

## Ensuring Fairness in Automated Traffic Enforcement: Examining Algorithmic Justice and Due Process in Malang's ETLE System

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### Abstract

This study analyzes the implementation of Electronic Traffic Law Enforcement (ETLE) in Indonesia and its consequential due process principle and algorithmic justice. The use of electronic traffic law enforcement (ETLE) has been embraced as a means to better achieve efficiency, transparency, and objectivity in the enforcement of traffic laws; however, procedural tension continues regarding how this style of enforcement plays into issues of due process and individual rights. This scientific paper aims to conduct a critical review on whether the ETLE system in Malang Regency aligns with due process of law and algorithmic justice. This study uses an empirical juridical (socio-legal) method with a descriptive-analytical approach, which makes legal analysis and field data from interviews, observations, and official traffic violations from the years 2021–2024. Results based on data until October 2023 show that ETLE enhances administrative efficiency, minimizes officer-citizen interaction, and solidifies evidence-based enforcement. Nonetheless, the system does not adequately satisfy due process and falls short—notably with regard to the right to be informed, the right to be heard, and access to effective remedies. Moreover, lack of transparency and accountability and inadequate human oversight are gaps in reaching algorithmic justice. ETLE increases governance quality but requires a robust mechanism for institutional and procedural reforms to augment fairness and transparency in the detection, prosecution, and adjudication of offenders while ensuring the protection of fundamental legal rights.

**Keywords:** Algorithmic Justice, Due Process, ETLE, Socio Legal, Traffic Law

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## INTRODUCTION

This digitalization of public governance has leveraged traditional legal enforcement mechanisms to establish technology-oriented regulation systems. All over the world, governments are now using automated surveillance and algorithm-driven enforcement tools to achieve efficiency, transparency, and better deterrence. In the traffic law sector, Electronic Traffic Law Enforcement (ETLE) marks a paradigm shift from traditional “in person” policing to digital, evidence-based punishment mechanism. In Indonesia, ETLE is part of the modernization effort under Law Number 22 of 2009 concerning Road Traffic and Transportation (Korlantas, 2024). Traffic violations can be detected electronically through cameras and hand-held units like a mobile phone. ETLE is an automated ticketing system that captures the data, verifies it digitally, and issues regulatory notifications electronically, unlike previous manual ticketing processes (Sinurat et al., 2026). In operational implementation, the traffic unit of the Malang Resort Police (SATLANTAS Polres Malang) applied various methods of static and mobile enforcement models (Kristanto et al., 2024).

**Table 1.** The Traffic Violators Data in 2021-2024

| <b>Types of Violations</b>                        | <b>2021</b> | <b>2022</b> | <b>2023</b> | <b>2024</b> |
|---------------------------------------------------|-------------|-------------|-------------|-------------|
| Contain                                           | 823         | 296         | 0           | 9           |
| Speed                                             | 0           | 0           | 0           | 13          |
| Violations of road markings/traffic signs         | 2251        | 1469        | 307         | 442         |
| Driving documents                                 | 1688        | 1134        | 0           | 72          |
| Helmet                                            | 979         | 583         | 864         | 260         |
| Safety Belt                                       | 39          | 28          | 0           | 9           |
| Carrying more than one passenger on a motorcycle. | 75          | 48          | 0           | 6           |
| Driving against the traffic flow.                 | 209         | 138         | 49          | 16          |
| Mobile Phone Use                                  | 91          | 70          | 0           | 0           |
| Equipment                                         | 1975        | 1210        | 190         | 8           |
| Total                                             | 8130        | 4976        | 1410        | 834         |

*Source: Satlantas Polres Malang*

Data-based findings from SATLANTAS which is setting of Malang regency in 2021 to 2024, have shown that ETLE has led to a quantifiable alteration in traffic violation patterns and public behavior. The system increases administrative efficiency, decreases direct contact between officers and citizens, and improves accuracy in documentation. Nonetheless, although previous data emphasizes economic aspects such as effectiveness, deterrence, or statistical decrease of violations of the law, little has been said about the normative impact of algorithm-driven enforcement mechanisms (Poti et al., 2026). Concerns about procedural fairness, transparency, algorithmic bias, and the right to be heard against automated decisions have sparked debates where automated enforcement technologies are deployed around the world, including jurisdictions (Decker et al., 2025). The issues at stake in these conversations touch on fundamental rights of due process of law—the right to notice, the right to contest evidence, and ensuring meaningful human review of automated decisions. The Indonesian ETLE system similarly poses challenging normative issues. While violations are electronically annotated, sanctioning knows only the ultimate administrative verification and judicial mechanisms (Cazzamatta, 2026; Engin, 2026; Fatmawati et al., 2025; Mardiansyah et al., 2025). This hybrid system, combining algorithmic detection and human confirmation, deserves a closer look. Significant questions arise about the accuracy of automated identification in these cases, for instance, license plate recognition, due process protections for those wrongly accused, access to objection methods, and transparency around evidentiary standards.

