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Role of robot mediators in settling disputes

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Abstract: The article explores the function of robot mediators equipped with artificial intelligence in conflict resolution through a mixed-methods approach combining systematic literature analysis and comparative case studies. It thoroughly studies the key advantages of such systems: neutrality, ability to work with large amounts of data, scalability, and minimal impact of emotional factors. Special attention is paid to such technologies as machine learning, natural language processing (NLP), and using blockchain to increase safety. Important restrictions of robot mediators are also highlighted, including the lack of empathy, potential algorithmic bias, confidentiality issues, and legal uncertainty. The authors employ qualitative analysis of real-world mediation scenarios and quantitative evaluation of algorithmic performance to assess the feasibility of AI-driven solutions. The authors also consider the prospects of hybrid models, which combine artificial intelligence with human involvement, and touch upon ethical and regulatory challenges related to the globalization of mediation processes. The article highlights the need to balance technological efficiency and humanistic values, proposing various ways to integrate robot mediators into legal and social practice.

Keywords: Robot. Artificial intelligence. Mediation. Settling Conflicts. Legal Regulation.

1 Introduction

Conflicts and disputes are inevitable in human interaction in various spheres of life. They may arise both in personal relations and in more complex spheres such as corporate and international relations.[1] Conventional conflict resolution methods

[1] IQBAL, A. S. M. Tariq. Alternative Dispute Resolution in commercial transactions: A comparative study between the UK and Bangladesh Jurisdiction. Revista Brasileira de Alternative Dispute Resolution

are often time-consuming and expensive, and require high emotional strain from the parties involved. In response to these difficulties, mediation is being developed as an alternative way to settle conflicts when a neutral agent (mediator) helps the parties to come to a mutually acceptable solution.[2] In the light of artificial intelligence (further – AI) growth, a question arises: Can robot mediators become full-fledged participants in this process, substituting people or helping them settle disputes? The authors use a multidisciplinary approach based on qualitative and quantitative methods to address this question: a systematic literature review and real-world case studies. The research combines general scientific methods (systematic review, comparative analysis) with specific scientific methods, such as legal and doctrinal analysis. This allows for an assessment of robot mediators' technological efficacy and adherence to legal and ethical standards. Integrating AI into mediation opens new possibilities to increase efficiency, reduce time and costs, and ensure impartiality of decision-making. At the same time, using robots in mediation raises questions related to ethics, legal status, accuracy of decisions, and ability to consider the emotional and social aspects of conflicts.

This article explores robotic mediators' function, strengths, weaknesses, and prospects for dispute resolution. The study examines the theoretical understanding of employing artificial intelligence in mediation, scrutinizing current technologies and their practical utility. Particular emphasis is placed on the legal framework, data security, and societal perceptions of these technologies.

To evaluate the impact of robots in mediation, it is crucial first to understand the nature of the mediation process and the mediator's responsibilities. Mediation is a process in which conflicting parties work together to reach an agreement with the help of a neutral third party, known as a mediator. The mediator's main task is to create conditions for negotiations, ensure the parties' equality, and search for a mutually acceptable solution. The development of AI and robotics in conflict settling has generated numerous scientific discussions on the possible advantages of robot mediators. Although conflicts are traditionally settled by people experienced in jurisprudence, psychology, and negotiations, the recent advancements in AI allow the creation of systems that may significantly improve this process.

This article aims to systematize current scientific knowledge on robot mediators, explore their potential and limitations, and identify key areas for future

– RBADR, Belo Horizonte, ano 06, n. 12, p. 207, jul./dez. 2024; GROMOVA, E.A., FERREIRA, D.B. Regulatory Sandbox: Bridging the Gaps by Designing a Dispute Resolution System. Conflict Resolution Quarterly, 2025.

[2] FERREIRA, D.B., GROMOVA E.A., TITOVA E.V. The Principle of a Trial Within a Reasonable Time and JustTech: Benefits and Risks, Human Rights Review, 25, 1. P. 47, 2024; FERREIRA, D.B., SEVERO, L. Multiparty Mediation as Solution for Urban Conflicts: A Case Analysis from Brazil, BRICS Law Journal, 8(3), 5-29, 2021.

research and development. The authors strive to answer whether robots may substitute people in settling disputes, what challenges face their introduction, and what changes are necessary to effectively use these technologies in legal practice and other spheres of conflict settlement.

