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Utilization of Artificial Intelligence (AI) in Mobile Applications to Ensure the Personal and Legal Safety, Security, and Welfare of Informal Migrant Workers Based on Real Just-in-Time (RJIT) Conditions Abroad

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Abstract: Indonesian informal migrant workers' long history of violence and other victimized experiences, crucial to be solved by the Indonesian government (and representatives of various countries) by getting real just-in-time (RJIT) updates about the migrant workers' situations. These updates play their role in the database information system and RJIT monitoring of informal migrant workers through situations, and conditions, including their legal standing. Advanced AI utilization might even save migrant workers' lives and/or health as it might be set as an emergency button that connects informal migrant workers to local emergency services (fast response), on-site Indonesian government representatives, and other necessary entities. It might also become the first pace of legal monitoring and protection for migrant workers. Using the empiric juridic methodology, this paper analyzed various regulations related to migrant workers, rules, and laws interaction, and examined the implementation of (AI-based) applications on migrant workers in multiple countries. AI's key focus role lies on features effectivity (location tracking, physical identification, emergency notification, risk assessment notification based on RJIT information), legal-info-chatbot (LIC), and legal counsel assistance (LCA). The research showed that integrated advanced and comprehensive RJIT-AI features in migrant workers' mobile applications positively contributed to improved access to justice, emergency case response, and handling, benefits for the safety and welfare of migrant workers, and function for any related parties. This research recommended regulations strengthening and cross-country synergies in supporting AI technology utilization on informal migrant workers through a protection system.

Keywords: Informal Migrant Workers, AI Artificial Intelligence, Real-Just-In-Time (RJIT) Information, Emergency Response, Mobile Application, Personal Safety and Welfare, Legal Standing/Safety/Security.

INTRODUCTION

Informal Indonesian migrant workers face serious challenges concerning human rights and legal protection (Shaliha, 2023). Physical violence, exploitation, unpaid wages, and illegal

passport confiscation are recurring issues in various migration destination countries (Safitri, 2023). The lack of access to accurate legal information and responsive reporting mechanisms worsens the bargaining position of migrant workers, especially those who work informally. This condition shows a gap in the protection system that cannot meet real needs in the field. Migrant workers are in a very vulnerable position when an emergency occurs, without guaranteed legal information or quick access to official assistance (Fikri, 2022). Limitations in legal protection are also triggered by a monitoring system that is static and unresponsive to the dynamics of migrant workers' lives abroad (Rosalina, 2020). Data is often passive, not updated regularly, and unable to capture rapidly developing critical situations. This makes it difficult for the government to intervene promptly, while also opening up opportunities for repeated violations. Undocumented migrant workers or those working without official contracts tend to be excluded from conventional reporting systems (Sakti, 2024). This situation requires a technology-based breakthrough to monitor their conditions in an actual and integrated manner.

Artificial intelligence (AI) technology offers great opportunities for building a more active and responsive legal protection system (Permana, 2025). AI allows real-time tracking of conditions, automatic provision of legal information, and activation of emergency buttons when critical situations occur. AI-based applications can work around the clock without interruption, providing direct access to legal and emergency assistance without having to wait for manual intervention (Wibowo, 2023). The implementation of features such as facial recognition, location tracking, and risk analysis can be used to prevent violence or save the lives of migrant workers in extreme conditions. Combining this technology with strong regulations is key to answering the needs of the times.

The concept of Real Just-in-Time (RJIT) has emerged as a new approach that is relevant to the need for technology-based legal protection. In the context of migrant workers, RJIT means that information, reporting, and response are carried out directly when the incident occurs or begins to be detected. The basic principles of RJIT are speed, accuracy, and information integration that supports rapid legal and administrative decision-making. This approach requires the integration of digital systems with responsive and non-bureaucratic legal structures. Without the RJIT approach, government intervention in the fate of migrant workers tends to be late and reactive, not preventive.

