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SWOT ANALYSIS ARTIFICIAL INTELLIGENCE FOR GOVERNMENTAL PURPOSES

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Abstract

From *Smartphones* to *Chatbots*, Artificial intelligence (AI) is already abundant in our digital lives. We just might not know it yet. The momentum behind AI is building, thanks in part to the massive amounts of data that computers can gather about our likes, our purchases and our movements every day. And specialists in AI research use all that data to *train machines* how to *learn* and *predict* what we want - or dislike. The applications of AI are likely to impact critical facets of our economy and society over the coming decades. We are in the early rounds of what many credible experts view as the most promising era in technology innovation and value creation for the foreseeable future.

Keywords: artificial intelligence, applications, machines, future

1. Introduction

Less than a decade after breaking the Nazi encryption machine Enigma and helping the Allied Forces win World War II, mathematician Alan Turing changed history a second time with a simple question: "Can machines think?"[1]. Turing's paper "Computing Machinery and Intelligence" (1950), and its subsequent Turing Test, established the fundamental goal and vision of AI.

At its core, AI is the branch of computer science that aims to answer Turing's question in the affirmative. It is the endeavor to replicate or simulate human intelligence in machines. The expansive goal of AI has given rise to many questions and debates. So much so, that no singular definition of the field is universally accepted.

The major limitation in defining AI as simply "building machines that are intelligent" is that it doesn't actually explain *what AI is? What makes a machine intelligent?* AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry.

In their ground-breaking textbook *AI: A Modern Approach*, authors Stuart Russell and Peter Norvig approach the question by unifying their work around the theme of intelligent agents in machines. With this in mind, AI is "the study of agents that receive precepts from the environment and perform actions."[2]

Norvig and Russell went on to explore four different approaches that have historically defined the field of AI:

-Thinking humanly
-Thinking rationally
-Acting humanly
-Acting rationally

The first two ideas concern thought processes and reasoning, while the others deal with behavior. Norvig and Russell focus particularly on rational agents that act to achieve the best outcome, noting "all the skills needed for the Turing Test also allow an agent to act rationally."

Patrick Winston defines AI as "algorithms enabled by constraints, exposed by representations that support models targeted at loops that tie thinking, perception and action together."[3]

While these definitions may seem abstract to the average person, they help focus the field as an area of computer science and provide a blueprint for infusing machines and programs with machine learning and other subsets of AI.

This paper, however, is to analyze the impacts of an emplaced AI on Governmental level based on a SWOT Analysis. A SWOT analysis is one of the most important strategic tools available to a company, division or department. The significance of SWOT analysis is that it provides a good way to examine both positive and negative attributes within a single analysis, determining the best choices at large.

SWOT analysis is an in-depth look at exactly how am organization operates. It examines the strengths of the organization, acknowledges its weak points and identifies both opportunities and threats in its field. These are all useful pieces of information that in most cases will help an organization to succeed. In conducting a SWOT analysis, it is evaluated the current position and compares it to the future opportunities and risks that could affect it moving forward.

Simplicity and a broad perspective are two core traits that combine to make a SWOT analysis so important in strategic planning. It can be a simple tool to use because the process involves listing all items in each category in a spreadsheet or table.

I have chosen this method mostly because of the self-deducted relevance of the path to follow within the years to come.

2. SWOT Analysis

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Productivity	Expensive	Interoperability	Unemployment
Less errors	Insensitive	Transportation	Less control
Fast	Non-divergent	Increased life quality	What if AI is wrong?
No human risks	Getting too smart	New inventions	Bandwagon effect
Availability	Human laziness	Digital assistance	Values jeopardy
Integration	Hard to keep up with	Train	
Remove dullness	Garbage in/out	New Q, New A	
Daily usage	One trick pony	New startups	
Life quality		Global solutions	

Table 1 – SWOT Analysis

Strengths

Increase workplace productivity

Rather than spending hours of manpower on menial, repeatable tasks, employees can configure AI to manage it instead. Although we've already used machines on the production lines before, AI allows us to manage a multitude of tasks more efficiently than before. This is beneficial for all companies. By having technology manage everyday tasks (rather than humans) companies save money. It lowers operations costs and even noncompliance fees.

Reduction in Human Error

The phrase "human error" was born because humans make mistakes from time to time. Computers, however, do not make these mistakes if they are programmed properly. With AI, the decisions are taken from the previously gathered information applying a certain set of algorithms. So errors are reduced and the chance of reaching accuracy with a greater degree of precision is a possibility.