2 Advantages of robot mediators

One of the main advantages of using robot mediators is their impartiality. This crucial principle of mediation helps build trust between parties and ensure a fair resolution of conflicts. However, with the increasing use of technology and the introduction of robot mediators, there is a question about whether they can provide the necessary level of impartiality and how this affects the efficiency of mediation.

Unlike humans, who may be influenced by unconscious biases due to personal, cultural, or emotional factors, robots operate based on objective algorithms designed to maintain neutrality. Research by A. Salamanca shows that people per se can be a source of conflicts and are often subject to cognitive bias, which may unintendedly influence the course of mediation.[3] Robot mediators, on the other hand, make decisions based on data, which excludes the risks of favoritism or subjective judgments. This unbiased approach is crucial for fostering confidence between the parties involved in a dispute and promoting the successful resolution of conflicts.

Traditionally, mediators must act impartially, giving the parties no reason to suspect bias. This, undoubtedly, improves the mediation process and strengthens the participants' trust in the fairness of the outcome. If neutrality is not possible, the mediator should refuse to participate. Robot mediators, as programmed machines, have a great potential for ensuring impartiality. Their algorithms can be set to eliminate the influence of personal biases and emotional reactions inherent in humans. This allows robots to act based solely on facts and logic, which can lead to more objective decisions.

Researchers confirm that machine-learning technologies may significantly support mediators, offering additional tools for analyzing conflicts and assessing complex information.[4] For example, research on conflict resolution negotiations in Yemen has shown how machine learning can help international agents by providing analytical tools to process and analyze complex data. According to the results, such tools may effectively support the management of knowledge accumulated during

[3] SALAMANCA, Andrés. Biased Mediators in Conflict Resolution. American Law and Economics Review, vol. 26, no. 1, pp. 45-67, 2024.

[4] GROMOVA, E., FERREIRA, D. B. On the Way to BRICS+Digital Sovereignty: Opportunities and Challenges of a New Era, BRICS Law Journal, 11, 3, P. 56, 2024.

many years of peaceful dialogue. It is important to note that the available open data may be too complex for analysis. However, robots may significantly enhance mediation efficiency by systematizing complex data and facilitating comprehension. Besides, machine-learning tools can be especially useful in complicated and long-term mediation processes when harmonizing the parties' positions may become complicated, hampering the achievement of consensus. Robots can also help to combat stereotypes and prejudices that may occur during mediation.[5]

However, one should note that the impartiality of robot mediators directly depends on the underlying data and algorithms. If source data contains bias or algorithms do not address specific nuances, this may lead to unintended bias in the robot's actions. Therefore, such systems should be developed and tested carefully to ensure their fairness and reliability.

Besides, it is important how conflict participants perceive the impartiality of robot mediators. The mediator's efficiency may be reduced if the parties do not trust the technology or believe that a robot can understand human emotions or context. Research shows that in human perception, a robot's politeness and behavior can significantly influence their trust and willingness to cooperate. For example, one study found that politeness was a key factor in humans' perception of robots, ensuring order.[6]

Another vital advantage of robot mediators is their ability to be consistent in their recommendations and decision-making, which is a key factor in their efficiency in settling conflicts. Consistency helps to build trust between the participants in the process and makes the outcomes more predictable, which is crucial in mediation. As noted by Ch. Moore, despite their training, people may hesitate in their judgments during mediation due to fatigue, stress, or emotional involvement.[7] At the same time, robots are programmed to consistently apply standardized protocols, guaranteeing the use of the same set of criteria in various cases. According to the research, robot mediators may enhance the level of trust between participants, showing that consistent mediation approaches promote positive dynamics in dispute settlement.[8] Such consistency is vital for ensuring procedural justice and legitimacy in settling conflicts.

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5 ARANA-CATANIA, Miguel, VAN LIER, Felix-Anselm., PROCTER, Rob. Machine Learning for Mediation in Armed Conflicts. Zenodo Preprint, 2021. https://doi.org/10.5281/zenodo.5282693

6 PIPERSKI, Alexander Ch. [PIPERSKI, A.Ch.]. Вежливость в коммуникации между человеком и искусственным интеллектом [Politeness in Human-AI Communication]. Слово.ру: Балтийский акцент [Slovo.Ru: Baltic Accent], vol. 15, no. 4, pp. 89-98, 2024. (in Russian). https://doi.org/10.5922/2225-5346-2024-4-6

7 MOORE, Christopher W. The Mediation Process: Practical Strategies for Resolving Conflict. 4th ed. San Francisco: Jossey-Bass, 2014.

