

CERIDAP

RIVISTA INTERDISCIPLINARE SUL
DIRITTO DELLE
AMMINISTRAZIONI PUBBLICHE

Estratto

FASCICOLO
2 / 2020

APRILE - GIUGNO

Prometea experience. Using AI to optimize public institutions

Juan G. Corvalán e Enzo Maria Le Fevre Cervini

Prometea is an artificial intelligence created in Argentina within the scope of the Innovation and Artificial Intelligence Laboratory of the School of Law of the University of Buenos Aires and the Public Prosecutor's Office of Buenos Aires, with the main goal of accelerate bureaucratic processes and free up time for the analysis of complex cases. Its biggest milestone is to predict a solution to a court case in less than 20 seconds, with a 96% success rate. Furthermore, it is able to identify urgent cases –within large volumes of files– in just 2 minutes, which would normally take a human being 96 days. Taking advantage of this AI, while working to consolidate Digital Governments and universal ICT access, we aspire to promote a transition towards a new archetype of public organizations that will make them exponential.

[L'esperienza di Prometea. Rendere le pubbliche amministrazioni più efficienti grazie all'intelligenza artificiale] Prometea è un sistema di intelligenza artificiale creata in Argentina nell'ambito del Laboratorio di innovazione e intelligenza artificiale della Facoltà di Giurisprudenza dell'Università di Buenos Aires e della Procura della Repubblica di Buenos Aires, con l'obiettivo principale di accelerare i processi burocratici e liberare tempo per l'analisi di casi complessi. Il suo più grande successo è prevedere una soluzione a un caso giudiziario in meno di 20 secondi, con un tasso di successo del 96%. Inoltre, è in grado di identificare casi urgenti, in presenza di grandi volumi di file, in soli 2 minuti, il che richiederebbe normalmente ad un essere umano 96 giorni. Approfittando di questa IA, mentre lavoriamo per consolidare i governi digitali e l'accesso universale alle TIC, aspiriamo a promuovere una transizione verso un nuovo archetipo di organizzazioni pubbliche che le renderà più efficienti.

1. Introduction to Prometea

Prometea is a predictive artificial intelligence system created in Argentina, developed by the Public Prosecutor's Office of the City of Buenos Aires. Under the technique "supervised learning," Prometea is an exponential optimizer of bureaucratic processes. The system, at first, was created and implemented so as to optimize the justice service, aiming to exponentially fasten the judicial processes to benefit the citizen. Later, it was also realized that the benefits generated by the system could be used and applied within any public organization.

From different layers of innovation, its development constitutes a highly disruptive technological advance, whose implementation arises from the State's necessity of being in charge of providing effective and innovative means, which are suitable for generating an impact on society as a whole.

Prometea is being applied in the judicial scope since October 2017. From that date onwards, we have interacted with more than 100 Organizations and National or International Institutions, and Prometea has collaborated in the automation of a series of tasks for these organizations^[1].

1.1. Fourth Industrial Revolution and the SDGs. Prometea development context

Humanity is currently going through the Fourth Industrial Revolution which is fundamentally transforming the human beings and its environment. New technologies have an impact on almost every aspect of human development and, in fact, they are an invaluable tool that can help the implementation of the 2030 Agenda for sustainable development under the principle of "leaving no one behind."

The Resolution A/RES/73/17 adopted by the United Nations General Assembly, "encourages Member States to continue to consider the impact of key rapid technological changes on the achievement of the Sustainable Development Goals and targets in order to benefit from opportunities and address challenges, promote the development of national strategies and public policies, science, technology and innovation road maps, capacity-building and scientific engagement, and share best practices."^[2] In this context and in view of these

objectives, Prometea is born.

Disruptive innovations like artificial intelligence (AI), big data, blockchain and neural networks, are powerful tools to increase government efficiency, effectiveness, accountability and inclusiveness in providing service delivery. The use of these technologies may create new opportunities for development and economic growth in different areas of government such as health care, law enforcement, food security, crisis mitigation. While governments can use the advantages offered by AI to provide a wide range of services, at the same time they are adapting to the specific needs of each citizen on a 24/7 basis.

Despite the benefits and the opportunities that the use of AI and other emerging technologies provide, they also create new challenges for public institutions to transform their structures. The extensive and successful use of AI requires that public administrations redefine strategies based on the use of new technologies. They must ensure a sustainable and inclusive development of AI that does not create inequality gaps in society but rather reduces the existing ones. Such transformation must be managed from a “social technology” approach.