Faster Decisions

Using AI alongside other technologies we can make machines take decisions faster than a human and carry out actions quicker. While taking a decision human will analyze many factors both emotionally and practically but AI-powered machine works on what it is programmed and delivers the results in a faster way

Takes risks instead of Humans

This is one of the biggest advantages of AI. We can overcome many risky limitations of humans by developing an AI Robot which in turn can do the risky things for us. Let it be going to mars, defuse a bomb, explore the deepest parts of oceans, mining for coal and oil, it can be used effectively in any kind of natural or man-made disasters.

Available 24x7

An average human will work for 4–6 hours a day excluding the breaks. Humans are built in such a way to get some time out for refreshing themselves and get ready for a new day of work and they even have weekly offed to stay intact with their work-life and personal life. But using AI we can make machines work 24x7 without any breaks and they don't even get bored, unlike humans.

Adopted into many industries

AI is now used in a variety of industries, ranging from digital marketing to healthcare. The type and sophistication of the AI needed depend on the task - you'll need less power to automate emails than sorting through a registry of patient information, for example. It's not just for sorting information either; we're also seeing AI used in facial recognition and academic research too.

Helping in Repetitive Jobs

In our day-to-day work, we will be performing many repetitive works like sending a thanking mail, verifying certain documents for errors and many more things. Using AI we can productively automate these mundane tasks and can even remove "boring" tasks for humans and free them up to be increasingly creative.

Daily Applications

Daily applications such as Apple's Siri, Window's Cortana, and Google's OK Google are frequently used in our daily routine whether it is for searching a location, taking a selfie, making a phone call, replying to a mail and many more

Better quality of life

AI is used outside of the workplace as well. Within the home, people who have smart speakers and light bulbs are using AI too. These devices make managing the home easier and can reduce the cost of electricity. You can even find AI in your car, so long as you're buying a brand like Tesla. In some ways, it's strange. Only a few years ago, AI was found only in sci-fi books, games, and movies. Now it's commonplace, despite not reaching even its full capabilities yet.

Weaknesses

High Costs of Creation

As AI is updating every day the hardware and software need to get updated with time to meet the latest requirements. Machines need repairing and maintenance which need plenty of costs. Its creation requires huge costs as they are very complex machines

AI remains inhuman

There is no doubt that machines are much better when it comes to working efficiently but they cannot replace the human connection that makes the team. Machines cannot develop a bond with humans which is an essential attribute when comes to Team Management.

AI is a form of technology. It can be a machine or an algorithm. But of course, it's not human. And this remains a strength and a weakness simultaneously. As a strength, it means people working in jobs requiring a touch of "humanity" feel safe - their job isn't up for grabs by our technological overlords quite yet.

But as a weakness, this means AI is limited. It's a tool but not necessarily a solution. AI can communicate, but it can't communicate emotionally. And so, although it can use information, it won't be able to grasp or react to the complexities of human emotion.

Lacking Out of Box Thinking

Machines can perform only those tasks which they are designed or programmed to do, anything out of that they tend to crash or give irrelevant outputs which could be a major backdrop.

The chance to outsmart us

Developers are always pushing to redefine the limits of AI. Right now, it's able to complete a task, learn, and retain information. But maybe, in the future, it'll get to the point of improving and redesigning without human input. It's this potential reality that makes people remember the robotic overthrowing in the movie I, Robot.

Making Humans Lazy

AI is making humans lazy with its applications automating the majority of the work. Humans tend to get addicted to these inventions which can cause a problem to future generations.

Governments are slow on the uptake

Technological experts, like Elon Musk, have warned against AI, believing that we need to be smart about how we use it. And how do we use it? This prompts the question of ethics. Is there a line for the ethical use of AI? Bills, regulations, and laws aren't keeping up with the rapid development of technology. Even Congress doesn't fully understand how the internet works, so what hope is there for the ethical use of AI? "Perhaps the main drawback to the introduction of AI in the area if defense planning and management is not technological, but derives from the conservative nature of the military establishment, which is formed through the interaction of organizations and individuals that think, behave and act in countless, less predictable ways"[4].

Garbage in, garbage out - quality of data is everything

The quality of information coming out of a system can never be better than the quality of information that was put in. It may sound sort of like one of Newton's laws of physics, it's not. It's an always relevant guiding principle for anyone who uses and analyzes data. Even more for the AI. That mainly because the AI might have the ability to dig out the relevant data among all the brushed collected information and to forecast the best way to follow.