Theoretically, this problem straddles three interconnected lenses of analysis, each bearing import for the larger project of community strengthening: (1) Due process in law—establishing fairness in sanctions, state-imposed or not; (2) algorithmic justice—affording transparency, accountability, and explainability to automated systems; and lastly, (3) legal effectiveness theory, which questions whether the law is operable within society but also whether it is being applied legitimately. Thus, the fundamental question is not whether ETLE reduces traffic violations or not; it is whether it meets the constitutional and human rights requirements in a digital enforcement system. As Indonesia moves towards data-based governance, it becomes all the more important to ensure that technological efficiency is not a lack of trample procedural justice. Therefore, to critically assess the implementation of ETLE in Malang Regency, this study engages two major themes, namely algorithmic justice and due process protections.

## METHOD

This study used an empirical juridical (socio-legal) research design (Hillyard, 2007) by looking at the existence of law in society through identifying the application of legal norms and theories in their real institutional context. It is intended for ETLE implementation and tests the conformity of ETLE implementation with the principles of due process of law and algorithmic justice. The research adopted a descriptive-analytical approach (Dayeh & Mohammed, 2023), whereby it describes the ETLE mechanism while also investigating whether automated traffic enforcement is in line with procedural fairness, transparency, and accountability of the administrator and the right to review for an automated decision.

The research used the juridical-sociological approach as well as conceptual and limited comparative approaches. This article employs a juridical-sociological approach to discuss the implementation of ETLE regulations and investigate procedural safeguards in the field. It connects normative regulation with empirical reality. Empirical assessment involves examining ETLE and determining by various means legal doctrines and theoretical frameworks associated with due process of law, procedural justice theory, algorithmic justice, and the theory of legal effectiveness. Also, this paper employed a narrow comparative method by drawing comparisons with automated traffic enforcement practices in other jurisdictions particularly with respect to procedural safeguards and accountability measures for digital enforcement systems.

This study considers primary legal materials, secondary legal materials, and tertiary legal materials as the sources of legal materials. This research uses primary legal materials: the 1945 Constitution of the Republic of Indonesia; Law Number 22 of 2009 concerning Road Traffic and Transportation (Indonesia, 2009); Government Regulation Number 80 in 2012 concerning Procedures for Inspection of Motor Vehicles and Enforcement of Traffic Violations; as well as ETLE implementation regulations. These sources include academic literature and legal doctrines of due process and algorithmic governance; scientific journal articles relevant to digital law enforcement; and prior work on ETLE. Tertiary legal material: This includes resources such as legal dictionaries, encyclopaedias, and other supportive legal sources.

The empirical data was collected by the data findings at SATLANTAS Polres Malang. The primary data collection was conducted through interviews with traffic police officers, technical operators who manage the digital system, administrative personnel responsible for violations processing, and road users receiving ETLE sanctions. The sources of this secondary data are the statistical report on traffic violations from year 2021 until year 2024, internal procedure documents, and official notifications and complaints related to cases of ETLE. The legal data was obtained through library research, statutory review, doctrinal scrutiny, and topic classification of relevant legal norms. Legal materials were classified around themes pertaining to the issues of procedural safeguards, automated decision-making, and the right to defence, transparency, and accountability.

In addition, the limited field reporting data collection processes were semi-structured interviews and document analysis and participatory observation. A semi-structured format was used to facilitate some flexibility but maintain focus on key topics that arose in preliminary discussions, such as how violations are identified, human verification of automated detectability, processes for charging or appealing a violation, and the handling of errors in identification. Two types of document analyses were conducted for ETLE notification letters (print), digital evidence documentation (digital), and administrative workflow procedures. The ETLE verification and sanction issuance are ascertained through observation. In this respect, it is expected that through the combination of normative assessment, grounded on legal theory, and empirical analysis based on institutional epidemiology, a valid answer can be provided about whether automated traffic enforcement under ETLE complies with constitutional guarantees of due process and recent international standards referred to as algorithmic justice in digital governance.

