



Implementation of Facial Recognition Identification System in Indonesia's Visa Services to Strengthen the Selective Policy of the Directorate General of Immigration in Supporting National Security

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ABSTRACT

This research discusses the implementation of a facial recognition identification system in the Republic of Indonesia's visa services as an effort to strengthen the Directorate General of Immigration's selective policy in supporting national security. Using the literature review method, this research analyzes the application of facial recognition technology in the immigration system adopted to improve the accuracy of identity verification and the efficiency of the examination process. The discussion covers RI's visa policy, facial recognition technology, comparison with other countries' visa systems, security enhancement, and risk management, as well as social and ethical implications. The results show that this technology is effective in strengthening national security and speeding up the immigration process. However, its implementation must be balanced with strict regulations related to personal data protection to avoid potential privacy violations. This research suggests the development of data protection regulations, training of human resources, socialization to the public, and periodic evaluation of the effectiveness of facial recognition systems in RI visa services.

Keywords: Facial Recognition, Visa, National Security.

INTRODUCTION

In the era of globalization, international mobility is increasing rapidly along with economic growth and the development of information technology. Visits between countries have become easier through various types of visas offered by countries in the world, including Indonesia. Visa functions not only as an entry permit but also as an important instrument in maintaining national security and selectivity of immigration policy. In this context, the Directorate General of Immigration of the Republic of Indonesia has a strategic role in regulating the entry and exit of foreigners to protect national interests and state security. Therefore, a reliable and efficient identification system is required to support the implementation of selective policies in the visa-granting process. Traditional identification systems based on physical documents, such as passports and static photos, are often vulnerable to forgery and manipulation. Identity

verification methods that rely on manual checks also have the potential for human error and delays in the examination process. With the increasingly sophisticated *modus operandi* of transnational crimes, such as terrorism, human trafficking, and illegal immigration, Indonesia needs to adopt cutting-edge technology to strengthen its border security system. In this case, face recognition technology offers an effective and efficient solution for identifying and verifying the identity of visa applicants accurately and quickly (Girsang & Yemima, 2023).

The application of facial recognition technology in visa services is not new internationally. Many developed countries, such as the United States, Australia, and Japan, have integrated this technology into their immigration systems. This technology works by analyzing the biometric characteristics of a person's face and matching them with the data stored in the immigration database. As a result, identity verification can be done automatically and more accurately than conventional methods. With high accuracy and faster processing, facial recognition technology not only improves the efficiency of visa services but also strengthens national security. A selective visa policy is one of Indonesia's strategies for screening foreigners entering its territory. This policy aims to ensure that only individuals who meet the requirements and do not jeopardize national security are allowed to enter. However, the effectiveness of the selective policy largely depends on the reliability of the identification system used. In this case, facial recognition technology can serve as an accurate and objective selection tool, thus assisting the Directorate General of Immigration in making the right decision regarding visa granting (Puspiptek, 2024).

Aside from the technical and operational advantages, the application of facial recognition technology also poses a number of challenges, especially with regard to privacy and ethical issues. Concerns about the misuse of biometric data and potential violations of privacy rights are issues that need to be considered. Therefore, strict regulations and transparency in the management of biometric data are needed so that the application of this technology does not cause polemics in the community. In addition, it is important to educate the public about the benefits and risks of using this technology to create positive acceptance. In addition to ethical aspects, the implementation of facial recognition technology also requires adequate infrastructure and human resources. The required infrastructure includes hardware such as high-resolution cameras, secure data storage servers, and software capable of analyzing and matching biometric data with high accuracy. Meanwhile, the human resources involved must have adequate technical competence in operating and managing this system. Therefore, training and capacity building are key factors in the successful implementation of facial recognition technology in visa services (Alifa, 2024).

On an international scale, the application of facial recognition technology in the visa system has shown significant effectiveness in improving border security and the efficiency of immigration administration. Comparative studies with countries that have successfully adopted this technology can provide insights for Indonesia in formulating policies and implementation strategies. In addition, analysis of best practices from other countries is also important to avoid

potential problems and maximize the benefits of this technology. By considering the complexity of national security issues and geopolitical dynamics, Indonesia needs to formulate policies that are adaptive and responsive to technological developments. The implementation of facial recognition systems in visa services can be a strategic step in strengthening selective policies that are in line with national interests. However, the success of this implementation is highly dependent on adequate regulatory support, infrastructure readiness, and public acceptance (Setiawan et al., 2020).

