

Challenges of Implementing Artificial Intelligence in the Ministry of Justice and Its Affiliated Bodies in Algeria"

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Abstract:

The integration of Artificial Intelligence (AI) in judicial systems presents significant opportunities to enhance efficiency, accuracy, and accessibility of justice. However, its implementation within the Ministry of Justice and affiliated bodies in Algeria faces multiple challenges. These include technological infrastructure limitations, legal and regulatory gaps, ethical and privacy concerns, resistance to change among staff, and the need for specialized training. This study examines these challenges, explores their implications for the Algerian judicial system, and highlights potential strategies to facilitate effective AI adoption while ensuring fairness, transparency, and protection of citizens' rights.

Keywords: Artificial Intelligence, Judicial System, Ministry of Justice, Algeria, Legal Technology, Implementation Challenges

Introduction:

If the first two industrial revolutions enabled us to replace our muscles with machines, the digital revolution is moving toward replacing our brains with artificial intelligence, so that the world we live in is being transformed by the invasion of smart machines, robots, and machine learning algorithms, affecting our daily lives, including the justice sector. In this regard, many countries are setting national and regional strategies for readiness and adaptation to this new technological development. Algeria, like other countries, will have to face this new challenge and prepare appropriate plans to deal with it, which can only be achieved by regulating the legislative frameworks governing it, as well as benefiting from the pioneering experiences of countries that preceded Algeria in this field.

Amid the significant debate and concerns raised by rapid digital development, most international and regional bodies have agreed on the necessity of governing artificial

intelligence and ethical usage, such as the European Ethical Charter on the use of AI in judicial systems and their environment (CEPEJ), emerging from the 31st session of the European Commission for the Efficiency of Justice, held in Strasbourg, France, on December 3–4, 2018, and adopted by the Council of Europe on December 8, 2018. Additionally, UNESCO's recommendation on the ethics of artificial intelligence, resulting from its 41st General Conference held in Paris from November 9–24, 2021.

In this study, we will discuss models of using artificial intelligence in the field of justice, and then evaluate the resulting effects, through the following two axes:

Axis 1: Models of using artificial intelligence in the field of justice

Axis 2: Evaluation of the feasibility of integrating artificial intelligence in the justice sector

Axis 1

Models of Using Artificial Intelligence in the Field of Justice

With the widespread reliance on artificial intelligence in most fields, its entry into the legal domain has become a matter of time, nothing more or less. In this regard, many comparative legal systems have moved to integrate AI at various stages of litigation procedures, whether in investigation and inquiry phases or during trial and sentence execution. Among the most important AI models adopted by many countries are smart litigation robots and programs for predicting, detecting, and tracking crimes, which we will examine in the following points:

A- Integration of Artificial Intelligence Using Robots in Comparative Litigation Systems

B- The Role of Artificial Intelligence in Predicting and Detecting Crime

A- Integration of Artificial Intelligence Using Robots in Comparative Litigation Systems

Experiments in relying on AI in courts began in 2016 in the United States and other Western countries under various names such as Robot Judge, Smart Judge, and Virtual Judge. This system differs from remote litigation systems in that the latter involves a human judge using video conferencing technology, whereas smart litigation proceeds without a human judge, relying on AI algorithms. In some countries, AI is used to directly make judicial decisions and issue and execute rulings as an alternative to criminal judges, while in others it is mostly used to provide assistance, consultations, and non-binding opinions to natural judges. We will address this in the following two elements:

1. The role of smart litigation robots in making judicial decisions in comparative systems
2. The role of litigation robots in assisting judges in making judicial decisions

1- The Role of Smart Litigation Robots in Making Judicial Decisions in Comparative Systems

In October 2017, the United Arab Emirates launched what it called the "UAE Artificial Intelligence Strategy," from which emerged its first global project of its kind, "Litigation Without a Judge" or the "Judicial Probe," making the courts the first judicial chamber worldwide to employ AI in litigation within an integrated platform without staff.

This new type of virtual litigation system was adopted in the Dubai courts in 2019, where the system acts as an alternative to a criminal judge in issuing and executing rulings in misdemeanors and minor claims punishable by fines, without imprisonment, such as illegal entry into the country, return after deportation, staying illegally, working for someone other than the sponsor, working after cancellation, leaving employment with the sponsor, possession or consumption of alcoholic beverages, issuing a bad-faith check, refusing to pay wages due, begging, street vending, causing harm to another's body, damaging others' property, driving under the influence, driving without a license, etc.

