AI Decision Making for Allocating Government Grant Funds

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ABSTRACT

This paper discusses the use of Artificial Intelligence in government decision making with a case study on the use of Artificial Intelligence to distribute government grant funds. Artificial Intelligence enables autonomous systems and decision support aids. A formal process is very important when designing a system to make decisions autonomously with Artificial Intelligence. The Office of Justice Programs, an agency of the U.S. Department of Justice, focuses on crime prevention; it provides research and development assistance to state, local, and tribal criminal justice agencies. OJP's public safety grants involve about $2 billion distributed to some 2,000 grantees. In the past, the agency had no standard approach for determining who received grants. Then, about 2011, OJP began introducing objective measures into the grant review process and automated the process. With AI, the new system resulted in increased accuracy and consistency of decisions, as well as a more efficient review process.

Keywords: Artificial Intelligence · Government Grants ·Autonomous Decision Making ·Government Grant ·Crime Prevention

INTRODUCTION

An important element in government administration is decision making. Large and small decisions are made constantly at every level. Traditionally, only a minority of government decision makers have used a formal approach; but now, politics, intuition and coincidence are increasingly being replaced by formal, structured decision making, which results in better outcomes. Further, the continued development of e-Government technologies is leading to the use of autonomous decision-making based on Artificial Intelligence (AI). A formal process is even more important when designing a system to make decisions autonomously.

AI software imitates intelligent human behaviors. AI programs learn, reason, and make decisions. In many areas, AI is superior to humans in decision-making. Successful decision-making calls for a formal process involving several factors such as defining the mission and weighing objectives, allocating resources, and setting indicators for measuring outcomes, among others. Steps in developing mission analytics include collecting mission-oriented data, building an analytics layer, and using the resulting insights to allocate resources.

The U.S. government distributes hundreds of billions of dollars annually in grants. A case study demonstrates the benefits of autonomous decision making to allocate government grant funds. The Office of Justice Programs (OJP), part of the U.S. Department of Justice, developed an autonomous decision process to allocate grant funds amounting to some $2 billion annually to about 2,000 grantees. The process substantially reduced the time to select grantees to receive funds. OJP now allocates its resources based on hard data rather than subjective opinion. Efforts are ongoing throughout all government to achieve more objective mission management and replace intuition with objectivity.

The following section discusses government decision making and the traditional methods by which government officials have made decisions.

Then the paper addresses the drive toward better government decision-making and summarizes laws and executive actions over the past 20 years that have sought to improve government decision-making, make government programs more effective, and obtain better outcomes.

The next section addresses autonomous decision-making and how AI functions, along with its various applications in government operations and decision-making.

Then the paper looks at how AI analyzes text and uses reasoning, logic, and deduction to support decision-making.

Finally, the paper describes a case study of the Public Safety Grant Program of the Office of Justice Programs of the U.S. Department of Justice and how autonomous decision-making helped to make the program more efficient and effective.

And last, some conclusions are presented.

TRADITIONAL GOVERNMENT DECISION MAKING

An important element in government administration is decision making—large and small decisions are being made constantly at all levels. For example, an official at the Social Security Administration approves or disapproves a disability claim; a mid-level official selects among competing bids for a new computer system; or the head of an agency approves a new agency policy. Elected officials also continually make decisions: Congressmen decide how to vote on a bill, or the president considers a new trade policy.

As Pearson notes, public administrators typically make decisions through a two-step process. First, they need to determine the requirements of the applicable law. For many routine government decisions, the law does not provide for discretion. For example, the social security benefit for an individual depends on a complex formula emanating from legislation. When the law allows them to use their discretion, they generally make decisions like most people: taking into account the facts and the relevant values, they seek to maximize utility.

THE GOV ERNMENT'S DRIVE TOWARD MORE OBJECTUVE DECISIIONS

Efforts are ongoing throughout the government to achieve more objective mission management and to replace intuition with objectivity. This effort emanates from the 1993 Government Performance and Results Act, which requires federal agencies to include performance management as part of their strategic planning. Since then, additional laws and government actions have reinforced the mandate for government agencies to get results. Table 1 summarizes the various actions.