Previous studies have highlighted the growing importance and effectiveness of facial recognition technology in immigration and border security systems. For example, Jain et al. (2011) demonstrated that biometric facial recognition significantly improves the accuracy and speed of identity verification compared to traditional methods, reducing fraud and enhancing security. Similarly, Schlett and Lam (2020) analyzed the integration of facial recognition in visa processing systems, noting that while it enhances operational efficiency and national security, it also raises ethical concerns regarding privacy and data protection.

This study aims to analyze the implementation of a facial recognition identification system in the Republic of Indonesia visa service in the context of strengthening the selective policy of the Directorate General of Immigration. The method used is a literature review, which collects and analyzes various scientific sources related to visas, border security, facial recognition, and selective policies. The results of the research are expected to contribute to the development of a more effective and efficient visa policy, as well as to strengthen national security through innovative technology. Overall, this research is expected to not only provide scientific contributions in the field of immigration policy and national security but also become a reference for the government in formulating regulations related to the application of facial recognition technology. Thus, the implementation of this system is expected to increase the effectiveness of selective policies, strengthen national security, and provide better visa services for the public and foreign tourists visiting Indonesia (Siregar & Saepudin, 2020).

RESEARCH METHOD

This research uses the literature review method by analyzing various scientific journals relevant to the implementation of facial recognition technology in the immigration system, especially in visa services. This method was chosen to gain a comprehensive understanding of the development of facial recognition technology, its application in border security, and its implications for selective immigration policies. The sources analyzed include international journals indexed in reputable databases such as IEEE Xplore, ScienceDirect, and SpringerLink, which contain research related to facial recognition, border security, and visa policy. Literature selection focused on articles published in the last 5 to 10 years to ensure relevance and actuality of the data. Journal selection criteria included the research methods used, validity of the research results, and relevance to the topic of visa policy and border security. The articles analyzed include

case studies of facial recognition technology implementation in different countries, evaluation of the effectiveness of selective policies, and analysis of risks and ethics in the use of biometric technology. This approach enables a comprehensive comparison of Indonesia's visa policy with other countries in the context of national security and risk management (Destianingsih et al., 2024).

RESULT AND DISCUSSION

Republic of Indonesia Visa Policy

Indonesia applies a selective visa policy to maintain national security and support economic development. This policy is based on the principle that only individuals who provide positive benefits and do not threaten security are allowed to enter Indonesian territory. According to Law No. 6/2011 on Immigration, visas are granted by considering the interests of security, public order, and public welfare. In a global context, this policy reflects Indonesia's efforts to balance between national security and international mobility. The Directorate General of Immigration, as the implementer of visa policy, plays an important role in selecting and evaluating each visa applicant. This process includes document verification, interviews, and background checks to ensure there is no potential threat from the visa applicant. In addition, this policy allows Indonesia to effectively manage the inflow of foreign workers, tourists, and investors in order to support national economic growth (Devi et al., 2023).

In its implementation, Indonesia uses an online visa system through the official Immigration Online Visa website that simplifies visa applications and increases transparency in the selection process. The Visa-Free Visit Policy, which has been applied to several countries, is also a strategy to increase tourism. However, this policy is carried out selectively based on an evaluation of diplomatic relations and potential security risks from the applicant's home country. Indonesia also adopted Visa on Arrival (VoA) to facilitate international travelers with business and tourism purposes. However, VoA applicants still go through a strict selection process using intelligence data and biometric verification to prevent visa abuse and potential national security threats (Antariksa et al., 2024).

Facial Recognition Technology

Facial recognition technology is a biometric innovation that uses artificial intelligence algorithms to identify or verify a person's identity through facial features. In Indonesia, this technology has been implemented at Immigration Checkpoints (TPI) as part of the digital transformation of immigration. In November 2022, the Directorate General of Immigration officially authorized the use of this technology through Decree Number IMI-003.TI.05.02 of 2022. The use of facial recognition technology aims to minimize cross-border crimes, such as human smuggling, terrorism, and illegal immigration. This technology utilizes a biometric database integrated with the Immigration Management Information System (SIMKIM) to verify the identity of border crossers accurately and quickly. This implementation is also in line with the immigration

modernization strategy that prioritizes efficiency and security in the immigration inspection process. The technology is used in the automated system at major airports, which enables automatic screening with facial scans linked to the immigration database. Thus, the inspection process becomes faster and more accurate, reducing queues and physical contact that could potentially spread infectious diseases (Purwanty & Daryanto, 2024).