The defendant can interact with the virtual judge, which operates 24/7, and conduct trial procedures that usually take only a few minutes if the defendant admits the charges. Smart programs can read the person's criminal record, identify the type of misdemeanor, and immediately determine the appropriate penalty after receiving the defendant's personal data. These programs can also provide immediate execution of the penalty and automatically issue an order to cease investigation once executed, meaning the file is cleared in three to five minutes.

Human judges oversee the design and monitoring of the virtual judge, each within their expertise. Decisions issued by it are appealable if the litigant feels wronged, returning to the "normal" path where a human judge at a higher level handles the case.

In 2019, Estonia began using AI-enhanced robots in courts, particularly for examining and analyzing legal documents and handling cases valued below €7,000, issuing rulings appealable to a human judge. Malaysia applied the same experiment in 2022, using AI litigation applications in some states' courts for misdemeanors and minor cases not punishable by imprisonment to relieve pressure on ordinary courts. Canada uses virtual judge systems in Ontario and Quebec courts through intelligent robots; the former handles labor disputes, while the latter settles minor commercial disputes. The Netherlands employs the

same technology, with smart litigation robots contributing to accurate judicial decisions in simple consumer disputes.

2- The Role of Litigation Robots in Assisting Judges in Judicial Decision-Making

These robots are important in providing in-depth analyses of legal information and comparative laws, based on extensive databases of judicial precedents and legislation, processing large volumes of data quickly and accurately. They help provide detailed analyses of similar cases and the comparability of laws and rulings across countries, assisting judges in making more precise, objectively grounded decisions.

These robots first appeared in the United States, where an algorithm called "COMPAS" calculates pretrial detention risk by analyzing integrated judicial records. The American Arbitration Association (AAA) adopted a virtual judge project online, based on accepting complaints related to trademark infringement, copyright issues, trade secret disclosure, morality-related cases, privacy violations, or other unlawful acts. This project aims to provide fast and neutral online dispute resolutions via a legally experienced mediator, appointing a human arbitrator from a preselected list; the virtual judge does not replace the human judge in decision-making.

China has over 100 robots in courts nationwide, striving for smart judiciary transformation. These robots can retrieve past case data, reducing staff workload. Some specialize in commercial or labor law. For example, the Xiaofa robot in Beijing's First Intermediate People's Court provides legal advice and helps the public understand legal terms, answering over 40,000 questions and handling 30,000 legal issues.

The "Intelligent Trial 1.0" application reduces judges' workload by assisting in document review and preparing electronic case copies, focusing on supporting judges, attorneys, and prosecutors rather than replacing them. In 2019, China's Internet Court service center began using AI to aid decisions in routine legal procedures, including filing and processing cases. According to Norton Rose Fulbright, China's judiciary adopting AI is unsurprising, given 120,000 judges handle 19 million cases annually.

The European Court of Human Rights has successfully used this technology, indicating that developed AI could act as a judge in analyzing preprocessed data, classifying it, and identifying applicable law. The system matches new cases with similar cases and issues rulings with accuracy up to 80%.

In Morocco, the Minister of Justice confirmed efforts to adopt digital transformation to improve rulings, including software assisting judges in calculating compensation for traffic accidents without affecting judicial discretion; testing on 1,000 rulings yielded positive results. Egypt pioneered the "Virtual Session Secretary" in April 2021, converting courtroom audio to written records using AI, capturing lawyers' oral pleadings and judges' decisions, producing a printed transcript signed by the judge and session secretary. In November 2021, Egypt's Minister of Justice issued Decision No. 8901, effective January 2022, allowing judges to hold remote hearings for detention renewal using AI-based speech-to-text transcription. On February 7, 2022, the project was registered with the Intellectual Property Authority as an Egyptian project executed by the Ministries of Justice and Communications and the Secure Document Complex.

Algeria and Tunisia have not reached this stage; they must prepare to face this inevitable challenge, adapt to the digital transformation, and develop appropriate plans. Delaying action will be futile against this powerful change.

However, a question remains controversial in comparative international law: "What are the criminal and civil liabilities arising from the use of these robots in case of serious errors causing criminal or civil harm?"