Table 1: Government Actions to Make More Objective Decisions

Year	Action
1993	Government Performance Results Act (GPRA)
2002	President's Management Agenda (PMA)
2004	Program Assessment Rating Tool (PART)
2009	Evidence-based policy push
2011	GPRA Modernization Act of 2010 (GPRAMA)
2014	Digital Accountability and Transparency Act (DATA)
2016	FedStat
2019	Grant Reporting Efficiency and Agreements Transparency (GREAT)

The Government Performance Results Act (GPRA) requires agencies to prepare a multi-year strategic plan and to submit an annual performance plan, as well as an annual performance report.

The President's Management Agenda of 2002 (PMA) was the Bush administration's strategy to improve the management of the Federal government. The goal was to make the government results oriented.

The Program Assessment Rating Tool (PART) rated the effectiveness of all federal programs. The rating took place several times during the Bush administration, and the results showed significant improvement. Subsequently, the Obama administration discontinued PART.

The Obama administration instituted its evidence-based policy push in 2009. The intent was to use evidence to shape decisions about the funding of social programs to have confidence that they would actually work.

The GPRA Modernization Act of 2010 (GPRAMA) took the existing requirements of the 1993 act and established a more efficient and modern system for government agencies to report their progress.

The Digital Accountability and Transparency Act (DART) of 2014 aims to make information on federal expenditures more easily accessible and transparent. It simplifies reporting for entities receiving Federal funds, holds Federal agencies accountable for the completeness and accuracy of the data submitted, and enables taxpayers and policy makers to track Federal spending more effectively.

FedStat provides access to the full range of official statistical information that the U.S. Government produces.

The Grant Reporting Efficiency and Agreements Transparency (GREAT) standardizes grant reporting standards, reduces federal grant recipients' reporting burden and compliance costs, and increases transparency and strengthens federal agencies' oversight and management of federal grants.

A Deloitte study finds that if a government formulates metrics to measure the results of its operations, then it can employ data-driven analytics to make better decisions and allocate resources for optimal results.

The first step is to find ways to quantify the mission. Metrics may measure inputs, outputs, and outcomes. Inputs are funding, personnel hours, etc. Outputs are products of the government activity, such as the number of homes visited by social caseworkers. The most important thing, however, is the outcome—the consequences of the program that directly affect the citizens. Then the agency needs to create a platform designed to collect, store, and disseminate the relevant data. This may mean going outside of the agency to obtain information from other entities, so it is necessary to break down the silos. Third, the use of analytics enables the government to derive meaning and insights from the data it collects. Finally, Step 4 is to transform insights into organizational action to implement operational changes.

AUTONOMOUS DECISION MAKING

Hofmann defines intelligence as the ability to make sense and to act accordingly. As described by Kusiak, et al., AI researchers and practitioners create models, algorithms, functions, and other constructs to develop techniques and tools to analyze data to achieve computational intelligence.

The continued development of e-Government technologies is leading to the use of autonomous decision-making, based on Artificial Intelligence. AI uses software to imitate intelligent human behavior. AI programs can learn, reason, and make decisions; they can carry out activities such as monitoring, discovering, predicting, and interpreting. AI is already superior to humans in skills such as playing chess.

A McKinsey study enumerates a number of applications for decision making in government. AI programs can read X-rays and other forms of medical data and can detect heart disease and various forms of cancer more accurately than humans can. This study notes that the problem-solving and predictive abilities of AI have become an important tool for government and can help government agencies solve complex problems. Consequently, government applications of AI are expanding. For example, AI systems also carry out functions such as identifying tax-evasion patterns, predicting the spread of infectious diseases, and inspecting bridges.

Autonomous decision-making with AI can reduce costs, improve outcomes, and improve process automation.

ANALYZING TEXT

AI systems that analyze text can perform cognitive functions and automate various tasks. For example, AI produces many routine articles in financial publications. The system analyzes data for a company such as revenues, stock price, etc., and drafts an article discussing the company's growth prospects and the trajectory of its stock price, among other things.

Computer reasoning based on logic and deduction, optimization and decision-making enables autonomous systems and decision support aids. Structured participatory processes are available, but government entities traditionally seldom used them in decision-making. Autonomous decision-making systems need a formal, structured process.