## **RESULT AND DISCUSSION**

### ***1. Implementation of ETLE and Due Process Compliance***

The Electronic Traffic Law Enforcement (ETLE) implementation at SATLANTAS Polres Malang shows a remarkable shift in the application of traffic law, from conventional to digital-based. The ETLE mechanism functions in accordance with the empirical findings. This ETLE mechanism is divided into two static models, CCTV-based monitoring, and mobile ETLE models, patrol-based digital recording, both of which apply to enforcing traffic violations automatically through electronic sanctions generation. The process includes a series of steps, beginning with automated detection, extraction of vehicle registration numbers, and verification of the same by officers who then send electronic tickets to the registered owner (Korlantas, 2024). This system signals a shift towards data-driven enforcement, with hopes of increased efficiency and organization and decreased documentation between officers and violators, curtailing opportunities for discretionary abuse.

From the aspect of due process of law, the results showed that the ETLE found in Malang Regency had not yet met substantive procedural justice and only met certain formal legal requirements. The detailed description is explained at Table 2, Due Process Compliance Findings in

the Implementation of ETLE, where this system has legally binding evidence, such as a digital recording, and also through this it can be seen that its implementation is based on a rule of law, including Law No. 22 of 2009 and Government Regulation No. 80 of 2012. The features that lead to more freedom, cost savings, and efficiency of enforcement procedures also add standardization and objectivity, allowing for recording violations based on facts rather than an officer's discretion. With this, ETLE increase legal certainty (*kepastian hukum*) and uniformity of action against traffic violations (Dahlan & Jalil, 2023; Samsiah et al., 2004).

**Table 2.** Findings on Due Process Compliance in ETLE Implementation in Malang Regency

| Due Process Principle             | Indicators                                 | Findings in ETLE Implementation                                                          | Assessment          |
|-----------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------|---------------------|
| <b>Legal Basis (Legality)</b>     | Clear regulation governing enforcement     | ETLE is implemented based on Law No. 22 of 2009 and Government Regulation No. 80 of 2012 | Compliant           |
| <b>Right to be Informed</b>       | Notification of violation to offender      | Notification is sent to vehicle owner, but often lacks clarity and timeliness            | Partially Compliant |
| <b>Right to be Heard</b>          | Opportunity to respond before sanction     | No prior hearing; individuals cannot present defence before sanction is issued           | Not Fully Compliant |
| <b>Evidence-Based Enforcement</b> | Use of objective and verifiable evidence   | Violations are recorded through CCTV and digital systems, reducing subjectivity          | Compliant           |
| <b>Transparency of Procedure</b>  | Public understanding of process            | Limited public knowledge about how ETLE decisions are generated                          | Partially Compliant |
| <b>Access to Legal Remedies</b>   | Availability of objection/appeal mechanism | Complaint mechanisms exist, but formal appeal procedures are unclear and limited         | Partially Compliant |
| <b>Human Oversight</b>            | Involvement of officers in verification    | Officers verify data, but oversight is limited and not transparent                       | Partially Compliant |

However, a deeper dive exposes multiple fatal flaws from the perspective of procedural justice. First, the notification mechanism to alleged violators is not always precise or immediate enough, impeding the individual's right to be informed. Secondly, there is little chance individuals have to respond or defend themselves before sanctions are imposed, suggesting a violation of the right to be heard (*audi alteram partem principle*). Third, while many drivers are aware of the existence of the ETLE system as well as how to access video footage of their vehicles violating traffic law, public awareness is still quite low about specific legal procedures within the ETLE system that give citizens avenues for contesting or verifying violations generated electronically. These findings, also presented in terms of content in Table 1, indicate that while ETLE provides efficiency and evidentiary reliability as its key features, it has not yet fully addressed the participatory aspect that needs to be embraced regarding due process.

Most critically, this situation demonstrates a structural imbalance that emerges when the efficiency of law enforcement and the balance ensured through procedural safeguards grow apart (Amiruddin et al., 2025). The system adds speed and automation to sanctions, embodiments of aspirational modern governance objectives, while at the same time narrowing the space for personal legal activity. In practice, people become objects of sanctions rather than subjects in an impartial legal system. Hence, despite Malang Regency's ETLE implementation being functionally and legally valid, it still partly violates the due process principle, thus necessitating further institutional restructuring to ensure legal effectiveness falls to sacrifice basic rights.