This issue requires establishing a legislative and legal framework for AI, with efforts from national, regional, and international actors to issue legal texts and ethical charters regulating AI use, including clarifying criminal and civil liability. Regarding criminal liability, its elements, conditions, controls, and legal objectives must be defined. Punishment aims to achieve general deterrence via financial (fines) or physical coercion (imprisonment), which would be meaningless if applied to AI robots. These robots operate according to algorithms programmed by their creators, who remain civilly liable under the "liability arising from things" theory. A robot, regardless of advancement, remains a machine, not a human. Criminal liability applies when its elements, primarily intent, are met; knowledge of potential serious harm by the creator suffices for liability.

B- The Role of Artificial Intelligence in Predicting and Detecting Crime

AI systems have successfully developed proactive measures and effective methods to dismantle criminal networks, largely through data analysis, one of AI's main strengths. Criminal organizations operate covertly, leaving complex networks and encrypted

communication channels. AI analyzes and dismantles this information to predict crime before it occurs, detect it, and track perpetrators afterward, as discussed in the following elements:

1. The Role of AI in Predicting Crime Before it Occurs
2. The Role of AI in Detecting Crime and Tracking Perpetrators

1- The Role of AI in Predicting Crime Before it Occurs

Crime prediction is not an end goal of justice institutions but a means to help them make correct decisions for preventing and addressing crime before it occurs. The key question is how AI can be used to predict and prevent crime. The Vice Minister of Science and Technology in China stated that AI technology in crime prediction will become an important government function.

Smart software experts affirm that continuous algorithm development can bring justice and crime prevention to an unprecedented era, heavily relying on AI by 2030 to predict and detect certain crimes before they happen. This works by linking elements of past crimes and training algorithms with data such as crime reports, arrest records, and license plate images to identify patterns predicting the location and time of specific future crimes. The effectiveness of these algorithms depends on the quality of the data provided.

Thus, crime prevention worldwide no longer depends solely on increasing police forces or specific types of armament but on collecting and analyzing data to anticipate crime. A BBC report questioned how modern technologies, including AI and algorithms, contribute to predicting crimes before they occur, concluding that this concept is nearing implementation. For instance, Predpol developed analytical algorithms improving crime detection by 10–50% in certain countries.

The use of these algorithms, considered the most common in American states, began by providing invisible investigators, so that they cannot be deceived or misled during investigations. Artificial intelligence is distinguished by its ability to process vast amounts of data, visual information, physical evidence, probabilities, and hypotheses, which it uses to identify perpetrators.

In the same context, a team from the University of Chicago unveiled a new algorithm capable of predicting crime with an accuracy rate of up to 90%, identifying areas in certain cities that, according to its calculations, may face a high risk of murder and theft. It can also evaluate the variation in police activity across neighborhoods in eight major U.S. cities, including Chicago, Los Angeles, and Philadelphia. Police also use robots and AI technologies to perform security

and crime prevention tasks, predicting crime locations based on data tracking criminal gatherings. These technologies possess high-precision features enabling them to reconstruct offenders' faces based on victim-provided information with great accuracy, as well as risk assessment capabilities.

AI algorithms have also been widely used to enhance border control measures by detecting potential drug and weapons smugglers and scanning luggage, cargo containers, and vehicles for suspicious materials, thereby facilitating authorities' interception of prohibited items and stopping their flow across international borders.

The effectiveness of algorithmic crime prediction lies in its ability to reduce wasted time and effort in searching and investigation. It includes algorithms for facial and voice recognition and detecting abnormal behaviors that indicate a potential crime before it occurs. These algorithms also have features that allow them to display predictions on an electronic map of the most dangerous criminal areas, using marked grids to prevent crime.

2- The Role of Artificial Intelligence in Detecting Crime and Tracking Perpetrators

Artificial intelligence plays a significant role in detecting crime and tracking offenders by identifying suspects, matching their images, determining weapons used in crimes, detecting gunshots, and analyzing DNA through precise and highly accurate algorithms.