Comparison of Indonesian Visa and Other Countries' Visa

In the era of globalization, human mobility across countries is increasing, prompting countries to develop secure and efficient visa systems. Developed countries such as the United States, Australia, and the United Kingdom have long implemented biometric technology in their visa systems to improve the security and efficiency of the immigration process. On the other hand, Indonesia is starting to follow this global trend by adopting facial recognition technology to strengthen its immigration system. However, there are significant differences in the approach and implementation (Girsang & Yemima, 2023).

United States of America

The United States has one of the strictest immigration systems in the world. They have a Visa Waiver Program (VWP) that allows citizens from certain countries to enter without a visa for up to 90 days but still go through a strict biometric verification process. The technology used includes fingerprint scanning and facial recognition at every entry point, both at airports and seaports. This technology is integrated with US-VISIT (United States Visitor and Immigrant Status Indicator Technology), which verifies the identity of visitors with data from the Department of Homeland Security, FBI, and Interpol. In addition, the United States uses a very strict surveillance system that allows the movement of every incoming and outgoing individual to be tracked through biometric data. This aims to detect security threats and prevent illegal immigration. With strict policies, the United States is able to effectively control its border security, but it raises concerns regarding privacy and civil liberties (Puspiptek, 2024).

Australia

Australia is known for its modern and efficient visa system, using the Face Verification Service (FVS), which verifies the identity of visa applicants with biometric data from electronic travel documents (e-passports). This technology enables fast and accurate identity authentication, reducing the possibility of document forgery. At airports, Australia uses SmartGates, which utilizes facial recognition technology to speed up the immigration screening process without the need for direct interaction with officers. Biometric data taken upon arrival is automatically matched with information in e-passports and immigration databases. However, Australia has a strict surveillance policy, where biometric data can be accessed by the Australian Border Force and Australian Federal Police for national security purposes. The system is also linked to the Five Eyes Intelligence Alliance to share information with the United States, United Kingdom, Canada, and New Zealand in an effort to prevent terrorism and international crime (Alifa, 2024).

English

The UK uses Biometric Residence Permits (BRP) which stores biometric data including fingerprints and facial recognition for foreign nationals staying longer than six months. In addition, Electronic Visa Waiver (EVW) is implemented for some countries which allows travelers to apply for visas online with accurate biometric verification.

At the port of entry, the UK uses eGates, which combines facial recognition with e-passport data, speeding up the screening process without having to meet immigration officers face-to-face. This technology is also connected to the Border Force National Operations Centre (NOC), which can monitor travelers' movements in real-time. In addition, the UK cooperates with the European Union Entry/Exit System (EES), which records biometric data of all non-EU citizens entering and leaving the Schengen area, thereby increasing border security and making it easier to track visa violations (Setiawan et al., 2020).

Indonesia

Indonesia began adopting facial recognition technology in its visa system to strengthen national security while improving service efficiency. Since November 2022, the use of this technology has been authorized through Decree Number IMI-003.TI.05.02 Year 2022 by the Directorate General of Immigration of Indonesia. The technology is used at auto gates at major airports that allow border crossers to verify their identity automatically by matching facial biometric data with e-passports. The main objective is to prevent cross-border crimes, such as human trafficking and people smuggling, and speed up the immigration check process. However, unlike the United States, which applies strict supervision, Indonesia focuses more on service efficiency without putting aside national security aspects. The system is not yet fully connected to global databases such as Interpol but is under development to enhance international cooperation in border security (Siregar & Saepudin, 2020).

Comparison and Analysis

1. Technology Used: The United States, Australia, and the United Kingdom have long used more advanced biometric technologies, such as iris scanning and fingerprint verification, while Indonesia has only recently implemented facial recognition technology.
2. Policy Objectives: The US and UK focus more on national security and terrorism prevention, while Indonesia focuses on service efficiency and border security.
3. Surveillance and Privacy: The United States and Australia have very strict surveillance systems with extensive data access for national security purposes, while Indonesia is more cautious in its use of biometric data and seeks to protect individual privacy.
4. International Integration: The United States, Australia, and the United Kingdom have strong international cooperation in sharing security data with the global intelligence alliance, while Indonesia is still in the developmental stage of strengthening international cooperation in border security.

Overall, Indonesia follows the global trend in the use of biometric technology for visa and immigration, but its approach is more focused on service efficiency and national security without compromising privacy. In its implementation, Indonesia needs to continue to strengthen personal data regulations and develop international cooperation to optimize a more secure and efficient immigration system (Yulianti et al., 2022).