AI-based systems, such as Prometea, have expanded policy options that did not exist in recent decades. These technologies have remarkable potential to reduce bureaucracy and increase efficiency of public sector, as well as putting the focus on the citizenship. They can detect information patterns from a large amount of data and, therefore, help us make better evidence-based decisions to achieve the Sustainable Development Goals and, in particular, Objective 16: access to justice for all and, building effective, accountable institutions at all levels.

1.2. Prometea characteristics and functionalities

Prometea is characterized by three major aspects:

It has an intuitive and friendly interface that allows "talking" to the system or chatting from a natural language recognizer. It uses the integrated screen approach, eliminate clicks and open multiple windows on the computer. On a single screen, the user has all the resources available to do his work;

It operates as an expert system with a multiplicity of functions, which allow to automate data and documents as well as perform intelligent assistance;

It uses supervised machine learning and clustering techniques, based on manual

labelling and in machine dataset training.

Prometea's functionalities can be described in four main groups:

Intelligent Assistance: the assistance involves the transmission of knowledge and processes for algorithm development that simplify, fasten and reduce their mistakes. Prometea guides users with his voice or through a chatbot^[3], in obtaining a result, the same way in which Apple's Siri works. In this way, the AI automates tasks related to the deadline control of judicial appeals filed and self-sufficiency controls; this implies analysing the documentation accompanied by the file, which is essential for its resolution. For example, from 5 questions, you are able to complete a legal opinion by which you must reject an appeal by extemporaneous.

Automation: the concept of automation presents several nuances according to multiple variables. Mainly, there are two big groups:

Complete Automation: the algorithms connect data and information with documents automatically. The document is generated without human intervention.

Automation with Reduced Human Intervention: in many cases, it is necessary that the persons interact with an automated system, in order to complete or add value to the creation of a document.

Prometea is able to operate with both types of automation.

Intelligent Classification and Detection: this complex task is performed using supervised machine learning techniques. The detection comes from the reading and analysis of a large volume of information, in which Prometea can identify documents within the multiple combinations of criteria used, even if the documents do not have a homogeneous language. Then, Prometea segments information based on shared patterns (keywords) in the documents. The more precise the keywords, the highest the number of documents that can be covered with a certain criteria.

Prediction: is the most sophisticated function that Prometea presents. It consist in one or several algorithms which reveal a lot of data in order to establish patterns that are translated into predictions, based on some statistical criteria. It is training based on patterns identified in previous cases. When a data is introduced, that data will be identified and compared with similar ones analysing the answers that were given in each case. As a result, a prediction based on

historical responses will be obtained. When Prometea matches the current document with a previous one, it tracks the solution given in previous cases and proposes the same solution by understanding that the circumstances are analogous. For example, in 20 seconds on average, you can obtain the applicable solution from entering only the case number to solve. This task is developed from the reading and recognition of patterns of judicial decisions of the previous instances that are available on the web. Once Prometea detects the solution, it allows the user to complete the legal opinion based on a few questions and then, it shows a preview of the final document, which can be edited online. In short, the first draft document is automatically generated by the AI.

2. Benefits of Prometea. Ethical use

It is exponential in terms of effectiveness and efficiency. It has an average success rate of 96% in relation to proposing legal solutions in the Public Prosecutor's Office of the City of Buenos Aires. In other words, it matches 96 out of 100 responses that a human expert provides. In addition, it allows radically increasing the response times of justice.

Auditable and traceable. Prometea works through traceable, auditable and reversible machine learning. This means that it is not a "black box", and that it is perfectly possible to establish what is the underlying reasoning that makes the prediction.

In continuous development. The team that develops Prometea constantly works to improve and keep updated the prediction rates. AI enhances human intelligence, based on a constant interaction about changes in jurisprudence, which in turn allows more time to analyze and improve the arguments behind decisions.

Automation that humanizes. By taking over the simplest, routine and mechanical tasks, Prometea allows judicial operators to add value to the most complex cases. From the team that works with Prometea, we understand that these benefits can only be achieved if a set of ethical principles are met both in its design and in its implementation^[4].

Respect for human rights. Prometea is compatible with the fundamental rights recognized in the Argentinian Constitution and the international human rights instruments, of which Argentina is a State Party.

Non-discrimination. Prometea is designed in order to prevent the development or intensification of any type of discrimination based in stereotypes. The methods used by this AI do not reproduce expressions or discourses of discrimination.