In 2018, Russia used AI-powered facial recognition systems, "Findface Security," developed by the Russian company Ntechlab, which helped Russian security forces arrest criminals during the FIFA World Cup, capturing over 180 thieves and wanted individuals during that period. Using these AI technologies, authorities arrested the person who stole one of the trophies displayed in fan zones, which was to be awarded to the best player of the tournament. Many countries have used facial recognition technology with algorithms for security purposes, primarily to identify criminals. For instance, the United States uses the US-VISIT system to prevent unwanted individuals from entering its territory by scanning fingerprints and matching visitor photos against a database containing a vast number of images of potential terrorists and criminals. This technology is considered a modern system for identifying individuals by mapping facial features and comparing them with stored database information. There is also the concept of the future police robot, or "octopus robot," which could potentially replace police officers, armed guards, or even patrol cars in the future. These devices could revolutionize police work. Some private security companies are considering using them to guard facilities, protect important individuals, and transport money. Police can

also use them to apprehend dangerous suspects, particularly criminal gangs known for resisting authority, and to conduct searches in highly risky and rugged areas.

In Algeria, the application of smart algorithms for crime detection and tracking has been used in several areas, including traffic safety, through real-time analytical video surveillance systems that automatically detect threats. These smart digital eyes are increasingly used by the national police, who equipped their vehicles with bright lights and multiple smart cameras capable of instantly scanning all vehicle license plates while in motion or parked and automatically comparing them with the stolen vehicle database. This helps in apprehending criminals. Recently, the Directorate of National Security launched a new smart system to ensure the security of detainees, preserving their dignity and respecting human rights.

Axis 2

Evaluation of the Feasibility of Integrating Artificial Intelligence in the Justice Sector

With increasing clarity regarding the risks of using artificial intelligence in various fields, including justice, this has sparked wide debate among scholars. Some argue that this technology negatively affects litigants' rights, particularly the right to a fair trial, while others acknowledge its positive role in several areas, such as predicting crime before it occurs, pursuing offenders, facilitating litigation procedures, and reducing the burden on courts, positively impacting the proper functioning of the justice system overall.

Given that the use of AI has become indispensable, most international and regional systems have agreed on the necessity of governing and ethically managing its use, as in the 2018 European Ethical Charter on AI use in judicial systems and its environment (CEPEJ), and UNESCO's 2021 recommendation on AI ethics. We will discuss this in the following two elements:

A- The Legal Debate on the Feasibility of Using AI in the Justice Sector

B- Guiding Documents on Ethical AI Use in the Field of Justice

A- The Legal Debate on the Feasibility of Using AI in the Justice Sector

The key question here is whether decisions made by robot judges or those resulting from integrating AI into the judicial system are legally valid and what impact they have on ensuring fair trial guarantees.

International legal scholars are divided between supporters and opponents of AI integration in the judicial system, as follows:

1. Supportive opinion on using AI in the field of justice

2. Opposing opinion on using AI in the field of justice

1- Supportive Opinion on Using AI in the Field of Justice

Proponents argue that using AI in the judicial system has proven highly successful and effective in various litigation stages, particularly in investigation and inquiry. It serves as a proactive preventive tool in predicting crime before it occurs, detecting it, apprehending criminals, and surprising them by discovering their offenses before they commit them. Most judicial systems worldwide, including countries opposing its application, rely on AI at this stage.

Regarding the trial phase, AI positively contributes to facilitating decisions, procedures, and speedy dispute resolution. The President of China's Supreme People's Court, Zhou Qiang, believes that applying AI techniques in the judiciary provides judges with remarkable resources, even though AI cannot replace the expertise of natural judges.

Even if there are design errors in algorithms, they remain important for improving the justice system if applied methodically and tested to ensure they achieve the intended goal. The generalized idea of "replacing" judges with machines is exaggerated; AI handles simple cases resembling mathematical equations.

In this context, Gregory Lewkowicz, a law professor in Brussels, argues that legal professionals must adapt to this new change: "The subject develops rapidly by nature, and it is inherent in practice to continuously adjust the law according to contemporary realities." He sees the real risk in being "hostages to private operators and opaque algorithms."

Some scholars supporting AI in justice, such as Adrien van den Branden and Lêmy Godefroy, believe that shifting justice to algorithm-based processes can better uphold the principle of individualizing sentences. By analyzing judicial precedents, the process will no longer rely on a judge's mood or discretion. According to this theory, algorithms are more objective in considering all factors contributing to individualized sentencing, eliminating potential bias. Their advantage lies in replacing intuition and potential judge bias with scientific facts derived from algorithm-generated data, characterized by neutrality and objectivity. A robot confirmed in a media interview that robots outperform world leaders in decision-making efficiency and effectiveness because they harbor no bias or emotion to influence the decision-making process.

