JUSTILEXIA: AN ARTIFICIAL INTELLIGENCE SYSTEM TO ASSIST IN VERIFYING ADMISSIBILITY REQUIREMENTS IN COLOMBIAN CIVIL PROCEEDINGS*

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ABSTRACT

This article proposes the design of Justilexia, an artificial intelligence system based on natural language processing (NLP) aimed at analyzing the formal structure of civil lawsuits in Colombia to automatically verify procedural admissibility requirements. Congestion in the Colombian judicial system causes significant delays in the preliminary review of pleadings, increasing the workload of judges and court officials. Using an applied research methodology with a socio-legal and technological approach, a prototype is designed to examine a representative corpus of civil lawsuits from the Circuit Civil Courts of Cartagena to identify the most common grounds for inadmissibility regulated under the General Code of Process (Law 1564 of 2012). The tool operates through a multi-tier architecture that converts procedural norms into computational logical rules, contributing to judicial management optimization, error reduction, and administrative efficiency..

KEYWORDS

Artificial intelligence, Lawsuit admissibility, Civil procedure, Legal Tech.

RESUMEN

En la presente investigación propone el diseño de un sistema de inteligencia artificial orientado a analizar la estructura de las demandas civiles en Colombia, con el fin de verificar los criterios de admisión y evaluar la pertinencia de los medios probatorios frente a los hechos del proceso judicial. El sistema propuesto utilizará un chatbot de conocimiento que denominaremos "JUSTILEXIA". La utilidad de la herramienta va encaminada al uso de los despachos judiciales, abogados litigantes, consultorios jurídicos, bufetes de abogados, entre otros. La metodología del proyecto desarrollado es de tipo investigación aplicada de enfoque sociojurídico y tecnológico, orientada el desarrollo experimental de un prototipo de software jurídico basado en inteligencia artificial para el apoyo en el análisis y la gestión de información jurídica. En la primera etapa se desarrollará: fase de recolección del corpus jurídico y la segunda en el diseño de un prototipo mediado por la inteligencia artificial, se construirá un Dataset jurídico, el cual es un conjunto de documentos jurídicos, como normas, sentencias, autos, entre otros, que permitirá entrenar y evaluar el sistema de la inteligencia artificial, para ello se recogerán muestras de demandas civiles, autos de admisión e inadmisión y sentencias judiciales y códigos procesales, todo lo anterior de fuentes como la Rama Judicial y su Página Web, de la Corte Suprema de Justicia.

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PALABRAS CLAVE

Inteligencia artificial, Admisión de la demanda, Proceso civil, Legal Tech.

INTRODUCTION

The use of various technological tools has transformed the legal field through digitalization, enabling the analysis of large volumes of information and thereby improving the efficiency of judicial systems.

As a result, Legal Tech solutions allow us to automate numerous tasks related to the requirements for complaints filed with the judicial branch, where judges, trial attorneys, and legal clinics spend a significant amount of time reviewing them to verify compliance with filing requirements and assess the relevance of the evidence submitted and requested during the proceedings.

This research proposes the design of an artificial intelligence system aimed at analyzing the structure of civil lawsuits in Colombia, with the goal of verifying the criteria for admissibility and evaluating the relevance of the evidence in light of the facts of the judicial proceeding. This will enable the use of a knowledge-based chatbot that we will call "JUSTILEXIA."

Colombia's judicial system is facing growing backlogs, which hinder the timely analysis of complaints filed with the courts. Both trial attorneys and judges must review all complaints filed with the courts to ensure they meet formal requirements, that there is consistency between the facts and the claims, and that the evidence is relevant, among other criteria. Consequently, this leads to increased backlogs and a heavier workload for attorneys and, above all, for the judicial branch. Requests for evidence are often not directly related to the facts and claims, which hinders the efficiency of the process. Consequently, the proposed research project will, in its first phase, analyze 346 judgments to identify the most common errors made by legal representatives and to design a technological tool based on the information collected during this initial phase. In this first phase, we will study the outcomes of 50 orders admitting the complaint.

The lack of technological tools capable of automatically analyzing the legal structure of complaints presents an opportunity to develop solutions based on artificial intelligence that could help improve the efficiency of document review tasks and support the preliminary identification of procedural requirements. The development of a system we will call "JUSTILEXIA" would enable the automation of the preliminary review of complaints, improve the presentation of relevant evidence, and facilitate judicial decision-making. The tool is intended for use by court offices, trial attorneys, legal clinics, and law firms, among others.

The methodology of the project is based on applied research with a socio-legal and technological focus, oriented toward the experimental development of a legal software prototype based on artificial intelligence and a knowledge chatbot to support the analysis and management of legal information.