8 BIRMINGHAM, Chris, HU, Zijian, MAHAJAN, Kartik, REBER, Eli, J, Maja. Can I Trust You? A User Study of Robot Mediation of a Support Group. 2020 IEEE International Conference on Robotics and Automation (ICRA), Paris, pp. 8019-8026, 2020. https://doi.org/10.1109/ICRA40945.2020.9196875

AI-driven robots can analyze large amounts of data and use standardized algorithms, making stable and justified recommendations. Unlike people whose decisions may vary due to emotional state or subjective factors, robots can maintain objectivity and consistency in their actions. Scientific studies show that AI technologies may effectively assist people and offer additional tools to analyze conflicts and assess complex information. An automated mediation system, using arguments to generate alternative solutions, enhances consistency during decision-making.[9]

Emotions often play a crucial role in conflicts, sometimes increasing tension instead of helping to settle them. Research has shown that robot mediators, through structured and emotionally neutral dialogue platforms, can promote logical and objective discussions, reducing the likelihood of emotional turbulence that can hinder settlement.[10]

However, as mentioned above, the success of robot mediators depends directly on the quality of the data and algorithms they use. If source data contains bias or algorithms do not consider specific nuances influencing the conflict outcome, it may lead to systematic errors in the robot's recommendations. Therefore, the creation and validation of these systems must be meticulously executed under the close supervision of human experts to guarantee their impartiality and dependability.

AI-powered mediation systems can analyze vast amounts of data in real-time, process legal documents, and generate potential speedy solutions far exceeding human capabilities. Scientists have demonstrated that machine learning algorithms can improve cybersecurity in mediation platforms by detecting and mitigating advanced threats, ensuring the integrity of sensitive dispute-related data.[11] According to research by R. Susskind and D. Susskind, artificial intelligence can optimize complex negotiation processes by rapidly assessing previous cases, legal principles, and behavioral patterns.[12] Such efficiency is instrumental in commercial and legal disputes, where timely settlement is crucial to prevent financial losses and legal complications. Research by E. Katsh and O. Rabinovich-Einy on online dispute settlement systems found that AI-powered mediation tools

[9] TRESCAK, Tomas, SIERRA, Carles, SIMOFF, Simeon, MANTARAS, Ramon L. Dispute Resolution Using Argumentation-Based Mediation. CEUR Workshop Proceedings, vol. 1283, pp. 1-15, 2014.

[10] SHEN, Solace, SLOVAK, Petr, JUNG, Malte F. "Stop. I See a Conflict Happening." A Robot Mediator for Young Children's Interpersonal Conflict Resolution. Proceedings of the 2018 ACM/IEEE International Conference on Human-Robot Interaction, Chicago, pp. 1-8, 2018. https://doi.org/10.1145/3171221.3171248

[11] CHEN, Long, ZHANG, Wei, SONG, Yanqing, CHEN, Jianguo. Machine Learning for Human-Machine Systems with Advanced Persistent Threats. IEEE Transactions on Human-Machine Systems, vol. 54, no. 6, pp. 753–761, 2024. https://doi.org/10.1109/THMS.2024.3439625

[12] SUSSKIND, Richard, SUSSKIND, Daniel. The Future of the Professions: How Technology Will Transform the Work of Human Experts. Oxford: Oxford University Press, 2015. https://doi.org/10.1093/oso/9780198713395.001.0001

significantly reduce the time required for dispute resolution, undoubtedly giving them a preferred status in the mediation process.[13]

Another significant advantage of using robot mediators in conflict resolution is their scalability. They can function effectively even if the number of parties involved or the complexity of the issues increases. The introduction of AI and machine learning opens up new possibilities for enhancing the scalability of these systems.

