to further improve accuracy by taking a more multidimensional approach to machine learning that more closely mimics human thinking.

Increasingly, the imperative for federal agencies is how can they harness the power of AI to advance the mission and improve performance. From an agency or operational perspective, the core functional capabilities enabled by AI technologies include:

ENHANCED INTERACTION

Enabling more natural and seamless collaboration between individuals and systems. **Chatbots** use conversational interfaces to enable intuitive interactions between people, devices and services. **Virtual assistants** guide users through simple tasks by delivering real-time answers that are both specific and compliant to enable more effective citizen self-service. **Virtual advisors** offer deep insight and personalized advice, helping humans to solve problems and make decisions.

INTELLIGENT AUTOMATION

Delegating common steps and decisions for system execution. **Robotic Process Automation (RPA)** automates routine processes that require limited human judgement. **Augmented Reality** can guide users through real-world scenarios.

ENHANCED JUDGMENT

Making more contextual determinations that go beyond static business rules. **Next Best Action** uses dynamic inferences, interperations and conclusions to guide case workers and customer service representatives through complex decision making processes. **Machine Learning** employs self-learning to extract insight from data to understand business rules, detect and correct errors, and optimize performance.

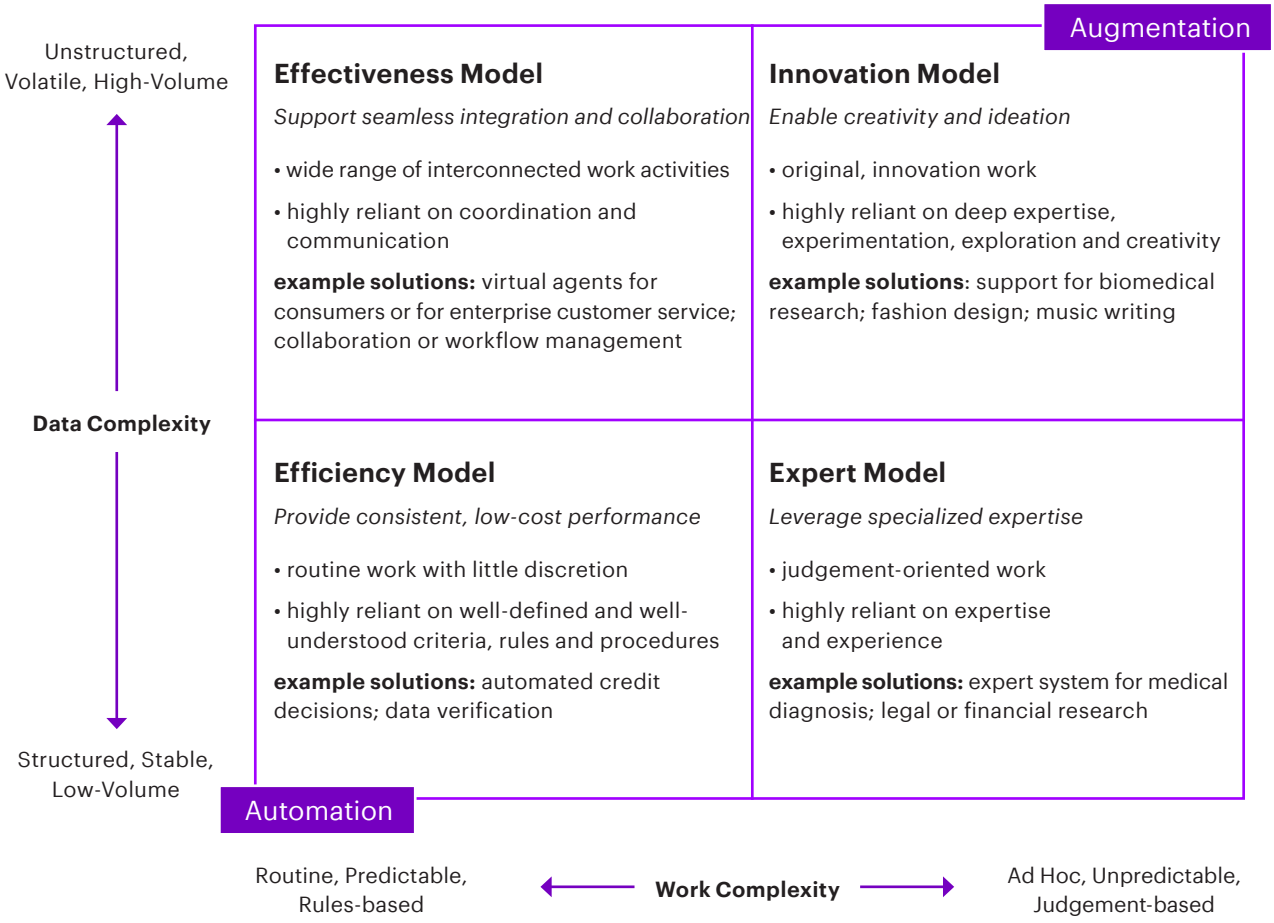
To Automate or Augment?