One trick pony

Although the AI has the complexity of an unthinkable magnitude it still does one thing: helps humankind. And it does that by learning, by placing questions that are asked themselves, by copying the human brain-like decision but with tremendous amount of data, unlike human brain which uses small amount of bits to do the same things but in a much slower version.

Opportunities

Combing AI with newer forms of tech

AI is connected to other new forms of technology, including machine learning, deep learning, and the Internet of Things (IoT). It'll likely be adopted into programming, enabling developers to reverse problem solve. This allows for enhanced responses to problems, which may benefit other industries, like customer service.

Smart cars drive progress for people with disabilities

Right at this moment, we're seeing the adoption of AI into the automobile market. Tesla car models use it to self-drive on the highway and park without human assistance. Obviously, this is something straight out of a science fiction novel (aka cool as heck) but it's also beneficial for people who have disabilities and has impacted their driving ability

Less anxiety on employees

And as I said in the strengths section of this SWOT analysis, AI allows us to automate boring, trivial tasks. This is perfect for people who dread taking care of these tasks and would rather focus on the "big picture". Entrepreneurs or start-ups who have employees wearing a lot of hats and are stretched thin will love AI for this

New Inventions

AI is powering many inventions in almost every domain which will help humans solve the majority of complex problems

Digital Assistance

Some of the highly advanced organizations use digital assistants to interact with users which saves the need for human resources. The digital assistants also used in many websites to provide things that users want. We can chat with them about what we are looking for. Some Chatbots are designed in such a way that it's become hard to determine that we're chatting with a Chatbots or a human being.

Computing without coding - train it, not program it!

Computers are becoming devices for turning experience into technology. For decades we have sought the secret code that could explain and, with some adjustments, optimize our experience of the world. But our machines won't work that way for much longer - and our world never really did. We're about to have a more complicated but ultimately more rewarding relationship with technology. We will go from commanding our devices to parenting them.

Opens new questions

In terms of evolution, the mankind mindset will change. It will adapt to newly risen solution, therefore the necessity to have an AI-based concept to help searching and looking for the answers to future not yet asked questions.

Create new high tech startups

Many companies nowadays create sophisticated analytics products intuitive for the user. They do that by integrating decision sciences, advanced math and AI into our way of living or within our businesses.

It all started with the IoT fed with tremendous amount of collected data cloud-stored and the ability that truly put the "I" into the AI, the sophisticated algorithms that can easily predict one's choice.

Opportunities to solve global problems

Diseases prevention, producing more with less resources, preventing frauds, online shopping, solving problems, medical diagnosis, fighting hate speech and trolls on social media, enhancing human performances, e-learning – these are just a few examples that have shown the AI applicability on a large scale.

Threats

Job stealing

As AI is replacing the majority of the repetitive tasks and other works with robots, human interference is becoming less which will cause a major problem in the employment standards. Every organization is looking to replace the minimum qualified individuals with AI robots which can do similar work with more efficiency.

People believe the adoption of AI will lead to job loss. And honestly, this is happening at a small scale. Think about those self-checkouts at Carrefour. There's several of them and only one or two employees stepping in whenever a customer has a problem. No more humans working the cashier is a viable future for corporations. This is one example of AI taking over simple human tasks, but also taking away job opportunities. To combat this, the job market will need to evolve. Rather than being replaced, humans will need to work alongside AI. Whether this is a viable future is yet to be determined.

Losing control

People wonder - will AI become so intelligent, humans can't control it any longer? This seems like a far off fear, but it may be closer than you think.

IBM has a supercomputer named Watson, who appeared on and won more than $5 million on the game show Jeopardy back 2011. Watson is hooked up to the cloud and uses machine learning and analytical software. It proved to be smarter than humans (at least in finding, using, and retaining information quickly) on the show eight years ago — and this is when AI was "new". Is it possible for Watson (or similar supercomputers) to eventually become sentient? It's too soon to tell, and this is the threat people feel.

What happens when AI gets it wrong?

AI is used in the diagnosis of medical conditions. In fact, it's been known to find diagnoses quicker than humans. But what if the computer gets it wrong? Or if the technology is corrupted by a virus and changed? The repercussions of premature or completely wrong diagnoses could lead to fatalities.

See, the biggest threat to AI is the "what if" of it all. Since technology is constantly tested and advanced, we don't know the limits. And that's both exciting and terrifying.