Traditional mediation requires well-trained specialists, who should allocate time and effort to each case, which often hinders decision-making and dispute settling. Meanwhile, robots can work simultaneously with several cases, providing timely and detailed means of settling disputes and conflicts. Research by A. Lodder and Jh. Zeleznikow showed that automation of dispute settlement may reduce the gap between supply and demand for legal mediation services, especially under limited access to qualified mediators.[14] The robots' ability to work on settling several disputes at a time makes them especially useful in large-scale conflicts and disputes in international and commercial relations, where rapid analysis of large amounts of data is required. Research shows that division of labor and instant communication between systems helps to minimize overload and improve scalability.[15]

A new chapter in AI technologies development in the sphere of justice was opened by a case of successful judicial dispute settlement by a robot mediator, covered by mass media in 2019. For the first time, a robotized system driven by machine-learning algorithms settled a civil dispute on debt through legal proceedings without direct human interference. A robot used natural language processing algorithms to comprehend the parties' positions and offered options for compromise solutions based on previous successful cases. As a result, the parties agreed on the proposed terms, which allowed for avoiding legal costs and protracted litigation.[16] This case demonstrated the AI's ability to organize the negotiation process and propose a fair and beneficial solution for both parties involved. It also demonstrated that automated systems can perform the functions of traditional mediators, providing objectivity and consistency in decisions.

Hence, robot mediators have significant advantages in conflict settling, ensuring impartiality, consistency, efficiency, scalability, and reducing the impact of

13 KATSH, Ethan, RABINOVICH-EINY, Orna. Digital Justice: Technology and the Internet of Disputes. Oxford: Oxford University Press, 2017. https://doi.org/10.1093/acprof:oso/9780190464585.001.0001

14 LODDER, Arno R., ZELEZNIKOW, John. Enhanced Dispute Resolution Through the Use of Information Technology. Cambridge: Cambridge University Press, 2010. https://doi.org/10.1017/CBO9780511777554

15 SOMA, Karthik, VARADHARAJAN, Vivek S., HAMANN, Heiko, BELTRAME, Giovanni. Congestion and Scalability in Robot Swarms: A Study on Collective Decision Making. arXiv Preprint, 2023. https://doi.org/10.48550/arXiv.2307.08568

16 LEGALFUTURES. 2019. Robot Mediator Settles First Ever Court Case. https://www.legalfutures.co.uk/latest-news/robot-mediator-settles-first-ever-court-case. Accessed 09 March 2025.

human emotional state. These advantages make them a valuable tool for dispute settling in various fields – from legal and commercial conflicts to interpersonal and corporate controversies. One may expect that with the further development of AI technologies, the integration of robot mediators into dispute settlement will increase, creating new opportunities for fair and efficient conflict resolution.

3 Disadvantages of robot mediators

One of the main limitations of robot mediators in conflict resolution is their lack of full empathy and emotional intelligence. Empathy plays a crucial role in mediation processes, as it fosters trust between conflicting parties, facilitates communication, and helps to find mutually beneficial solutions. However, despite significant advancements in affective computations, modern AI technologies can still not reproduce all the complex aspects of human empathy. While AI can recognize basic emotions such as anger or joy, it cannot understand complex emotional states like ambivalence or suppressed frustration.[17]

Empathy is a complex cognitive and affective phenomenon, which includes understanding other people's emotions, sympathizing with their feelings, and reacting accordingly. Empathy plays a crucial role in mediation as it allows the mediator to tailor the conflict resolution strategy based on the emotional state of the parties involved. Research shows that during dispute settling, participants expect a rational analysis and emotional support from a mediator, which reduces tension and creates a favorable atmosphere for negotiations.[18]

Robot mediators, acting based on natural language processing and machine-learning algorithms, can analyze text and voice data to identify emotions, but their ability to deeply understand them is still limited. Although AI can recognize the central emotional states, such as joy, anger, or sorrow, it has no true emotional experience. It cannot interpret complex emotional nuances like sarcasm, hidden anxiety, or ambivalent feelings. Besides, a significant drawback of robot mediators is the absence of non-verbal sensitivity. Research shows that most human communication occurs through non-verbal channels, such as facial expressions, body language, and tone of voice. Recent studies have shown that robots have difficulty interpreting subtle nonverbal cues, such as micro-expressions and

[17] MELLO, Celso de, PETTERS, Dean, PARTHEMORE, Joel, MOFFATT, David, BECKER-ASANO, Introduction to the Special Issue On Computational Modelling of Emotion. IEEE Transactions on Affective Computing, vol. 12, no. 2, pp. 277-278, 2021. https://doi.org/10.1109/TAFFC.2021.3073214