A review of the theory of legal protection emphasizes that the state has a responsibility to ensure that every citizen receives fair and comprehensive protection, including when they work abroad (Jatmiko, 2025). Legal protection is not only in the form of regulation, but also in the form of access to information, assistance, and justice (Kristiadi, 2022). In this context, AI technology can be positioned as part of a modern legal protection instrument (Sinaga, 2024). A digital system that can detect threats and provide legal information automatically can significantly expand the reach of legal protection. This shows that legal protection can now be realized not only formally, but also functionally through technological intervention (Adriyan, 2024).

Social justice theory also provides an important foundation for discussing protection for informal migrant workers (Auliaillah, 2024). Migrant workers, especially those without official documents, are a marginalized group and often lose access to justice (Situmorang, 2021). This inequality of access worsens their working conditions and increases the chances of rights violations. AI technology that is designed inclusively and responsively can be a bridge to restore this inequality. With the help of AI features, every migrant worker has an equal opportunity to receive legal assistance and protection, regardless of their formal status (Mita Noveria, 2021).

In addition, information systems and rapid response theories highlight the importance of speed in data-based decision-making (Purnawati, 2024). In the context of migrant workers, time is a critical factor that differentiates between safety and danger. AI-based information

systems and RJIT can process and analyze data in seconds, enabling rapid action supported by accurate digital evidence (Hasan, 2024). Such systems can channel important information to authorities, government representatives, or migrant workers' families in a short time. Thus, information systems are not only documentation tools, but also life-saving intervention tools. The use of AI shows great potential in international labor (Masrichah, 2023). Several applications in developed countries have developed similar systems to support their migrant workers, including voice-based violence reporting features, digital counseling systems, and legal chatbots (Putra, 2023). However, there has not been much research examining the effectiveness of implementing AI systems for migrant workers from developing countries such as Indonesia. This opens up important research space to adapt technological approaches to the needs and socio-cultural characteristics of Indonesian migrant workers. Understanding this context will be the basis for designing a technology-based protection system that is not only sophisticated but also relevant.

Regulations that support the use of AI and the protection of migrant workers are also available, although they have not been fully integrated across sectors. Law No. 18 of 2017 concerning the Protection of Indonesian Migrant Workers is the main foundation for guaranteeing the rights and safety of migrant workers (Mawikere, 2024). Minister of Manpower Regulation No. 4 of 2023 further strengthens these provisions by providing more technical guidelines regarding destination countries that have high risks (Yuliastuti, 2024). At the international level, ILO Convention No. 189 and the 1990 UN Convention are human rights standards that must be ratified and internalized into the national legal system. All of these instruments can be the legal basis for designing a more adaptive and equitable technology-based protection system.

The integration of technology in the protection of migrant workers must also pay attention to the latest regulations on personal data protection. Law No. 27 of 2022 concerning Personal Data Protection emphasizes the importance of individual data security, including biometric data, location, and communication history. In the context of AI applications for migrant workers, data protection principles must be a core part of system design and operation. Failure to protect personal data can endanger migrant workers, especially if the data falls into the hands of irresponsible parties. The combination of legal protection and digital data protection is an absolute requirement in building an ethical and effective AI system.

METHOD

This study uses an empirical legal method, namely an approach that combines analysis of positive legal norms with a study of social and technological realities that are developing in the context of protecting informal migrant workers. This method allows researchers not only to examine applicable laws and regulations—such as Law No. 18 of 2017 concerning the Protection of Indonesian Migrant Workers, Ministerial Regulation No. 4 of 2023, and related international conventions—but also to examine how these regulations are implemented in practice through the support of artificial intelligence (AI)-based technology. The legal analysis is carried out by examining the legal suitability and gaps related to the use of AI features in mobile applications for migrant workers, while an empirical approach is applied by evaluating examples of the application of similar technology in various countries, such as “JustGoodWork” in the UK and “SafeStep” globally. This study also pays attention to the dynamics of the implementation of legal protection in the destination countries of migrants, observing the extent to which foreign jurisdictions recognize and can cooperate with Indonesia's digital technology-based protection system. In addition, this study explores secondary data from reports, journal articles, the latest regulations, and documentation from institutions such as BP2MI, the Ministry of Manpower, and related NGOs, to map actual needs and implementation challenges. With this approach, the research is expected to provide a

complete picture, both normatively and practically, regarding the potential and obstacles in utilizing Real Just-in-Time-based AI technology as a comprehensive protection solution for Indonesian informal migrant workers abroad.