Therefore, litigants will have no reason to worry about a judge who bases decisions on the fluctuations of their personal temperament and discretionary power, which may give

excessive or insufficient weight to certain factors affecting the case. To effectively respect this principle, litigants should have access to the algorithm's "black box" to benefit from it or determine the extent to which it considers certain criteria. In cases of doubt, there must be the possibility to appeal to a human judge.

Proponents of this view also argue that the discretionary power of a natural judge in assessing and issuing judicial decisions results in differences in outcomes based on each judge's conviction. What one judge considers an appropriate ruling in a case may differ from another judge in a similar case. Many countries seek to resolve this issue through the use of algorithms, or what is called the risk assessment system adopted by the United States, which evaluates the risks involved when deciding to release a defendant pending trial and the likelihood of committing criminal acts in the near future, based on the defendant's prior data provided through this system.

Furthermore, some believe that using AI applications in litigation will have a positive indirect effect on judicial independence and integrity, particularly in systems where full judicial independence is not guaranteed. In such cases, one cannot exclude the risk of judges facing indirect pressure when making decisions, nor is the non-intervention of the executive in judicial work assured. Litigation using smart robots, however, does not present such issues at all.

Ultimately, it can be said that the role of AI in developing legal systems is undeniable, particularly in improving case and legal document management, facilitating trial procedures, and reducing procedural errors that may be a major cause of biases and misjudgments in many cases. From this, we conclude that this technology plays a prominent role in improving the justice system and enhancing efficiency and transparency in judicial work.

2- Opposing Opinion on Using AI in the Field of Justice

When people are usually asked whether the idea of an electronic judge deciding their fate is a good one, the answer is a resounding "No." The rejection stems from fear of machines controlling human destiny.

From this perspective, some scholars question the feasibility of using AI in justice, arguing that despite all advances in AI, it cannot simulate the human mind, emotions, or consciousness. Moreover, the rapid pace of AI development, which developing countries cannot match, is itself a source of fear and the primary risk that may negatively impact fair trial guarantees and the proper functioning of justice systems.

In this regard, economic and ICT sector expert Wasfi Al-Safadi explained that current AI systems lack creativity, emotional intelligence, and problem-solving skills required for decision-making comparable to humans, which may involve feelings and human insight. He noted that these systems rely on algorithms fed by data, and any deliberate deviation in data input produces flawed outputs, which originate from human error, not machine error. Therefore, advocating for a return to human oversight is essentially a call to address the source of error, not avoid it. He further argued that these systems are not meant to replace humans but to create a complementary relationship between humans and machines, where neither can replace the other.

Some human rights advocates also expressed concern about using this technology, noting that algorithms constitute a secret system for monitoring individuals for acts they have not yet committed. Using them this way, even if justified as crime prediction, violates individuals' rights and freedoms, particularly the right to equality. They argue that this technology is a pretext for unjustly targeting people of color, as with the U.S. "COMPAS" program, which they claim perpetuates racism by correlating skin color with higher risks of temporary imprisonment. They support this claim by noting that the technology has not reduced crime rates, which continue at the same pace and severity, effectively creating a new form of unlawful abuse of power. A practical experiment in Virginia, U.S., confirmed this, as algorithm use doubled the number of defendants released without increasing court evasion rates, meaning the results were counterproductive.

Similarly, French scholar Fabrizio Papa Techera, assessing the risks of the "Netflix du droit," argued that algorithmic justice is particularly suited to Anglo-Saxon countries relying on case law as a legislative source to simulate judicial decisions in similar cases. Transferring this system to France, however, could significantly weaken French legal culture and reduce lawyers' maneuvering space during advocacy, negatively affecting the right to defense.

Some scholars, such as Olivier Leroux and Jean de Coudt, contend that judicial algorithms may not better uphold the principle of individualized sentencing. They argue that humans differ, and some factors, such as litigant behavior or judicial precedents, cannot always be measured or objectively guided. A judge's role inherently depends on their personal judgment, which allows adaptation to each case's uniqueness—something algorithms cannot fully replicate. Certain data may also be unsuitable for electronic processing, highlighting the uniqueness of human judges.