Saturation Bandwagon effect

The concept was bitterly embraced and integrated simply because the AI is a human developed capability. Therefore it is biased on human needs, choices and even flaws and weaknesses. The question is: are we willing to allow AI to develop itself to take control over our own personalities, to influence behaviors, to change mindsets? Why would we do it? Should we?

Danger to democracy, privacy, objectivity, security etc.

In terms of G-MAFIA (Google, Apple, Facebook, IBM, and Amazon), the danger is ubiquitous, knocking down the door to your privacy, security, fairness and even democracy on a daily basis, with no on hand proper rules or regulations to fight back with. It's only up to human choice to adjust the approaches so that the tastiest juice come out of the squeezed benefits of the AI. But the choices are still biased and the flexibility is not yet tested on a field where man is out of traditional control.

3.What to do

3.1 Track the leaders

Governments need to start looking to - and learning from - the leaders when it comes to AI implementation. Many governments have begun to implement AI across various small-scale pilots. But they are still limited to experimentation, and few have achieved true AI at scale. In compare, AI leaders have implemented AI broadly, transforming the business through higher-quality and more personalized services, enhanced revenue, and lower costs. They offer a point of contrast and a sense of what is possible through AI.

Effectively implemented, AI can generate benefits for public-sector organizations in three ways: *smarter policymaking, reimagined service delivery, and more efficient operations*. Thus, the technology can help governments better meet the needs of their citizens while making better use of taxpayer money.

While governments are still in the early stages of applying AI, some leading exemplars offer key insights into AI adoption and the potential benefits in service quality, customer satisfaction, and overall business efficiency (speed, cost, and accuracy). These leaders can help governments understand the art of the possible.

Starbucks, for example, has maximized its use of data and AI to create personalized experiences for its millions of customers, taking into account details like product preferences, store location, and time of day. Personalized services range from product offers to food and drink recommendations to brewing specifications. Apps and order history are used to simplify and streamline the ordering and purchasing processes. Behind the scenes, AI improves operational efficiency, allocating labor across stores and optimizing staffing schedules. These efforts have freed up employee time and resources for reinvestment in connecting with customers and, ultimately, in providing a better in-store experience. Customers have rewarded the effort with a three-fold increase in revenue per customer and a similar increase in marketing campaign engagement.

With such global leaders providing examples of the transformative change brought about by AI, governments can begin to envision the full extent of an AI-powered government. There are three broad areas in which governments can apply the lessons of AI implementation: smarter policymaking, reimagined service delivery, and more efficient operations.

Smarter Policymaking

AI has the potential to enhance the effectiveness and efficiency of each stage of policymaking by giving decision makers the tools to deliver more value to their constituents. AI and data analytics can make sense of demographic, consumption, behavioral, and other trends in nearly all government sectors, thus helping policymakers identify emerging issues and intervene with smarter policies and a more accurate understanding of their impact and costs. As policymakers formulate responses, advanced prediction, simulation, digital-twin, and optimization capabilities can help them evaluate a more comprehensive range of alternatives and find the best courses of action. Natural-language processing can identify similar or overlapping policies and eliminate conflicts prior to implementation. Once policies are implemented, social media sensing can scan for constituent sentiment and feedback. AI-enabled tools have the potential to provide regional and local leaders with the types of insights and analysis that were previously possible only at the national level, allowing policies to be better tailored to local conditions. And they are feedforwarding (the pathway within a control system that passes a controlling signal from a source in its external environment to a load elsewhere in its external environment. This is often a command signal from an external operator.), too.

Reimagined Service Delivery

The second benefit of AI for governments is providing citizen services more effectively - and even developing new services. For example, governments can use job seeker data (such as work history, educational background, socioeconomic circumstances, and other relevant factors) to optimize the types of supplemental support that employment agencies offer, based on the interventions that have been most effective for similar job seekers. Traffic management optimization modeling can significantly reduce the amount of time spent in traffic. Allocating health system resources using AI-enabled patient demand analytics can minimize wait times while reducing costs.

But the potential of AI-powered government goes far beyond these narrow examples. AI and digital technologies enable governments to create an entirely new citizen experience, with a single entry point connecting people with all relevant government services, personalized to their individual needs. Imagine the experience of a woman who loses her job. In an AI-powered future state, she would not need to apply separately for unemployment, food assistance, medical assistance, or other government services. Instead, her former employer would report the job loss to the government, and she would be automatically enrolled in all the relevant services for which she qualifies. In this same AI-powered state, when citizens contact their governments for support online, over the phone, or in person, a complete profile of all services used, recent life experiences, personal preferences, and other relevant data will be available to support improved service quality and faster resolution of their needs.