[18] MAYER, John D., GASCHKE, Yvonne N. The Experience and Meta-Experience of Mood. Journal of Personality and Social Psychology, vol. 55, no. 1, pp. 102–111, 1988. https://doi.org/10.1037/0022-3514.55.1.102

context-dependent gestures, essential for building rapport during mediation.[19] People perceive and interpret these signals intuitively, which allows them to understand an interlocutor better and to adjust their responses. Robots, even those with the most advanced sensor systems, cannot reproduce or interpret non-verbal communication at a level comparable to a human's. Today, researchers study the possibilities of developing robots capable of predicting human emotions and feeling psychological states. However, despite their first successes[20] robots do not yet have a full-fledged ability to empathize and communicate nonverbally.

Another aspect related to robots' limited empathy is their lack of ability to make moral judgments and adapt to different situations. Successful mediation requires considering both rational arguments and moral aspects of a conflict, which is impossible in the case of rigidly programmed algorithms. Unlike a human, who can be flexible and change tactics depending on the parties' emotional state, a robot acts within preset rules, which may lead to insufficient adaptability in difficult emotional situations. Furthermore, as mentioned previously, trust in the mediator is essential to successful dispute resolution. Research shows that the absence of an explicit emotional response from the mediator may reduce the participants' trust in the procedure, which, in turn, decreases the probability of successful conflict settling. People tend to trust more those who demonstrate an understanding of their emotions; that is why people have an advantage over robots in this sphere.[21]

Thus, limited empathy and emotional understanding in robot mediators are a serious obstacle to their practical use for settling disputes. Although AI technologies continue to advance, they currently cannot replace humans in terms of emotional perception and interpersonal communication. Future research should focus on creating hybrid models that combine the capabilities of AI with human intuition and improve emotion processing algorithms to increase empathy in robotic mediation systems.

One of the key challenges in using robot mediators for dispute settlement is data confidentiality and safety. Under the growing digitalization of mediation processes, the problem of personal information protection becomes increasingly relevant. Processing of confidential data requires reliable cybersecurity measures,

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19 SAUNDERSON, Shane, NEJAT, Goldie. How Robots Influence Humans: A Survey of Nonverbal Communication in Social Human-Robot Interaction. International Journal of Social Robotics, vol. 11, pp. 575-608, 2019. https://doi.org/10.1007/s12369-019-00523-0

20 INVOLTA MEDIA. 2024. Робот Emo научился предугадывать и воспроизводить улыбку, глядя в глаза человека [Emo Robot Learns to Predict and Reproduce Smiles]. https://involta.media/post/robot-emo-nauchilsya-predugadyvat-i-vosproizvodit-ulybku-glyadya-v-glaza-cheloveka. Accessed 09 March 2025.

21 BAZAROV, Tahir Yu., CHINNOVA, Alesya S. Социально-психологические детерминанты эффективности медиации [Socio-Psychological Determinants of Mediation Effectiveness]. Психологические исследования [Psychological Studies], vol. 5, no. 23, pp. 40-52, 2012. (in Russian). https://doi.org/10.54359/ps.v5i23.769

but modern AI systems are still vulnerable to attacks and leaks. Robot mediators work with large arrays of data, including audio recordings of negotiations, biometric parameters, and behavioral characteristics of parties; however, their protection systems are often unable to counteract viruses, which creates risks of unsanctioned access. Centralized storage of such information in cloud services increases the probability of its misuse. Hacking of autonomous mediation systems may result in negative consequences, as robots' vulnerability against hacker attacks threatens not only the participants' privacy but also the process objectivity, as violators may manipulate the system's conclusions. Such risks are particularly significant in international disputes, where data crosses borders and falls under jurisdictions with differing protection standards. For example, the General Data Protection Regulation (GDPR) is in force within the European Union, which requires strict anonymization.[22] In other regions, laws may allow personal data collection without users' explicit consent.

To address these issues, researchers are proposing complex approaches to ensure better protection against malicious software and hacker attacks. These measures should include two levels of protection – during the development and operation of an autonomous system.[23] These measures must detect, identify, and eliminate system vulnerabilities, also known as "backdoors", through which viruses can enter the system.