RESULT AND DISCUSSION

Utilization of AI and RJIT-Based Application Features for Migrant Workers

The main feature of AI-based applications for informal migrant workers lies in their ability to track location and conditions in real-time. By utilizing GPS technology and mobile device sensors, the system can accurately and continuously determine the geographic position of workers. This information is crucial for responding quickly when violence, exploitation, or workers lose contact. Regular data updates allow authorities and families to understand workers' movement patterns and safety conditions. This monitoring is a form of technology-based legal protection that relies on data speed and accuracy.

Moreover, for location tracking, applications can be equipped with facial recognition and biometric identification features that are very helpful in verifying the identity of migrant workers, especially when they experience lost documents or are in a legal emergency. This technology minimizes the potential for identity misuse and ensures that assistance is only provided to authorized users. Using biometrics can also be applied to log in to sensitive features such as activating the emergency button or accessing personal legal data. This identification is significant in destination countries that have strict legal systems against illegal or undocumented immigrants. With biometric authentication, legal and rescue processes can run more efficiently.

Another vital feature in AI-based applications is an emergency button directly connected to local emergency response services, Indonesian government representatives in the local country, and NGOs working for migrant protection. This button can be designed with high sensitivity so that it only needs to be pressed once to activate a series of automatic responses. Through a geofencing system, the application can also send warnings when workers enter areas known to be dangerous or high-risk, such as conflict areas or human trafficking-prone zones. The combination of an emergency button and a location-based warning system makes the application a life-saving tool that can be accessed at any time.

The AI system in this application is also designed to automatically carry out risk assessments based on user input, tracking movement patterns, and continuously updated legal information. AI will process various variables such as working hours, location, last communication, and previous reports to detect potential dangers or violations. The analysis results will be sent in the form of notifications to users and relevant parties, encouraging them to immediately take preventive or mitigating steps. A mechanism like this provides a more proactive approach to legal protection than just acting after a violation occurs. This system works like a social radar that detects abnormalities before they develop into a crisis.

Besides physical protection, migrant workers also really need access to accurate and easy-to-understand legal information. For this reason, the Legal-Info Chatbot (LIC) feature based on Natural Language Processing (NLP) was developed as a means of automated legal consultation. This chatbot is designed to answer basic legal questions in simple language, using question-and-answer scenarios that are often faced by migrant workers. Topics such as employment contract rights, violence reporting procedures, and residence permit information can be accessed at any time without having to meet a lawyer in person. This function is very helpful for migrant workers who experience limitations in language, time, and access to formal legal services.

For more complex cases, the application provides an AI consultation (LCA) service that can digitally connect migrant workers with lawyers, legal aid organizations, and representatives of the Indonesian government. This platform can act as a bridge between users and

professionals in handling serious legal cases, such as deportation, detention, or serious violence. The system prioritizes confidentiality and information security, with end-to-end data encryption and a multi-layered authentication system. This relationship ensures that migrant workers receive credible, verified, and legal assistance without having to leave their workplace or residence. This service can be an important element in accelerating the efficient legal advocacy process.

One challenge that cannot be ignored in developing this feature is the potential for data misuse and the spread of false information or hoaxes. The application system must be equipped with content filters and automatic fact-checking to prevent the spread of fake news that can trigger fear or panic. In addition, there needs to be ethical supervision of the use of migrant workers' data so that it is not used for commercial or political purposes. Strict regulation and transparency in data use are key to maintaining user trust in the system. The protection of digital privacy must be a priority on par with the protection of physical safety.