Thus, theoretically speaking, due process of law includes three basic procedural rights: the right to be informed, the right to determine, and the right to contest (Crema & Solum, 2022). These principles act as an essential guarantee that any particular legal enforcement mechanism works not merely on the premise of legality but within its broader framework of fairness and justice. As for

the ETLE system in Malang, it could be justified as compliance against lawful formality based on existing traffic law and the supporting technology. Yet mere adherence to formal legality does not ensure that procedural fairness takes place.

A deeper look indicates that the ETLE in Malang has fallen more into the hands of bureaucracy rather than procedural rights protection. In the process, countries have adopted varying degrees of digital surveillance and automated ticketing mechanisms that have helped to reduce face time between law enforcement officers and road users, thus mitigating opportunities for corruption and discretionary abuse. However, this technological transition also creates new challenges, especially concerning procedural transparency (Yoku & Zien Sgn, 2025). If many alleged violators are not aware of the basis for the violation, the evidence used against them or procedural steps to take in response to a sanction, which indicates there was an asymmetry of information, it suggests that at least part of the 'right to be informed' is not being met. Furthermore, the ETLE system seems to restrict the involvement of citizens in the verdict process (Grasella et al., 2025). Such channels for objection or clarification are seen as indirect, sometimes inaccessible, and not too responsive. The right to be heard, however, is often being weakened in a way that allows people not to receive a proper forum to present their case before they are sanctioned (Amiruddin et al., 2025). Furthermore, while a formal mechanism exists for appealing decisions and cases, it may be neither clear nor effective in practice, limiting the ability to meaningfully exercise the right of appeal or review of enforcement decisions.

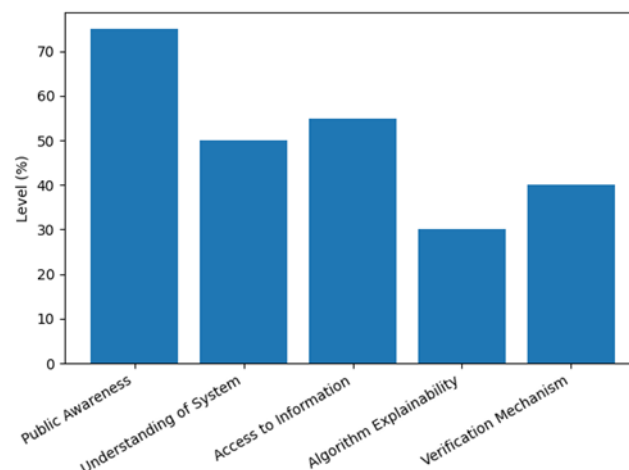
Based on these observations, it is arguable that the ETLE system in Malang can be called a semi-due process model. Although it meets specific legal compliance, enhances administrative efficiency, and combats corruption, the propriety still lags behind as an embodiment of a rights-based law enforcement approach. Hence, the system assumes a liminal position where, while technological progress in governance is already ongoing, it still needs to operate in accordance with the basic tenets of procedural justice to ensure that there are better and fairer legal mechanisms.

## 2. *Transparency, Accountability, and Human Oversight in the ETLE System*

Through this research, it is evidenced that efforts to improve transparency and accountability in the government ethics of the Malang Police SATLANTAS through ETLE have been structured but are still ongoing. Using empirical data from interviews, observations, and documentation, they find that the system is largely dependent on automated detection technologies such as CCTV and mobile digital devices to detect traffic violations. Although this integration of technology enhances efficiency and objectivity, it presents pressing concerns related to public transparency on the decision-making processes.

According to the data, with regard to transparency, citizens generally recognize that ETLE exists in municipal circles and its presence on roads, but not how it actually works in practice. In particular, the majority of road users are not sufficiently educated about how violations are detected, how data undergoes processing, and how results get generated in the system. This has resulted in what could be termed a black box phenomenon of legal outcomes: decisions are made, yet there is often insufficient explanation to affected parties. As summarized in Figure 1, Transparency Indicators of ETLE Implementation, the pressure for procedural open alerts is limited, both regarding explainability and access to verification methods.

**Figure 1.** Transparency Indicators of ETLE Implementation



In terms of accountability, the ETLE system establishes responsibility in formal institutional frameworks, especially within traffic police authority (Irfan, 2023). Additionally, the system ensures that officers have verified each recorded violation before a sanction is applied: this suggests accountability is not completely transferred to automated systems (Mokobombang et al., 2025). However, the research shows that accountability mechanisms remain largely internal and lack independent scrutiny. When the system does malfunction, for instance, calling a vehicle accountable for violations it did not commit or incorrectly parsing visual information about its environment, there is no precisely delineated external auditor overseen by an independent third party. As shown in Table 3, Accountability Mechanisms in ETLE Enforcement, this ambiguity tends to diffuse responsibility when such technological inaccuracies take place and thus undermines the all reliability of the system from a legal perspective.