Automated systems also face the problem of algorithmic bias.[24] AI-driven mediators trained on historical data with discriminatory patterns may reproduce prejudices in their recommendations. One of the earliest cases of algorithmic bias occurred in the 1970s and 1980s, when software was used to select matriculates at St. George's Hospital Medical School in the United Kingdom. As a result, many applicants were not invited for an interview based on their gender or ethnic characteristics.[25] In 2015, the Google Photos service mistakenly defined black

22 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R0679 (date of access: 09.03.2025).

23 PETRENKO, Vyacheslav I., TEBUEVA, Fariza B., ANZOROV, Artur R., STRUCHKOV, Igor V. Метод защиты системы машинного обучения от вредоносных программ [A Method for Protecting a Machine Learning System from Malicious Programs]. Прикаспийский журнал: управление и высокие технологии [Caspian Journal: Management and High Technologies], no. 1 (57), pp. 113-126, 2022. (in Russian).

24 KHARITONOVA, Yulia S., SAVINA, Viktoria S., PAGNINI, Fabrizio [KHARITONOVA, Yu.S. et al.]. Предвзятость алгоритмов искусственного интеллекта: вопросы этики и права [AI Algorithmic Bias: Ethical and Legal Issues]. Вестник Пермского университета. Юридические науки [Perm University Herald. Juridical Sciences], no. 53, pp. 488-515, 2021. (in Russian). https://doi.org/10.17072/1995-4190-2021-53-488-515

25 GARCIA, Megan. Racist in the Machine: The Disturbing Implications of Algorithmic Bias. World Policy Journal, vol. 33, no. 4, P.116, 2016.

people in a photo as gorillas.[26] This decreases trust in the process and creates legal risks, especially if participants prove that the algorithms violated the principles of fairness. A hidden bias is especially dangerous: the conflict participants do not see what criteria AI proposes specific terms for and cannot contravene the machine's "objectivity". This undermines the very idea of justice for the sake of which technologies are introduced.

Besides, one has to consider the legal aspects related to decisions made by AI. The legal systems of most countries have not yet adapted to using AI as an official mediator, which requires changes in legislation. Currently, most jurisdictions do not recognize decisions made by robots as having legal power, demanding that they be confirmed or approved by a human. This creates legal uncertainty, especially if one of the parties does not agree with the AI's decision. It is essential to establish clear legal procedures for defining the status of these decisions and criteria for appealing and reviewing them. One of the possible solutions is to create specialized norms regulating the sphere of using AI in legal practice, as well as establishing international standards of using it in dispute settlement. The issue of legal liability also remains open. It is necessary to determine who will be liable for possible mistakes in the decisions made by AI-algorithm developers, system operators, or users.

Therefore, the widespread introduction of robot mediators necessitates overcoming technical, legal, and ethical obstacles. Only a combination of robust solutions in cybersecurity, interdisciplinary research, and global regulatory alignment will enable the minimization of risks and the fostering of trust in these technologies.

4 Prospects of robot mediators' development

The prospects of the robot mediators' introduction into dispute settlement resemble a technological revolution capable of reforming the very philosophy of conflict studies. These AI-powered systems already show the potential to go beyond simple automation of routine tasks. Let's imagine a scenario: a buyer and seller residing in different countries are having a dispute over a multimillion-dollar deal. Traditional mediation would require months of negotiations, language translations, and addressing cultural nuances. In contrast, a robot mediator, integrated with a machine translation platform in real-time and trained in thousands of similar cases, can propose variants that consider both legal and social, economic, and even ethical aspects of each jurisdiction. Some of these programs apply deep

[26] BARR, Alistair. 2015. Google Mistakenly Tags Black People as 'Gorillas', Showing Limits of Algorithms. https://www.wsj.com/articles/BL-DGB-42522. Accessed 09 March 2025.

learning technologies, which are constantly being improved by analyzing their mistakes and getting feedback after each research performed. These tools can significantly reduce the time spent on research, but human intervention is still essential to ensure the algorithm functions appropriately. A qualified expert is essential to use the research tool properly, formulate the correct question, and analyze and interpret the results obtained.