One way to think about the range of available AI solutions is to evaluate them in terms of both **automating** and **augmenting**. Automating involves taking over underlying tasks routinely done by humans, such as simple data entry, to allow them to focus on higher value work; augmenting bolsters workers skills, knowledge, and experience, helping them become smarter and more productive or effective.

Looking first at what processes and tasks can be automated or augmented can help agencies understand how AI can advance mission requirements. For this evaluation, AI solutions can be considered based on two criteria: first, the predictability and repeatability of the task and, second, the complexity of the input.

In the matrix in Figure 1, on one end are routine, predictable and rule-based processes—typing information from a paper form to the computer, or checking that dates use the correct format and are not missing digits – that allow little deviation. At the other end, processes may be more ad hoc and unpredictable and require the expert judgement of an experienced benefits case manager or intelligence analyst.

Figure 1: AI Task Mapping Framework



In terms of data, in some cases it is structured and well-known. At the other end of that spectrum, data can be semi- or unstructured —speech, social media, multimedia data or sensor data. Agencies can use the work complexity/data complexity framework to map tasks to four primary types of activity models: efficiency, expert, effectiveness and innovation. By using the matrix, agencies can see which tasks cluster around either automation or augmentation and then can begin to map the appropriate types of AI solutions for exploration and testing.

As the matrix suggests, activities that are closer to the bottom left are more likely to involve automation, while those closer to the upper-right part of the matrix are more likely to use AI to augment human capabilities. It is also important to note that many jobs will have aspects or characteristics that span the different models. For example, some elements of the work of a lawyer or doctor might fall under Efficiency and Effectiveness, while other aspects might be more in line with the Expert and Innovation models. For more detail on the models, see "Turning Artificial Intelligence into Business Value Today".

Ready Now: Five AI Use Cases for Federal

Accenture researched how current AI technologies could be used by the U.S. federal government, documenting nearly one hundred discrete use cases across various agencies in the civilian, national security, law enforcement and public safety, and healthcare sectors. Below is an overview of constraints and illustrative solutions for five primary or most common categories where AI can readily drive performance improvements today. These examples are offered as a starting point for further conversations within one's agency.

Case Management

CHALLENGES – High claim or case volumes, manual data entry, lack of integrated data, and ad hoc decision making result in long processing times, inaccurate reporting and inconsistent outcomes.

AI SOLUTION – Machine learning with robotic process automation can speed up data entry and minimize errors. With semantic technologies, a broader array of decisions can be automated, and complex cases can be directly routed to a specialized case manager.

AI IN ACTION – A federal agency needed to help reviewers more quickly determine the verification information required from claimants. Accenture created a prototype solution that used machine learning and predictive analytics to streamline and shorten the evidence gathering process for adjudicating claims. Using the agency's existing data warehouse, it employed models to "learn" what evidence is typically required or most effective based on historical claims.

With this insight, the solution was able to generate a recommended evidence list at the onset of each claims review process, eliminating time-consuming and frustrating back and forth communication with the claimant. It also reduced errors throughout the determination process, and the time required to identify missing evidence. The solution embraces continuous improvement as well, "learning on the job" to refine recommendations based on ongoing user feedback.

Customer Service

CHALLENGES – Extended call wait times and case backlogs create a poor customer experience that can result in non-compliance, loss of revenue, and poor public reputation.

AI SOLUTION – Virtual agents with natural language processing can enable customer self-service and route citizens to the right information or representatives, freeing up call centers and employee time for more complex cases.