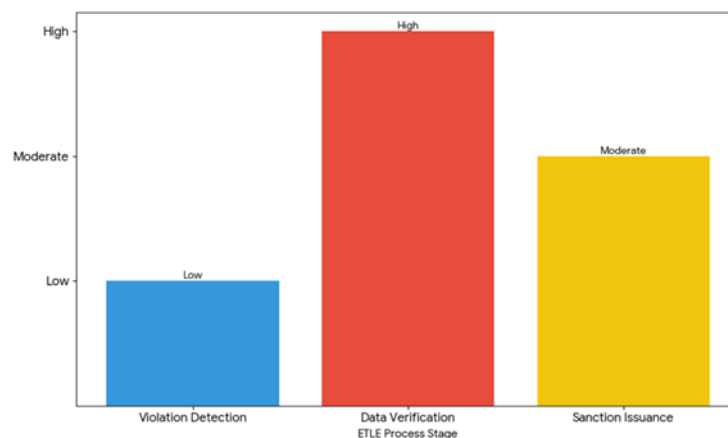
**Table 3.** Accountability Mechanisms in ETLE Enforcement

| No | Aspect of Accountability         | Existing Mechanism in ETLE                              | Empirical Findings                                    | Level of Effectiveness | Critical Notes                                                            |
|----|----------------------------------|---------------------------------------------------------|-------------------------------------------------------|------------------------|---------------------------------------------------------------------------|
| 1  | Institutional Responsibility     | Enforcement handled by traffic police                   | Police verify violations before issuing tickets       | Moderate               | Accountability centralized in institution, not externally monitored       |
| 2  | Verification Process             | Manual validation of CCTV/mobile recordings by officers | Officers review captured data before sanction         | Moderate               | Human verification exists but lacks procedural transparency               |
| 3  | Error Handling Mechanism         | Complaint / clarification system available              | Public can report incorrect violations                | Low–Moderate           | No clear standard procedure for resolving errors                          |
| 4  | Legal Basis                      | Based on Law No. 22/2009 and PP No. 80/2012             | Strong formal legality                                | High                   | Legal framework exists but not fully adapted to digital enforcement risks |
| 5  | Public Access to Accountability  | Limited access to detailed violation data               | Citizens receive notification but limited explanation | Low                    | Lack of transparency reduces public trust                                 |
| 6  | Independent Oversight            | No independent audit or external monitoring body        | Oversight conducted internally by police              | Low                    | High risk of institutional bias or unchecked errors                       |
| 7  | Responsibility for System Errors | Not explicitly regulated                                | Unclear who is liable (system vs officer)             | Low                    | Major gap in algorithmic accountability                                   |

|   |                              |                                    |                                                     |          |                                            |
|---|------------------------------|------------------------------------|-----------------------------------------------------|----------|--------------------------------------------|
| 8 | Documentation & Traceability | Digital records stored as evidence | Evidence exists but not always accessible to public | Moderate | Traceability present but not user-friendly |
|---|------------------------------|------------------------------------|-----------------------------------------------------|----------|--------------------------------------------|

Additionally, concerning human oversight, the study affirms that even though ETLE functions through automated detection, there is still human involvement at some stages of the process such as verification and validation of violation data. Officers are involved in determining if a recorded incident is a violation before they issue an electronic ticket. However, its important role is narrowly focused and not always observable or available to the general public. After all, as a paper by Lefkow the procedural records for how officers review and approve automated findings are not publicly available (Joh, 2016). In fact, as depicted in Figure 2, the level of surveillance could be described as composite suggesting some presence of human monitoring, even if it has not yet been so formalised to act as a strong guard against possible algorithmic bias or error.

**Figure 1.** Transparency Indicators of ETLE Implementation



A critical reading of these results indicates that, at least for now, the ETLE system represents a transitional model of digital law enforcement designed on the foundations of technological efficiency but barely realizing some important values and principles behind algorithmic justice—in particular, transparency, accountability, and meaningful human oversight. This imbalance shows the need to improve regulatory and institutional arrangements so that automated enforcement mechanisms are not just more effective but also support key legal protections applying to humans.