A comparative study of similar apps in other countries shows that this approach is not just a theoretical idea, but has been implemented with varying degrees of success. The JustGoodWork app in the UK, for example, offers a step-by-step guide for migrant workers seeking domestic or agricultural work, including contract information, employment rights, and emergency contacts. Meanwhile, the global SafeStep app provides a mobile-first approach with anonymous reporting features and direct connections to emergency services. While these apps are helpful, many still rely on manual user input and have not fully integrated AI. This opens up opportunities for more responsive and personalized innovations. In the context of Indonesian migrant workers, the adaptation and development of AI features must consider the social, cultural, and digital backgrounds of the users. Many migrant workers come from rural areas who may not be accustomed to using high technology. The interface design must be simple, with the use of Indonesian or even regional languages that are familiar to migrant workers. In addition, initial training on how to use the app must be carried out before departure abroad, so that they understand the function and benefits of each feature. This combination of technological approaches and sociological understanding is key to success in building an AI-based protection system that truly sides with humans.

Legal Analysis and Implementation of RJIT-AI Based Applications

The implementation of Real Just-in-Time (RJIT)-based applications with AI technology within the framework of protecting informal migrant workers must first be reviewed in compliance with national law. Law Number 18 of 2017 concerning the Protection of Indonesian Migrant Workers provides a fairly strong legal basis regarding the protection of rights, placement, and repatriation of migrant workers. However, in the context of digitalization and utilization of AI, this law does not explicitly regulate technological instruments as part of the protection mechanism. This gap shows the importance of revising or issuing new implementing regulations that integrate information technology into the PMI protection system. Regulations that are responsive to innovation will strengthen the legal legitimacy of the applications being developed.

Another national legal challenge lies in the protection of the personal data of migrant workers, which is increasingly relevant with the increasing risk of digital information leaks. Law Number 27 of 2022 concerning Personal Data Protection (PDP) has been passed and is the main reference in the governance of personal information in Indonesia, including in the application system. However, the technical implementation of principles such as explicit consent, access rights, and data deletion have not been described in detail in the context of protecting cross-border migrant workers. AI-based applications must be designed to strictly adhere to these principles so as not to create new legal issues. Harmonization between the PDP

Law and the 2017 PMI Law is an important prerequisite to ensure the legitimacy and accountability of the digital system used.

The next obstacle is cross-jurisdictional applicability, considering that this application will be used by Indonesian citizens who are abroad. Not all destination countries for migrant workers have legal regimes that are compatible with digital systems from other countries, especially those that are AI-based and contain sensitive data. Some countries even have strict rules on the collection and management of personal data by foreign entities. It is a challenge to ensure that applications are not only legal in Indonesia but also legally acceptable in the countries where migrant workers are located. The strategy for cross-border legal recognition must be strengthened so that the digital protection system is not rejected or restricted in certain jurisdictions.

Bilateral cooperation is an important step in bridging legal differences between countries regarding the protection of migrant workers through technology. International cooperation agreements that include aspects of the digitalization of protection can expand the legal legitimacy of the RJIT-AI application. Indonesia can draft new MoUs or revise existing agreements with major destination countries for migrant workers, such as Malaysia, Saudi Arabia, Taiwan, and Hong Kong, to include commitments to the use of technology. Such agreements can also regulate data exchange, rapid response access to incidents, and cross-border information security standards. A technology-based diplomatic approach is key to strengthening the legal foundation for migrant protection in the digital era.

The Indonesian government through the Ministry of Manpower (Kemenaker), the Indonesian Migrant Workers Protection Agency (BP2MI), and the Ministry of Foreign Affairs (Kemlu) play a central role in the regulation and implementation of AI-based protection applications. The Ministry of Manpower is tasked with designing employment policies that are adaptive to technological innovation, while BP2MI is at the forefront of socializing and distributing applications to prospective migrant workers. The Ministry of Foreign Affairs, through labor attachés and diplomatic representatives, is tasked with ensuring the connectivity of this system with local systems in destination countries. This inter-institutional synergy must be carried out within an integrated national framework so that there is no overlap or lack of responsibility in the implementation process. In addition to the government, the involvement of the private sector, especially application developers and technology startups, is needed to ensure that the products produced are user-friendly, safe, and can be updated regularly. AI technology and RJIT updates require a system that can learn from new data, process quickly, and still uphold digital ethics. Collaboration with local and international application developers must pay attention to the principles of openness and state supervision so that it remains within the corridor of national interests. This collaboration is not only about technical matters but also concerns transparent business models and governance for the benefit of migrant workers as end users.