The project will develop a prototype based on an **experimental and technological development** approach that combines **computational, legal, and software engineering** research methods**.** Therefore, the project seeks a partner from the " " systems engineering program at educational institutions in the city of Cartagena or through partnerships with other campuses of the Universidad Libre, capable of developing the functional prototype phase.

The problem to be solved is as follows:

To what extent can an artificial intelligence system based on natural language processing support the identification of admissibility requirements and grounds for dismissal in membership claims filed with the Civil Courts of the Cartagena Circuit?

For this initial phase of the research, the scope of the study will be limited to the first phase of the project, during which the grounds for dismissal in civil proceedings will be analyzed: Membership proceedings in the Civil Courts of the Circuit of the city of Cartagena and the relevance of the evidence in light of the facts presented in the complaint; the second phase will be carried out subsequently, during which the AI-mediated knowledge chatbot will be developed.

2. RESULTS

The Colombian judicial system, particularly in the area of civil proceedings, faces growing backlogs stemming from the high volume of complaints, the complexity of cases, and the limited operational capacity of court offices. This situation negatively impacts the efficiency, speed, and quality of the administration of justice, causing significant delays in the admission of complaints and in the initial assessment of the evidence submitted by the parties.

One of the main factors contributing to this problem is the lack of technological tools that effectively support the verification of the admissibility requirements for lawsuits and the analysis of the relevance of evidence. Currently, these processes rely heavily on manual review by judges and court officials, which increases the workload, raises the risk of inconsistencies, and hinders the standardization of legal criteria. Furthermore, many litigators file complaints with formal deficiencies or irrelevant evidence, leading to avoidable dismissals, rejections, or procedural delays.

Despite global advances in legal tech and artificial intelligence applied to the law, the development and implementation of systems that can automate or intelligently assist these key processes in civil procedure are still in their infancy in Colombia. This technological gap limits the possibilities for optimizing judicial management and improving the technical quality of procedural actions from their initial stage.

In this context, there is a need to design and implement an artificial intelligence-based tool that can automatically verify the admissibility criteria for civil claims and assess the relevance of evidence in relation to the facts of the case. However, this raises important questions: How can we ensure that an artificial intelligence system can properly interpret procedural rules and jurisprudential criteria? How can we ensure the reliability and transparency of its results? And what impact would its implementation have on the efficiency of the judicial system and the professional practice of law?

Therefore, the research problem centers on the lack of intelligent technological tools to support the verification of admissibility and evidentiary relevance in the Colombian civil process, and on the need to develop an innovative solution that helps reduce judicial backlog, improve the quality of lawsuits, and strengthen the efficiency of the justice system.

Technologies applied to the law have given rise to an interdisciplinary field known as **Legal Tech**, which seeks to optimize the provision of legal services and improve the efficiency of judicial systems through digital tools. Various authors have contributed to the theoretical development of this field, particularly in relation to artificial intelligence, legal analytics, and the automation of legal processes.

According to Susskind (2013), in his book *The End of Lawyers*, "...the author argues that technology will enable the development of more accessible and efficient legal services, which will lead to a reconfiguration of the role of legal professionals. Later, in *Tomorrow's Lawyers*, he delves deeper into the idea that computer systems will be able to support activities such as document review, litigation management, and predictive analysis of judicial decisions."

Kevin D. (2017), "…concludes that artificial intelligence can process large quantities of legal documents to identify patterns, compare judicial precedents, and support legal reasoning." In his book *Artificial Intelligence and Legal Analyt-

ics*, the author explains how the use of computational methods makes it possible to analyze judicial decisions and predict litigation outcomes. This perspective has contributed to the development of the field known as **legal analytics**, which uses data science techniques to study the behavior of judicial systems."

On the other hand, author Trevor Bench-Capon has made contributions to computational legal reasoning used in legal argumentation, which allows for the identification of relationships between facts, legal rules, and legal conclusions.

Furthermore, Katz, through the use of ***big data*** and machine learning techniques, enables the identification of trends in case law and the prediction of judicial outcomes with a certain degree of accuracy. This field is known as ***jurimetrics***, which combines statistical and computational methods for the analysis of law; processes for mediation and conflict resolution have been developed without resorting to the judicial system.

The theories mentioned above are pertinent and relevant to the project known as *Justilexia*, because research has shown that legal processes can be analyzed and processed using computational tools.

2.1 Legal Tech and the Automation of Legal Processes

The definition of Legal Tech refers to the use of digital technologies that enable the provision of legal services to function more effectively. Therefore, it includes tools that assist with document automation, predictive analytics, and artificial intelligence systems.