AI IN ACTION – Service centers for the U.S. Citizen and Immigration Service (USCIS) receive approximately 14 million calls annually. To mitigate call volume, and provide a better customer experience, USCIS added self-service options to better support online audiences. A virtual assistant chat service – "Emma" – helps visitors access information more easily across the USCIS website. Emma is integrated into USCIS.gov and answers common questions about immigration procedures like, "How do I get a green card," or "How do I obtain employment authorization" in English or Spanish using everyday language.

Visitors using the virtual assistant can escalate to a human representative, requesting additional help in either language. When developing the capabilities of Emma, particular attention was paid to vernacular and common terms that don't always match official government terminology, creating a more natural, conversational experience for users.

According to USCIS, the solution has dramatically reduced the amount of time visitors spend looking for information. Since Emma now answers over one million questions per month, the agency has accumulated a large amount of data which can be used to improve the service by offering more advanced self-service options in the future.

Human Capital Management

CHALLENGES – Challenges identifying the right talent pool and executing targeted recruiting in a timely and effective manner as well as difficulty assessing the competencies of potential hires can compound existing workload/backlog issues.

AI SOLUTION – Natural language processing and machine learning can identify applicants with the right skills and behavioral attributes that predict future job success.

AI IN ACTION – A large international consulting firm wanted to streamline the new hire process and improve the validity and predictive accuracy of prospective employee assessments. Since many candidate interviews were done remotely, developing more accurate initial screens around this constraint was a priority. Using machine learning, they deployed an assessment solution that can extract and understand behavioral attribute patterns from a candidate's digital interview through audio, video, and text analysis. This capability was integrated into a single talent hub that consolidated all talent data, creating a comprehensive view of the candidate that recruiters could more readily assess. The solution, initially targeting niche technical jobs, performs analysis of video interviewees in real time and provides predictive metrics related to job performance.

The benefits of this machine learning solution include gaining insight into skills and attributes that matter, building teams with top performers, improving retention rates, and reducing the recruiting process cycle time for global recruiting efforts. Results include: saving 9 hours average in the interview process, improving the remote candidate experience due to location and time flexibility, and improving the interview-to-hire ratio with smarter assessment tools.

Fraud and Risk Management

CHALLENGES – Disparate data and siloed organization structures result in difficulty identifying and proactively mitigating vulnerabilities across the enterprise.

AI SOLUTION – Robotic process automation can validate and integrate data from multiple sources. Machine learning can analyze behaviors to identify emerging trends in fraud and abuse so that agencies can act before they cause significant damage.

AI IN ACTION – A government agency responsible for social welfare benefits needed a better way to combat fraudulent claims. Through the use of machine learning, Accenture was able to analyze case files and interview transcripts to identify specific attributes associated with high-risk groups. A solution was then implemented to monitor for suspicious transactions using these criteria.

The initial machine learning models resulted in a 20% improvement in fraud detection compared to the current methods in place. The models continue to learn and refine, improving accuracy as more data is analyzed over time.

Inspections and Maintenance

CHALLENGES – Manual, infrequent inspections and maintenance processes result in high cost of repairs and safety concerns.

AI SOLUTION – Remote sensors, video analytics, and machine learning can be combined to model and predict risks, such as mechanical failures, contaminated food, or public safety threats to save the investigator time by identifying higher likelihood cases, and in that way, the investigator can take preemptive action.

AI IN ACTION – An international oil and gas production company sought to implement predictive maintenance to reduce repair costs, improve uptime and minimize lost production. Using a human-centered approach to problem identification, Accenture worked with the client's engineers to codify required maintenance, potential breakdowns and proposed process controls. Ultimately, more than 3,000 fit-for-purpose models were developed to predict equipment failure and pinpoint necessary maintenance intervals.

These predictive asset models currently monitor more than 200,000 sensors spanning more than thirty equipment types, including valves, motors, pumps, heat exchangers, compressors and blowers. By using these models to analyze operating data and inspection reports, the company was able to predict high risk-areas for maintenance and potential failure, resulting in safer working conditions, higher production levels, lower operating costs and more effective incident investigations.

Getting Started Right

More so than any preceding technologies, AI creates living systems that will continue to advance, evolve and mature over time. This is inherent in the self-learning and improving nature of many AI technologies. Successful adoption requires both clear guidelines and guardrails for use as well as a commitment to cultivating the technology so it can be adapted and trained for specific use cases.