Civil Society Organizations (CSOs) also play a key role as a bridge between the state and migrant workers. These organizations often have strong roots in migrant communities and are more trusted in conveying information and legal advocacy. The involvement of CSOs in the design and implementation of applications can increase the acceptability of the system, as well as be a source of authentic feedback from the field. In the context of implementing AI-based applications, CSOs can be partners in digital education, monitoring user rights, and as intermediaries in mediating emergency cases. Cross-sector collaboration like this creates a more participatory and adaptive protection ecosystem.

The migrant worker data reporting and updating system is an important part of the success of the RJIT-AI application. Every incident report, location update, or legal interaction that enters the system must be managed in a structured and standardized manner so that it can be accessed quickly and processed as needed. This database will be the foundation for

formulating more accurate policies and detecting trends in violence or rights violations in various destination countries. The government needs to form a special unit or digital command center tasked with handling this data traffic in real-time, including in coordination with foreign parties. Neat data integration will strengthen the reliability of the overall protection system.

The integrated command or national control center must be the main authority in supervising the RJIT-AI application system, both from a technical and legal perspective. The function of this center is not only as a monitor but also as a quick decision-maker in emergencies that require cross-ministerial or even cross-country intervention. The structure of this center can include a team of legal experts, IT experts, diplomatic representatives, and field officers trained in handling crises. Effective coordination between team members will speed up the response process to reports from the application and improve the quality of protection for migrant workers. With the presence of an optimally functioning control center, the sustainability and resilience of the digital protection system can be better guaranteed.

CONCLUSION

The Artificial Intelligence (AI) technology integrated with the Real Just-in-Time (RJIT) approach in mobile applications shows great potential as a concrete protection tool for migrant workers, especially those in the informal sector and high-risk areas. The presence of features such as location tracking, emergency buttons, legal chatbots, and real-time data-based risk assessment systems allows for rapid intervention against potential human rights violations and dangerous working conditions. This technology provides an immediate response to incidents and constructs a more responsive, transparent, and humane legal protection ecosystem. In practice, the success of this system is highly dependent on the ability of national and international law to accommodate technological developments. Responsive regulations, supporting legal infrastructure, and cooperation between countries are elements that must go hand in hand so that the use of technology does not stop at the level of discourse or pilot projects alone.

The Indonesian government must immediately formulate special implementing regulations that bridge the use of AI in protecting Indonesian Migrant Workers (PMI), both in technical and ethical aspects. These regulations must include data security standards, accountability of system managers, and legal protection for PMIs who are active application users. At the international level, Indonesia is also encouraged to initiate legal harmonization with major migration destination countries, including through ratification of agreements that recognize the legitimacy of digital systems in labor protection. In addition, trials and further development of the RJIT-AI application need to be focused on areas with high levels of risk of violence or exploitation, as well as segments of migrant workers who have not received much formal protection. This step is critical not only to measure the system's effectiveness but also as a form of the state's commitment to providing inclusive technology-based social justice.

REFERENCES

Adriyan, R. A. (2024). HUKUM MODERN. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang, 10(04)*, 445-457.

Auliaillah, D. &. (2024). Perlindungan Tenaga Kerja Migran Dari Kejahatan Lintas Negara Dalam Upaya Penegakan Hak Asasi Manusia. *Media Hukum Indonesia (MHI), 2(3)*.

Fikri, S. (2022). Perlindungan Dan Pemenuhan Hak Asasi Manusia Bagi Pekerja Migran Indonesia Di Luar Negeri. *Morality: Jurnal Ilmu Hukum, 8(2)*, 108-126.