As Sundberg and Larsson note, successful decision-making needs a formal process involving several factors, including:

- Defining and weighing objectives
- Analyzing stakeholders
- Planning activities and allocating resources
- Identifying and assessing risk
- Setting indicators for measuring outcomes
- Determining if objectives were met, as input to subsequent decisions

A formal process is even more important when designing a system to make decisions autonomously.

Currently, only a minority of government decision makers have been using a formal approach. Much government decision-making stems from politics, intuition, and coincidence. Now these factors are being replaced by formal, structured decision-making. It has been found that a structured, formal decision making process results in better outcomes: A rational decision-making process increases the likelihood that the objectives of the program are fulfilled.

Further, in e-government, technological factors, political factors, organizational and institutional factors, and legal and regulatory factors need to be considered. Decision making in government becomes very complex when multiple systems and stakeholders need to collaborate and interoperate. Rational decision-making, based on a structured process is more likely to yield the desired outcome.

CASE STUDY: DOJ OJP

Government programs must allocate scarce resources. U.S. Federal grant programs amount to some US$600 billion annually. Recipients of these funds include school districts, fire departments, food banks, homeless shelters, job-training centers, and water treatment facilities, among many others. The government seeks to spend grant money wisely and obtain positive results. AI is helping to achieve this objective by offering a way to improve efficiency in disbursing government funds. An example of this is the grant program of the Office of Justice Programs (OJP), an agency of the U.S. Department of Justice (DOJ).

OJP does not carry out law enforcement or justice activities itself. Rather, the agency focuses on crime prevention through research and development assistance to state, local, and tribal criminal justice agencies. Its activities cover law enforcement, corrections, and juvenile justice. OJP works in partnership with the justice community to identify the most pressing crime-related challenges confronting the justice system and providing information, training, coordination, and innovative strategies and approaches to address these challenges. It focuses on a science-based, "smart-on-crime" approach.

An example is OJP's public safety grants. For many years, during the summer grant "season," OJP distributed about $2 billion to some 2,000 grantees. Examples of OJP's grant programs include:

- Cold case investigations and training
- Substance abuse treatment for state prisoners
- Protecting inmates and safeguarding communities
- Community re-entry
- Preventing wrongful convictions
- Adult drug court and veterans treatment court

OJP's goal is to administer a grant awards process in a fair, accessible, and transparent fashion and to manage the grants system in a manner that avoids waste, fraud, and abuse.

In the past, the agency had no standard approach for determining who received grants. The individual grant managers used their own judgment, basing their decisions largely on their knowledge of the applicants.

Then, about 2011, OJP began introducing objective measures into reviewing the grand applications and automated the process. The new system resulted in increased accuracy and consistency of decisions, as well as a more efficient review process. The time for a grant manager to capture grantee data in the database fell from 30 minutes to almost zero, and the agency can review grant applications quarterly instead of

annually. OJP now allocates its resources based on hard data rather than subjective opinion.

CONCLUSIONS

Government officials must make many decisions in the course of their duties. Government agencies must allocate scarce resources and seek to do so in a more efficient and effective way. Over the past 20 years, U. S. government administrations have instituted policies and taken actions to require government agencies to make sure that their programs work and achieve the desired results.

Artificial Intelligence and autonomous decision-making have become important tools to support the drive to better decisions with better outcomes. By instituting a formal decision-making process and establishing objective, quantitative measures as the foundation of decision-making, outcomes are improved. Artificial Intelligence and autonomous decision making in the allocation of resources introduces objectivity, reduces costs, makes the process more efficient, and improves outcomes.

The new method provides performance measurement with regular collection of data, metrics to demonstrate program progress and success, and enables agencies to know if they have met their performance objectives. OJP and other government agencies now distribute grant resources based on hard data rather than subjective opinion.

Benefits of the autonomous decision making include:

- Increased consistency in allocation of funds
- Greater efficiency in the review process
- Substantial reduction in time to capture data and analyze proposals

In summary, the use of Artificial Intelligence and autonomous decision-making enables government agencies to better fulfill their mission.

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