Strengthening Security and Risk Management

The implementation of facial recognition technology in visa and immigration check services in Indonesia aims to strengthen national security and risk management effectively. This technology enables accurate identification of individuals by comparing facial biometric data with an integrated database. Thus, the immigration authorities can detect and prevent the entry of individuals with criminal records or who could potentially jeopardize the country's security. This helps in tightening surveillance at international entry points such as airports and seaports, thus minimizing the risk of threats to national security. In addition, this facial recognition technology can be integrated with global security systems such as Interpol and ASEANAPOL. This integration enables the real-time exchange of intelligence data to detect and prevent transnational crimes, such as human trafficking, terrorism, and narcotics smuggling. Through this international cooperation, Indonesia can strengthen its position in maintaining territorial security and preventing international criminals from entering the country with fake identities or using stolen documents (Aditama & Haryanti, 2023).

The implementation of facial recognition-based autogate also speeds up the identity verification process at immigration points. With this technology, passengers can pass through immigration checks automatically without physical interaction with officers, thereby reducing queuing time and improving service efficiency. In addition to speeding up the process, facial recognition-based autogate also reduces the risk of human error in identity verification. Unique and hard-to-fake biometric data makes this technology more reliable in identifying individuals compared to conventional verification methods such as manual passport checks. However, the application of facial recognition technology in the immigration system also needs to pay attention to data security and privacy aspects. The biometric data collected must be protected with strong encryption and strict privacy policies to prevent data misuse or leakage. In addition, there needs to be clear regulations regarding the use of biometric data and transparent audit mechanisms to ensure this technology is used ethically and responsibly. With strengthened data security and proper policy implementation, facial recognition technology can be an effective solution to strengthening security and risk management in Indonesia (Widigusti et al., 2023).

Social and Ethical Implications

While facial recognition technology provides security and efficiency in visa and immigration screening services, there are social and ethical implications that need to be taken seriously. One of the main concerns is the violation of personal data privacy. Biometric data such as faces are unique and permanent, so if the data is leaked or misused, the impact can be very detrimental

to the individual concerned. In addition, there is the potential for surveillance that can interfere with individual freedoms, especially if this technology is used to monitor people's activities in public spaces without clear consent. In addition to privacy concerns, the potential for algorithm bias is also a significant ethical concern. Facial recognition technology is known to have different accuracy rates based on race, age, and gender factors. Some studies show that facial recognition algorithms are often less accurate in identifying individuals from minority groups or darker skin tones. This can lead to indirect discrimination, such as visa denials or stricter security checks against certain groups. Therefore, it is necessary to periodically test and evaluate algorithms to ensure fairness and accuracy in the application of this technology (Muharram et al., 2022).

To address these social and ethical implications, the Government of Indonesia needs to develop strict and comprehensive regulations to protect biometric data. The regulations should cover the collection, storage, use, and deletion of biometric data in a transparent and secure manner. In addition, it is important to set clear restrictions on third parties' access and use of data so that biometric data is not misused for unauthorized commercial or surveillance purposes. Educating the public on the benefits, risks, and rights regarding the use of facial recognition technology is also crucial to building public trust. Overall, the implementation of facial recognition technology in Indonesia's visa services is a strategic step in strengthening national security and risk management. However, social and ethical aspects must be prioritized to ensure the implementation of this technology is sustainable and responsible. The government should adopt a balanced approach between security and privacy and proactively address potential algorithm bias. With proper regulation and adequate education, facial recognition technology can be used ethically and effectively in Indonesia's immigration system (Muhlisa & Roisah, 2020).

CONCLUSION

The implementation of a facial recognition identification system in Indonesia's visa service represents a strategic advancement in strengthening selective immigration policies and enhancing national security. This technology improves the accuracy of identity verification, accelerates border inspections, and helps prevent the entry of individuals who may pose security risks. Integration with international security networks such as Interpol and ASEANAPOL further bolsters cross-border crime prevention efforts, increasing operational efficiency and adding a crucial security layer. However, the deployment of facial recognition must be carefully balanced with concerns regarding privacy, data protection, algorithmic bias, and potential misuse of biometric information. Strict, transparent regulations governing the collection, storage, use, and deletion of biometric data are essential to protect individuals' rights and build public trust. Additionally, comprehensive training for immigration officers on both technical operations and ethical considerations, along with public education campaigns, are vital for responsible adoption. Regular evaluation and monitoring of the system will ensure ongoing effectiveness and security. Future research should explore the long-term social impacts of facial recognition technology on

privacy perceptions, the effectiveness of regulatory frameworks, and the system's adaptability to emerging security threats. By addressing these areas, Indonesia can maximize the benefits of facial recognition technology while upholding ethical standards and public confidence in its immigration processes.

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