More Efficient Operations and Processes.

AI-based process improvements have helped leading organizations increase the efficiency of internal operations and processes. For instance, AI-enabled procurement processes allow decision makers to identify inefficiencies and potential cost savings in the products and services they purchase. Other support functions can also benefit. AI can help learning and development organizations create customized training and education programs, it can help HR functions match qualified candidate employees to open positions, and it can help building maintenance predict problems for proactive remediation.

Imagine a future state in which every worker executing the myriad back-office administrative functions of government is paired with an intelligent assistant that can complete repetitive tasks. This robotic process automation tool fills forms, aggregates information from different government agencies and departments, and handles low-risk, routine approvals. The human worker is left with additional capacity to engage with citizens and address the most complex cases. The degree of engagement and personalized assistance citizens receive is dramatically improved, and government workers have far more rewarding jobs.

3.2Prioritizing investments

One of the most fundamental challenges for government leaders is a lack of clear success metrics, which creates related issues in determining how to allocate financial resources. Corporations have profit and sales, but a housing and urban development department or ministry of justice has multiple outputs, many of which are incredibly difficult to quantify. Should a government's next cent be spent on drug treatment, reducing recidivism, policing, or urban renewal? And within those areas, should it prioritize smarter policymaking, reimagined service delivery, or more-efficient operations? AI can help governments by analyzing specific outputs and then determining the initiatives most likely to make an improvement.

For example, consider a government working to reduce unemployment. There are multiple, potentially conflicting objectives the government must balance, including minimizing the amount of time that individuals remain unemployed, maximizing placements in long-term positions, and maximizing the economic value of jobs. By breaking these objectives down into specific metrics and

assembling them into a scorecard, an organization can apply AI-enabled tools to understand which ones have the greatest effect, and it can use data about past initiatives to understand the probable effect of future actions. This approach will provide decision makers with an understanding of which interventions are likely to have the greatest overall impact, the net effect of which will be to allow leaders to solve one of the core challenges of any enterprise: determining where to invest the next cent.

4.Where to start

Governments need to develop a strategy, governance structure, and change management approach for integrating AI into their operations. To maximize the benefits of AI and avoid some of the risks often experienced in the public sector, they should consider the following recommendations:

a) Determine clear ownership.

Implementing such a broad vision often means coordinating across departments/agencies, developing centralized expertise in AI, and addressing a range of ethical issues. Accordingly, someone in each department or agency should be designated as a point person to speak on behalf of the initiative, with clear lines of authority and ownership across the entire institution.

b) Align on the vision.

Starbucks met (and surpassed) its goal by setting a north star. The management team had a vision of what it wanted the company's future to look like. It developed a strategy to create that future and used its vision as a guide throughout the journey. Governments need to do the same.

c) Start small and build the business case.

Developing a business case will become easier once early measures begin to prove the value of implementing AI. In the beginning, governments should focus on a small number of straightforward yet impactful use cases, build experience and capabilities, and then scale them across the organization. Initiatives need to begin with clear objectives and measures of success (some of which may not be financial in nature). Although creating a business case may be challenging, it will be critical over the long term in securing consistent funding and maximizing the benefits of scaling AI. Strong business cases and demonstrable successes will create tremendous support that transcends administration changes or leadership transitions.

5. Conclusion

AI is transforming our world. The field is an engine of innovation that is already driving scientific discovery, economic growth, and new jobs. AI is an integral component of solutions ranging from those that tackle routine daily tasks to societal-level challenges, while also giving rise to new challenges necessitating further study and action. Most people already interact with AI-based systems on a daily basis, such as those that help us find the best routes to work and school, select the items we buy, and ask our phones to remind us of upcoming appointments.

AI holds tremendous potential to help Governments better serve constituents through higher-quality service offerings, increased efficiency, and other advantages. Yet the current pace of implementation among governments is simply not sufficient. Given the pace of technology development, every day that governments wait to take decisive action is another day they fall further behind. To make faster progress, policymakers should study and take inspiration from the paths forged by global AI leaders

AI is here and it isn't going anywhere. The possibilities are endless, and this drives experts to keep advancing it. However, some of the public worries - about the future of jobs, and even of humankind.

AI isn't evil though - it takes over mundane tasks to free up our time. It's ported into various forms of technology, like smart bulbs, to reduce electricity use and emissions. It's also helping to diagnose conditions early in healthcare — in the right hands, AI has the ability to increase our quality of life. We just need to keep an eye (and hand) on it.

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