Safety and quality. Prometea is a project that is expanding rapidly, so every time we contact organizations and / or people to design an intelligent system according to their needs, one of the first steps is to obtain the corresponding permissions to comply with security protocols.

Transparency and impartiality. AI algorithms must be completely transparent in their decisions. This means that it must be possible to infer or deduce an "understandable explanation" about the criteria they use to arrive at a particular conclusion, suggestion or result. As a rule, all the methodology used to design Prometea is accessible, traceable and understandable, in a clear and familiar language to describe how results are reached.

Strict human control. Human control is present at all stages of Prometea implementation in order to train the system to constantly improve itself. This is achieved through trial and error, so human control is essential in an intelligent system that impacts or has a strong impact on people's fundamental rights.

2.1. Prometea in numbers

This innovation has brought immense benefits in its application and the development of several proofs of concepts within Justice and Public Administration:

It predicts the solution to a judicial case in less than 20 seconds with a 96% success rate. It allows the drafting of 1000 judicial sentences related to housing rights in only 45 days; in the traditional way this would take 174 days.

In minor offenses, it allows the creation of 1000 resolutions to suspend trials for driving under the influence of alcohol in 26 days, which manually would take 110 days.

In the Constitutional Court of Colombia, which received thousands of files daily, the time destined to select urgent cases was reduced from 96 days to up to 2 minutes since the application of machine learning. Prometea reads, analyses, detects and in a few seconds suggests which the priority cases within health

related matters are. All this, under human supervision. Moreover, 14 documents can currently be created in 16 minutes, when before it would take a person 2 hours and 40 minutes of work. The efficiency in this case is increased by a 937%. In the Civil Registry of the City of Buenos Aires, the rectification of 6000 administrative records which enter during one year, are done in 2 months using Prometea, when the normal procedure took 8 months.

In relation to all the implementations, it was concluded that Prometea reduces the amount of typing mistakes by 99%; and allows an exhaustive control of formal aspects of the documents involved.

2.2. Other contexts in which Prometea is applied

One of the most relevant sectors that civil courts are called to assist to is trials invoked by traffic accidents.

The Province of Buenos Aires is the largest jurisdiction with the largest number of inhabitants in Argentina. It is also the province in which the greatest number of traffic accidents occurs. During the last decade, the province increased the road accident rate by 50%, a percentage that represents 34% of the total country.

In this context, the team working on the development of Prometea established a link with the Court of Moron, a jurisdiction of the aforementioned province, in order to put Prometea into operation so that it could collaborate in the bureaucratic processing of civil procedures around traffic accidents, with the aim of reducing judicial response times.

A great number of the traffic accidents trials is affected by the determination of a causal link (or chain of causation). The causal link is a cause-effect relationship that allows establishing the facts that could be considered determinants of the damage and which of them caused the tangible damage. This causal relationship is essential to claim damages caused to the author or responsible. Determining whether the trial is affected or not by causal link requires the justice system a lot of time, resulting in a delay in resolving the case.

According to the data-collection done by the research team, out of 400 files from different Argentinian jurisdictions, in 84.8% there was a causal link and in 15.2% of the cases, there was a rupture of the causal link. Doing the same analysis in the Province of Buenos Aires demonstrated that there was a causal link in 70.9% of

the files, while the rupture of the link occurred in 29.1% of the cases.

Prometea here works as a predictive assistant that allows to analyse in a few seconds, that projected document. This means that the Artificial Intelligence performs the task of control and contrast with the story described in the file, in a few seconds, which allows the judge to increase the knowledge base to make a better decision.

2.3. Task-based approach. Automation that humanizes

From the moment we started designing Prometea, we understood that the perspective had to focus on the distinction between jobs and the tasks that form them. In general, professions are made up of multiple and diverse tasks, which in turn require distinctions in relation to the cognitive abilities behind each one. We insist on separating jobs and tasks, because in the short term there are few occupations that can be completely automated with the existing technologies. However, when those tasks are automated, work profiles must be transformed^[5]. Based on this analysis, we classify the tasks into three large segments: automatable, semi-automatable and non-automatable. In the Deputy Attorney General Prosecutor's Office in the Contentious Administrative and Tax Matters of Buenos Aires, we segmented tasks and detected that of 169 activities that are carried out, 54 can be completely automated, whereas there are 74 tasks that cannot be and 41 that can only be partially automated^[6].