The key breakthrough lies in the evolution of data analysis. Modern algorithms do not just process information – they learn to identify hidden patterns of human behavior. The future of robot mediators is in the development of multimodal analysis, i.e., the combination of speech, mimics (through computer vision), and physiological parameters (heart rate, gestures). However, the problem is, inter alia, in the ethical aspect of this approach – namely, how to convince the parties that their biological characteristics will not become a tool for manipulation.

The development of natural language processing (NLP) turns robot mediators from passive analysts into active communicators. Various platforms allow for generating dialogue scenarios, adapting the tone and complexity of speech to the educational level of the participants. However, a real challenge for computer system developers is incorporating people's emotional states into algorithms. The Replika project aims to test AI that recognizes anger or disappointment and adapts its strategy. For example, it slows down the dialogue when it detects stress, or offers "breaks", imitating the techniques of experienced mediators. As a result, some users admitted during the research that it was easier to share painful details with a robot, as the absence of a person reduces the fear of condemnation.[27]

Another promising area is the use of blockchain and decentralized technologies to enhance the safety and confidentiality of mediation processes.[28] Many users are concerned about the possibility of personal data leaks[29] and potential manipulation of negotiation outcomes.[30] Integrating blockchain could provide transparency and immutability of the mediation recordings, reduce the risk of data falsification, and increase trust in automated dispute settlement systems. Trust in automated

[27] XIE, Tianling, PENTINA, Iryna. Attachment Theory as a Framework to Understand Relationships with Social Chatbots: A Case Study of Replika. Proceedings of the 55th Hawaii International Conference on System Sciences, Maui, pp. 2046-2055, 2022.

[28] KELLONIEMI, Alisa R. Как использовать блокчейн для обеспечения безопасности данных [How to Use Blockchain for Data Security]. Международный научный журнал «Вестник науки» [International Scientific Journal "Science Bulletin"], vol. 5, no. 7 (64), pp. 206-210, 2023. (in Russian).

[29] BAKHTEEV, D. V., SOSNOVIKOVA, A. M., KAZENAS, E. V. Overcoming Illegal Cross-border Transfer of Personal Data. Journal of Digital Technologies and Law, vol. 2, no. 4, pp. 943-972, 2024. https://doi.org/10.21202/jdtl.2024.45

[30] CORNEJO, Ya. Neurorights and Personal Data: Challenges and Mental Autonomy. Journal of Digital Technologies and Law, vol. 2, no. 3, pp. 711-728, 2024. https://doi.org/10.21202/jdtl.2024.36

dispute resolution systems depends on universal standards for transparency and accountability, especially in cross-border e-commerce transactions.[31]

The global spread of automated mediation faces a legal vacuum. It is not always clear what legal norms apply in a dispute when, for example, an AI-powered mediator based in Singapore resolves disputes between parties from the European Union and Brazil. We believe creating a model where autonomous systems with a self-learning function could independently adjust to various jurisdictions is necessary. Technically, this would require the unprecedented integration of legal databases and the creation of an algorithm trained on the legislation of all countries. The ethical dimension exacerbates the problem, specifically, what methods and standards AI should use if countries' laws are involved in a dispute or conflict. We consider it expedient to propose a system of priorities, where human rights would prevail over commercial interests.

A trigger for the widespread acceptance of robot mediators would be eliminating the perception of technology as something foreign. In the long run, it is possible that robot mediators could become an integral part of the dispute resolution system, supplementing or even replacing traditional mediation methods in some cases. Their use would reduce costs for mediation procedures, speed up conflict settlement, and make mediation more affordable for many people and organizations. At the same time, it is important to continue research and development of new technologies to ensure their efficiency, reliability, and compliance with ethical standards.

Ultimately, robot mediators will not replace people but will redefine their roles. Some researchers argue that hybrid human-AI models, where humans and algorithms work together to refine each other's input, could help bridge gaps in empathy and context-based reasoning, creating a more adaptable mediation framework.[32] A future mediator will likely resemble a pilot: the system will operate independently most of the time, but human intervention will be necessary during critical moments. The synergy between human emotional intelligence and AI's cognitive abilities may lead to a new, more inclusive and effective method of conflict resolution.