Critics of AI decision-making also question its reliability, claiming it merely magnifies human errors. The COMPAS risk assessment system used in U.S. courts is an example: it misjudged defendants' eligibility for release based on personal data analysis, leading to erroneous decisions. A similar Japanese AI program launched in 2020 misjudged the protection needs of a four-year-old girl in Tsuo, failing to place her in temporary custody despite visible injuries, which ultimately led to her death. Investigations revealed that protection center staff did not visit the family to check on the child, while her mother, suspected of causing harm, was detained.

These severe errors raise the question of AI responsibility when it makes mistakes in decisions, judgments, or programmed orders. Should responsibility lie with the AI or the person providing the data? Most opinions reject the idea, as AI has not yet reached artificial consciousness; its responsibility is considered nonexistent. While its intelligence may surpass natural intelligence, AI remains human-made, and humans are not infallible. A recent trend suggests this does not preclude accountability in relation to AI, or "robotization," though it is not the same responsibility we know. Until clarity emerges on this responsibility and its consequences, human oversight in reviewing AI programs and ensuring reliability remains essential.

AI is unbiased, holds no preconceptions, and can make objective decisions with minimal errors. However, issues of transparency and accountability in cases of erroneous judgments, and other concerns arising with virtual judges, must be addressed, which will be discussed in this final section of the study.

B- Guiding Documents on Ethical Use of AI in Justice

With AI use becoming indispensable, most international and regional systems have agreed on the necessity of governance and ethical use. Examples include the European Ethical Charter on AI in Judicial Systems and its Environment (CEPEJ), from the 31st session of the European Commission for the Efficiency of Justice in Strasbourg on December 3–4, 2018, and adopted by the Council of Europe on December 8, 2018, and UNESCO's Recommendation on the Ethics of Artificial Intelligence from its 41st General Conference in Paris, November 9–24, 2021.

Most AI programs are produced by profit-driven companies, often devoid of humanity, caring only about profit, raising concerns that criminal justice could become inhumane. The European Ethical Charter addressed this issue in its accompanying study, "In-depth Study on

the Use of AI in Judicial Systems," especially AI applications handling judicial decisions and data.

The study emphasized individuals' right to access courts without interference from online AI use. The Parliamentary Assembly of the Council of Europe, in 2015, adopted a resolution on "Access to Justice and the Internet... Opportunities and Challenges," calling for parties in dispute resolution to retain direct electronic communication while preserving the right to appeal to human judges in line with fair trial standards.

The Charter also stressed that AI tools must not create legal disparities among litigants. While AI facilitates litigation and many individuals are proficient in its use, some may lack sufficient expertise with these modern tools, necessitating guidance or access to legal advice when required.

UNESCO's AI Ethics Recommendation acknowledged AI's significant positive and negative impacts on human societies and minds, while emphasizing core ethical concerns such as transparency and potential consequences for human dignity, rights, and fundamental freedoms, particularly the rights to a fair trial and equality. Paragraph 36 asserts that AI tools must be appropriate, based on accurate scientific principles, and that humans should retain final decision-making authority in cases involving potentially irreversible consequences or life-and-death decisions, such as the death penalty or life imprisonment.

Similarly, Ahmed Aloui Turkbag, law professor at Istanbul University, argues that ethical oversight principles must govern AI, notably requiring absolute transparency. He added that AI can make sudden decisions. Even if AI reliability in justice is accepted, human oversight remains essential legally and ethically. Algorithmic decisions must be auditable and reviewable by humans in higher courts, with proper algorithm management through programs analogous to antivirus software to ensure ethical reliability.

Conclusion:

The use of AI in litigation is a double-edged sword. Its use is acceptable, particularly in investigation and inquiry, provided caution is exercised. Strict acceptance criteria should be enforced, and smart systems tested to ensure their validity and reliability.

Technological development is blurring the lines between the possible and impossible, requiring a reevaluation of desirable versus undesirable applications. Consequently, recent AI developments and their prospects necessitate recognizing the limits and constraints needed for

reasonable and controlled use. Ethical oversight must not only guide AI design, creation, and use but also monitor the behavior of these artificial entities.

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