Figure 1: task according to automation grade

ACTIVITY	Automatable	Non-automatable	Semi-automatable	Total
Legal-Systematization	16	26	13	55
Legal-Ruling	1	5	6	12
Legal-AI	1	8	3	12
Planning and management	9	7	3	19

CERIDAP

Administrative-Ruling	14	-	-	14
Training and promotion	13	28	16	57
Total as for automation grade	54	74	41	169

During the development of Prometea, workers had to learn concepts and logics linked to intelligent systems. At the same time, they had to unlearn techniques and approaches that they have acquired to develop within the "industrial" paradigm, based on a succession of linear steps to reach a certain result.

Working with AI makes the search for solutions and the way to reach them, more clear and precise. Training algorithms into routine, repetitive and mechanical tasks, give employees the possibility to be more productive in postponed or complex tasks.

When a worker has an AI system such as Prometea, which for example, in a few seconds detects and compares prices of the latest purchases in the public sector, it increases its capacity to improve the efficiency of public spending. It is evident that the combination of human workforce and AI systems, under an inclusive approach, produces the phenomenon we have called "automation that humanizes".

The reduction of biases, mistakes and time, allows redirecting biological cognitive abilities to more sophisticated tasks or to those that require empathy and creativity. For example, it is estimated that by 2030 digital workers will dedicate two hours less per week to routine tasks which can be automated, being able to focus on more complex activities^[7].

In conclusion, far from unemploying people, Prometea hierarchized the work, simplified bureaucracy, optimized the process, accelerated the response times of justice, incorporated new operators and also allowed the development of delayed tasks or complex activities.

3. Conclusions

During the 20th century, the bureaucratic structures were based on a logic that

migrates from paper, typewriter and printing press, to computers, text processors and printers. This “printing bureaucracy” does not focus on the citizens, but on the public organization. With the advance of ICT –Internet, social networks, mobile apps– “digital bureaucracy” began to consolidate, that results in clicks, window opening and copying and pasting data into computer programs.

The incorporation of new technologies should be approached from the perspective of people and their rights. In order to do that, it is no longer enough to “apply” new technologies to existing problems, or to improve computer systems to “do the same” but with more technology. On the contrary, it is about rethinking or redefining new strategies and ways of understanding the relationship between society and technology.

We strongly believe that public institutions must move to a different paradigm, what we called “intelligent bureaucracy”. In this context, AI systems simplify and exponentially accelerate interactions and tasks based on automation and predictive activity. We have already verified that this is possible thanks to Prometea. This AI impacts on the effectiveness of rights in general and, specifically, the principles of equality and legal security. In turn, it humanizes public workers as it allows them to be freed from mechanical tasks, which makes it possible to allocate more human capital to more complex activities.

We aspire to promote a transition towards a new archetype of public organizations that will make them exponential. Although we do not ignore the many challenges that we have to face, we propose to move forward in this path in order to achieve more accessibility, acceleration, precision, simplification, knowledge base, and in the end, more rights for more people.

1. To consult the implemented projects, the projects in progress and the Prometea concept tests: <https://ialab.com.ar/proyectos-de-impacto/>.
2. Resolution No. 73/17 of the UN General Assembly, “Impact of rapid technological change on the achievement of the Sustainable Development Goals and targets” A/RES/73/17 (December 3, 2018), item 1.
3. A chatbot is a conversation agent that interacts with users in a certain domain or in a certain topic with natural language. See, Jizhou Huang, Ming Zhou, Dan Yang. 2007. Extracting Chatbot Knowledge from Online Discussion Forums. *International Joint Conference on Artificial Intelligence*, Hyderabad, India, 423-428.
4. These principles are inspired by the European ethical Charter on the use of Artificial Intelligence in judicial systems and their environment.

CERIDAP

5. International Labor Organization. 2018. *The economics of artificial intelligence: Implications for the future of work*, Research Paper 5, ILO Future of Work Research Paper Series, p. 9.
6. In this case, the AI system Prometea was used. For the preparation of this study on tasks that is carried out in the Office of the Deputy Attorney General for Administrative and Tax Matters of Buenos Aires, we are based on the research: Kate Pounder and Geoffrey Liu. 2018. “New Jobs. Latin America and Australia”, in BID-INTAL, *Planet Algorithm. Artificial Intelligence for a Predictive and Inclusive Form of Integration in Latin America*, 273-289.
7. *Ibid.*, p. 279.