Susskind (2019) has argued in his works that technology will transform legal practice and the administration of justice; according to his theory, various traditional legal tasks can be **automated through computational systems.**

The use of artificial intelligence helps us analyze large volumes of legal information using machine learning techniques, natural language processing, and legal text mining.

These technologies have enabled an interdisciplinary approach to law, known as "Legal Tech," allowing legal services to improve efficiency by using technology to automate legal processes, leverage artificial intelligence, and employ legal analytics.

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In this context, the JUSTILEXIA project falls within the field of **Legal Tech applied to the automation of the analysis of legal claims,** proposing a system that uses natural language processing techniques to identify procedural requirements and evaluate the relevance of evidence in civil proceedings.

2.2 Procedural Legal Grounds for Dismissing Lawsuits in Civil Proceedings in Colombia

The "JUSTILEXIA" project is legally grounded in the procedural rules governing the filing, admission, and dismissal of complaints in Colombian civil proceedings, as regulated by the General Code of Civil Procedure, which establishes the formal requirements for the admission of a complaint, as set forth in Article 82. Among these, the most important provisions are: the judge's jurisdiction, identification of the parties, facts of the complaint, claims, legal grounds, and the request for and presentation of evidence. These requirements will determine the legal structure of JUSTILEXIA, which the system must automatically identify, and will determine whether the complaint is admitted, accepted, and/or rejected. Article 90 of the General Code of Civil Procedure sets forth the grounds for non-admission of a complaint, which may be remedied within the time limit granted by the judge.

2.3 Principles of Procedural Law Related to the Application of Artificial Intelligence

Among the principles that the "Justilexia" system would help to uphold are: the principle of access to justice, as it ensures that proceedings are not delayed and that claims are not dismissed, thereby avoiding the risk of the right becoming time-barred or expiring.

Another principle that the "Justilexia" system will promote is *procedural economy*, since if the judiciary uses the system, the costs of administering justice

The artificial intelligence system automates repetitive processes and tasks to promote the principle of judicial effectiveness, thereby increasing efficiency.

2.4. Relationship Between Evidence Law and Artificial Intelligence

The requirements for evidence are set forth in the General Code of Civil Procedure; Article

168 states that a judge may reject evidence that is irrelevant, inconclusive, useless, or prohibited by law. This information would be incorporated into the algorithm to analyze the relevance of the evidence in light of the facts of the case and the claims, and would provide an indicator of evidentiary relevance.

2.5. Justilexia Architecture

According to (OpenAI, 2024), the system would consist of five (5) main layers. The first would be the user interface layer, where users interact with the system through a conversational interface. Potential users include: trial attorneys, judicial branch employees, legal clinics, and citizens. The second layer is where the user interacts using natural language; it would perform the following functions: formulating legal questions, guiding the user, requesting missing information, and allowing the user to inquire about the facts of the case. A third layer would handle natural language processing (NLP), where legal texts are analyzed, syntactic analysis is performed, legal entities are extracted, and information is classified. Specifically, this layer identifies: facts, claims, parties to the proceeding, and evidence. The fourth layer is the core of the system, where legal rules, artificial intelligence models, and logical inferences are applied. At this stage, the requirements of the complaint are verified, as well as the consistency between facts and claims and the relevance of the evidence. And finally, the fifth layer—the legal knowledge base—includes procedural rules, case law, and legal doctrine, with the General Code of Civil Procedure serving as the central legal framework.

The proposed chatbot design will use a **conversational legal analysis algorithm**.

2.5.1 *Functional Description of the Interaction Flow*

Home
1. Receive user input
2. Process text using NLP
3. Identify the type of query

If query = "civil lawsuit":
Request case details
Analyze the facts
Request the claims
Verify consistency between the facts and the claims
Request evidence
Evaluate the relevance of the evidence
verify procedural requirements
Generate a legal report

If query = "review of complaint":
analyze document
extract legal structure
compare with legal requirements
Identify procedural errors
End
(OpenAI, 2024)

2.5.2 Conversion of the General Code of Procedure into a Knowledge Base

For artificial intelligence to utilize legal norms, these must be transformed into computational rules, a process that involves the following four stages: 1) Identification of procedural norms, 2) semantic structuring of the norms, 3) conversion into logical rules, 4) integration with artificial intelligence. We will explain these below.