Hasan, M. K. (2024). *Penerapan Sistem Informasi Berbasis AI untuk Analisis Data Real-time.* Padang: Takaza Innovatix Labs.

Jatmiko, L. J. (2025). Perjanjian Kerja Sebagai Upaya P Perjanjian Kerja Sebagai Upaya Perlindungan serta Pemenuhan Hak-Hak Asasi Manusia untuk Pekerja Migran

Indonesia: Perjanjian Kerja Sebagai Upaya Perlindungan serta Pemenuhan Hak-Hak Asasi Manusia untuk Pekerja Migran Indon. *The Prosecutor Law Review, 3(1)*.

Kristiadi, E. Y. (2022). Perlindungan Hukum Terhadap Pekerja Migran Indonesia. *Jurnal Pendidikan Kewarganegaraan Undiksha, 10(1)*, 312-317.

Masrichah, S. (2023). Ancaman dan peluang artificial intelligence (AI). *Khatulistiwa: Jurnal Pendidikan dan Sosial Humaniora, 3(3)*, 83-101.

Mawikere, A. G. (2024). Perlindungan Hukum Terhadap Pekerja Migran Indonesia Berdasarkan Undang-Undang Nomor 18 Tahun 2017. *Lex Privatum, 14(1)*.

Mita Noveria, D. K. (2021). *Perlindungan Pekerja Migran Indonesia.* Jakarta: Yayasan Pustaka Obor Indonesia.

Permana, Y. P. (2025). *Kecerdasan Buatan: Mengubah Dunia dengan Teknologi.* Sumedang: MEGA PRESS NUSANTARA.

Purnawati, N. W. (2024). *Sistem Informasi: Teori dan Implementasi Sistem Informasi di berbagai Bidang.* Jambi: PT. Sonpedia Publishing Indonesia.

Putra, G. A. (2023). Tantangan Hukum: Keakuratan Informasi Layanan AI Chatbot Dan Pelindungan Hukum Terhadap Penggunanya. *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional, 12(2)*.

Rosalina, H. N. (2020). Perlindungan Hukum Terhadap Pekerja Migran Sektor Informal dalam Perspektif Teori Bekerjanya Hukum di Masyarakat. *Jurnal Pembangunan Hukum Indonesia, 2(2)*, 174-187.

Safitri, D. &. (2023). Keamanan Manusia Pekerja Migran Indonesia: Ketidakamanan dan Perlindungannya. *Intermestic: Journal of International Studies, 7(2)*, 741-769.

Sakti, L. S. (2024). PEMENUHAN HAK KONSTITUSIONAL PEKERJA MIGRAN INDONESIA ILEGAL DI LUAR NEGERI. *Jurnal Hukum Agama Hindu Widya Kerta, 7(2)*, 90-104.

Shaliha, R. &. (2023). Tinjauan yuridis perlindungan hukum jaminan sosial bagi pekerja migran berdasarkan undang–undang nomor 18 tahun 2017 tentang perlindungan pekerja migran indonesia. *Indonesia Berdaya, 4(1)*, 389-396.

Sinaga, B. B. (2024). Peran Teknologi Blockchain Sebagai Instrumen Pembangunan Penegakan Hukum Berbasis Digital & Mewujudkan Masyarakat Berkeadilan di Era Society 5.0. *Padjadjaran Law Review, 12(1)*, 71-82.

Situmorang, B. A. (2021). Perlindungan Hukum Terhadap Pekerja Migran Indonesia Informal Menurut Undang Undang Nomor 18 Tahun 2017 Tentang Perlindungan Pekerja Migran. *Jurnal Ilmiah Metadata, 3(2)*, 669-693.

Wibowo, A. W. (2023). *Pemolisian digital dengan artificial intelligence.* Depok: PT. RajaGrafindo Persada-Rajawali Pers.

Yuliastuti, B. C. (2024). Penerapan Peraturan Menteri Ketenagakerjaan Nomor 4 Tahun 2023 Terhadap Perlindungan Jaminan Sosial Pekerja Migran Indonesia. *UNES Law Review, 6(4)*, 11167-11183.