This means that enterprises including federal agencies need to clearly define upfront how AI should and should not be used. They should also embrace user-driven design and iterative agile development to best leverage available data and configure technologies for required roles. And recognizing its pervasive and transformative effect, they must also plan to make it a core competency for their organization—both within IT as well as the mission, business and operational groups that AI will support.

Defining Your Trusted AI Framework

Federal executives already recognize that their ability to take direct action is based on specific authority granted to them. As agencies expand their reliance on technologies to make recommendations and decisions, they need to ensure that they are delegating appropriate authority. An important safeguard within AI systems is putting in provisions to document decision making to show adherence with established business rules and policies. In other words, ensuring that these systems have the ability to explain how they arrived at specific conclusions.

More broadly, agencies need to champion responsible AI to maintain trust in our civic institutions. This means using AI in an ethical, transparent manner that protects privacy and other rights, and actively monitoring for unintended consequences. For example, developing systems to avoid the biases too often prevalent in our everyday lives; this can be supported by using training data that is fair and representative. Already, 70% of federal executives believe that ensuring transparency around AI is critical to maintaining citizen trust, according to the 2018 Accenture Federal Services Technology Vision.

Identifying and Capturing Opportunities to Automate and Augment

As discussed earlier, AI technologies can both automate and augment human tasks with four roles—Efficiency, Effectiveness, Expert and Innovation—most common. Agencies can develop these use cases using an iterative approach and cross-functional teams, starting with value targeting to isolate and understand problems and using agile methods to develop and refine the proposed solution while minimizing cost and disruption.

When identifying opportunities, be sure to:

Identify the Value Case – Articulate how AI can enhance and improve the service delivery value chain, from both a user and operational perspective, for example, by remediating current bottlenecks and/or delivering added value.

Human-Centered Design – Employ user-centered and service design to optimize both the end-to-end user journey and human/system interactions.

Define Data Requirements – Determine what data is available for use, how it can be augmented and how it can be safeguarded.

Prototype and Test – Create the technology (preferably, cloud-based) environment and build a minimum viable product to pilot, test, iterate, refine and scale the proposed solution.

Integrate into Operations – Redefine business processes and train users to take full advantage of AI's contributions; building trust in AI systems is an important change management focus.

As a point of reference, a value targeting exercise may take two weeks to three months to execute; development of a program pilot often requires similar timeframes.

Growing Enterprise AI Competency

AI is unique from an enterprise perspective for a number of reasons, including the projected pervasiveness and dynamic nature of the technology; the depth and intimacy of its interactions with users; and its long-term transformative impact. As noted previously, 82% of federal executives believe that AI will emerge in the next two years "...as a co-worker, collaborator, and trusted advisor." Ultimately, AI is likely to be infused in nearly all facets of operations, requiring that we collaborate with systems in entirely new ways.

In establishing AI as a core enterprise competency, agencies need to consider a number of issues, including:

Maintaining the Right Data – Establish the complete AI landscape necessary to meets agency objectives including developing a Big Data strategy and architecture and defining and maintaining appropriate data governance.

Investing in Capabilities – Creating an AI development roadmap that encompasses both scalable platforms and modular AI capabilities or services that can be leveraged across multiple requirements; determine sourcing (e.g., insource, co-invest, etc.) criteria.

Developing Skills and Culture – Aligning agency leadership with the AI imperative, building a culture that understands and embraces AI's potential and responsibilities, and developing a "Liquid Workforce" of multidisciplinary teams with necessary skills (e.g., business analysis, process design, analytics, and AI) to directly support.

An important element of change management for AI is engaging staff at all levels in the design of the tools and in training the solution. By doing so, they can identify the lower value tasks to automate, which will free up their time, and ultimately augment their knowledge and capabilities, allowing them to handle more complex situations.

Think Big, Start Small

Given the breadth of use cases that AI can address, it can be a bit overwhelming to think about where to begin. With AI, agencies can now start to think big, and not shy away from tackling the biggest obstacles to mission success that have been seemingly unsolvable in the past.

By starting with a well-defined area of opportunity, iterating, testing, and piloting AI solutions mapped to specific processes and tasks, agencies will begin to see rapid changes in service delivery capabilities and staff productivity. By combining humans and AI, agencies can achieve breakthroughs in mission capabilities that were unthinkable in the past.

Let's Get to Work Together

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