A) Identification of procedural rules: In this stage, relevant articles from the General Code of Civil Procedure are selected, as stipulated, such as: Requirements for the admissibility of a complaint, as provided by the General Code of Civil Procedure and Law 2213 of 2022, and other laws, depending on the type of legal proceeding.
B) In a second stage, the semantic structuring of the rules, where each rule is divided into the rule element and the rule description, such as: Rule: requirements for a complaint; Condition: if a civil complaint is filed, it must include facts and claims; if it does not, it will be dismissed.
C) Conversion into logical rules: At this stage, the legal provisions are convert-

ed into computable logical rules. For example:
IF complaint.no_has_facts
THEN error = "procedural requirement missing"

D) The fourth stage involves integration with artificial intelligence, where legal rules, machine learning models, and text analysis are combined, enabling the system to identify errors in complaints, evaluate evidence, and make legal recommendations.

The system's final output would generate reports such as: Claim Analysis**:** requirements, identification of parties, clear facts; it would prevent ambiguous claims; furthermore, once the system is operational and meets the admissibility criteria, it could subsequently evaluate evidence irrelevant to the proceedings.

User → Chatbot → NLP Analysis → Legal Engine → Regulatory Database → Result.

As we can see, Justilexia would enable the integration of procedural law with the application of claim analysis, artificial intelligence, and natural language processing, as well as legal tech, legal automation, and legal data science.

Given that technologies and the development of artificial intelligence have transformed the field of law, "Justilexia" aims to contribute to this transformation by using artificial intelligence in natural language processing to automatically analyze civil complaints and verify compliance with procedural requirements and the relevance of evidence.

The General Code of Civil Procedure and its procedures permit automation through artificial intelligence and the evaluation of procedural requirements and the relevance of evidence. Case law also provides a deeper explanation of these requirements, enabling the creation of algorithms that can identify legal patterns in procedural documents.
The "Justilexia" system would represent a significant advance in judicial efficiency if implemented in the judicial branch, given the high levels of judicial backlog.

However, it is also necessary to recognize the limitations of such systems. Legal reasoning is not limited solely to the mechanical application of normative rules but involves complex interpretive processes that depend on the context of the case and the judge's assessment. Consequently, artificial intelligence systems should be viewed as tools to support judicial decision-making and not as substitutes for the judicial function.

KEY FINDINGS ON THE MOST FREQUENT GROUNDS FOR DISMISSAL IN THE CIRCUIT CIVIL COURTS

In the first phase of this research, approximately 50 orders dismissing civil complaints in the Circuit Civil Courts of the city of Cartagena were reviewed, and the grounds for dismissal were analyzed. The preliminary results indicate problems related to: service of process or the appointment of a curador ad litem, and incomplete complaints or those that do not meet the requirements, with three cases in each category. Deficiencies were also identified in injunctions and legal representation, as well as errors related to documents, attachments, and other formal requirements. This indicates that a significant portion of the dismissals is related to noncompliance with the formal and documentary requirements of the complaints.

DEBATE

The use of AI in the legal context has sparked a broad doctrinal debate regarding its role in the administration of justice. On the one hand, several authors argue that digital technologies can help improve access to justice and reduce the time required to resolve legal proceedings. From this perspective, automated legal document analysis systems would streamline court operations and facilitate the work of judges and attorneys.

On the other hand, some legal scholars have warned of the risks associated with the automation of legal processes, particularly regarding the transparency of algorithms, the protection of fundamental rights, and the potential reproduction of biases present in the data used to train artificial intelligence models.

In this regard, the development of systems such as JUSTILEXIA must take place within a framework of ethical and legal principles that ensures respect for the rights of the parties and protects the independence of the judiciary. Therefore, the implementation of artificial intelligence technologies in the judicial system must be understood as a gradual process that combines technological reforms with appropriate institutional safeguards.

CONCLUSIONS:

This research leads to the conclusion that the application of artificial intelligence technologies to the analysis of civil complaints represents a promising avenue within the field of Legal Tech. An analysis of the regulatory framework governing Colombian civil procedure reveals that the procedural requirements established in the General Code of Civil Procedure can be modeled using computational tools capable of identifying structural elements of complaints and evaluating the appropriateness of evidence.

Similarly, the theoretical study conducted demonstrates that there is extensive doctrinal development in the international context regarding the application of AI to law, which provides a solid basis for the design of automated legal analysis systems. These tools have the potential to contribute to improving the efficiency of the judicial system and enhancing access to justice by automating repetitive tasks associated with document review.

However, the use of artificial intelligence in the legal field poses significant challenges related to the transparency of algorithms, the protection of fundamental rights, and the preservation of the judge's role as the guarantor of legality and justice. For this reason, the development of systems such as JUSTILEXIA must be guided toward the creation of tools that support judicial activity, avoiding any attempt to replace the interpretive responsibility inherent to legal reasoning.

In summary, the JUSTILEXIA project presents an innovative proposal that integrates knowledge of procedural law, artificial intelligence, and data science, contributing to the development of new technological tools aimed at improving the functioning of the administration of justice.

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