Therefore, the development of robotic mediators is not just a linear technological advancement but a complex interplay of technology, law, ethics, and cultural values. Their success will depend on society's ability to avoid blindly relying

[31] ABEDI, Fahimeh, ZELEZNIKOW, John, BELLUCCI, Emilia. Universal standards for the concept of trust in online dispute resolution systems in e-commerce disputes. International Journal of Law and Information Technology, vol. 27, no. 3, pp. 209–237, 2019. https://doi.org/10.1093/ijlit/eaz005

[32] LU, Jinwei, YAN, Yikuan, HUANG, Keman, YIN, Ming, ZHANG, Fang. Do We Learn from Each Other: Understanding the Human-AI Co-Learning Process Embedded in Human-AI Collaboration. Group Decision and Negotiation, 2024. https://doi.org/10.1007/s10726-024-09912-x

on algorithms and instead integrate them into a humanistic framework, where technology enhances human potential rather than replaces it in the pursuit of justice.

Conclusion

The introduction of robot mediators in conflict resolution represents a significant technological advancement and a fundamental shift in the approach to conflict management. AI-powered systems have the potential to transform traditional mediation methods by combining speed, scalability, and analytical capabilities with the challenges of deep interdisciplinary understanding.

The benefits of robot mediators are already making them indispensable tools for resolving commercial, legal, and even personal conflicts. The algorithms free from human cognitive bias offer solutions based on analysis of precedents, legal norms and behavioral patterns, which is especially valuable under globalization when disputes cross cultural and legal borders. However, restrictions on these systems remain significant despite rapid technological progress. The lack of empathy, inability to interpret complex verbal signals, and risks of algorithmic bias contravene the universality and the future of robot mediators.

Robot mediators' development prospects lie in the synergy between technologies and humanitarian knowledge. Multimodal analysis, which combines speech, facial expressions, and biometric data, can potentially improve the accuracy of dispute escalation prediction. However, ethical concerns must be addressed to ensure that biometric data does not become a means of manipulation. At the same time, integrating NLP and emotional intellect, as tested in projects like Replika, transforms robot mediators into active communicators who can adapt their tone and strategy to the participants' emotional state.

The legal and ethical landscape continues to be a zone of uncertainty, as globalization requires the harmonization of regulatory standards. Technically, this involves training AI on the laws of hundreds of countries, similar to creating modern language models such as ChatGPT, which aim to solve legal issues. The algorithm's functioning should be based on ethical frameworks, with the priority of human rights taking precedence over commercial interests.

The future of mediation is seen in hybrid models where AI and humans complement each other. Similar to a pilot in aviation, a robot mediator takes up routine data analysis, while a human focuses on empathy and moral judgments.

In conclusion, one should note that technologies are not a goal but a tool. The success of robot mediators relies on their ability to enhance, rather than replace, human potential. This requires technological innovations and a global dialogue between lawyers, developers, and mediators from various countries.

Therefore, the development of robot mediators is moving towards a humanistic technological synthesis, where the efficiency of artificial intelligence is combined with human cognitive thinking. Justice is no longer an algorithmic formula but rather the result of collaboration between a robot and a human being.

Resumo: O artigo explora a função dos mediadores robôs equipados com inteligência artificial na resolução de conflitos através de uma abordagem de métodos mistos, combinando análise sistemática da literatura e estudos de caso comparativos. Ele analisa detalhadamente as principais vantagens desses sistemas: neutralidade, capacidade de trabalhar com grandes volumes de dados, escalabilidade e impacto mínimo de fatores emocionais. Atenção especial é dada à tecnologias como aprendizado de máquina, processamento de linguagem natural (PLN) e o uso de *blockchain* para aumentar a segurança. Também são destacadas as principais limitações dos mediadores robôs, incluindo a falta de empatia, possível viés algorítmico, questões de confidencialidade e incerteza jurídica. Os autores empregam análise qualitativa de cenários de mediação do mundo real e avaliação quantitativa do desempenho algorítmico para avaliar a viabilidade de soluções orientadas por IA. Os autores também consideram as perspectivas dos modelos híbridos, que combinam inteligência artificial com a participação humana, e abordam os desafios éticos e regulatórios relacionados à globalização dos processos de mediação. O artigo destaca a necessidade de equilibrar eficiência tecnológica e valores humanísticos, propondo diversas formas de integrar mediadores robôs na prática jurídica e social.

Palavras-chave: Robô. Inteligência artificial. Mediação. Resolução de Conflitos. Regulação.

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