Applying this lens of algorithmic justice to the adoption of the ETLE system, it is evident that there are a number of structural issues with implementing such an arrangement, which merits scrutiny. The first is a transparency gap, which has become the primary challenge. In theory, the algorithmic systems deployed in law enforcement should be explainable and open to scrutiny (de Bruijn et al., 2022; Kirat et al., 2023). But with reference to ETLE, there is no adequate information available to citizens about how violations are detected, processed, and verified by the system. This creates an asymmetry of information between authorities and the public. Consequently, people to whom electronic ticketing measures apply cannot have their decision based on evidence scrutinized or challenged. A lack of explainability mechanisms can undermine public trust and, much more importantly, questions the legitimacy of the use of automation for enforcement purposes.

According to the findings, when mistakes or inaccuracies happen within the system, the accountability problem becomes pronounced. Whereas in traditional policing, accountability can be mapped to human officers or institutions. Unlike ETLE, which distributes the responsibility among two, the driver and the enforcement agent, some processes require or permit a full delegation of decision-making to technologically mediated systems. This change gives rise to uncertainty over responsibility when it comes to wrongful ticketing, data misidentification or system malfunction. Without accountability, those who are adversely affected by automated decision making often lack

recourse to remedying or contesting unfair results. As a result, the use of automated algorithms poses a threat to existing legal paradigms regarding accountability and liability.

Third, the problem of fragile human oversight shows how much it increasingly let automation decide for us. Technological systems, at their best ethical usage, should act more as an aiding tool rather than a deciding agent. In the ETLE system, however, human intervention seems restricted from continuing in practice and does not appear to be permanently internalized as a guardian of sorts (Chan, 2025). This may heighten the risk of becoming overly dependent on algorithmic outputs that might, in certain cases, fail to account for contextual nuances or exceptional circumstances. The lack of processes for systematic human review significantly limits the ability to address errors and biases in enforcement practices.

In sum, these issues give rise to an important insight: the ETLE system threatens to become a sort of technocratic law enforcement initiative over which there are few legal or procedural guardrails. This system, whilst efficient and scalable, is implemented in such a way that causes people to raise issues of fairness, accountability, and citizens' rights. Hence, it is important to enhance transparency measures, ensure accountability, and provide institutionalized human oversight to ensure that ETLE use does not violate algorithmic justice principles and the rule of law.

### 3. *ransparency, Accountability, and Human Oversight in the ETLE System*

The results showed that the ETLE system used in SATLANTAS Polres Malang contains procedural mechanisms that are basically intended to become a legal protection for people who receive traffic sanctions without their transaction. These mechanisms include notification procedures, confirmation processes, and limited complaint channels. Through ETLE, once a violation is detected, the registered vehicle owner receives a notification, containing photographic evidence, with instructions to confirm the violation. As a stage of a process, confirmation provides the first procedural option for individuals to establish whether they were in fact driving at the relevant time or if ownership of the vehicle has changed or not. This means that the system is attempting to integrate a basic form of procedural fairness into a digital enforcement architecture.

Nevertheless, the artful empirical evidence suggests that these protections are still principally administrative rather than judicial. As outlined in Table 4, although a confirmation mechanism exists, it does not operate fully as an adversary process with the formal characteristics of legal procedure (Head, 2024). There is no formal opportunity for people to offer evidence or contest the reliability of the system, nor a public adjudication process, before punishment is exacted. Rather, the system just makes it your problem and requires you take action in a short window of time on the premise that you know enough about your rights or how to proceed, and legal aid does not get allocated to help levels, and people are left high and dry. See also this. This situation illustrates a procedural asymmetry in which the system favors compliance over contestation.

**Table 4.** Procedural Safeguards for ETLE Implementation

| No | Procedural Safeguard        | Description                                                         | Availability | Weaknesses                                                      |
|----|-----------------------------|---------------------------------------------------------------------|--------------|-----------------------------------------------------------------|
| 1  | Violation Notification      | Notification sent to vehicle owner with photo evidence of violation | Available    | Information sometimes unclear and not fully understood by users |
| 2  | Confirmation Mechanism      | Vehicle owner can confirm or clarify driver identity                | Available    | Limited time and no structured legal defence process            |
| 3  | Complaint/Objection Channel | Users can submit complaints or clarifications                       | Available    | No clear standard procedure or transparency in evaluation       |
| 4  | Human Verification          | Officers verify data before issuing sanctions                       | Limited      | Process not visible to public, reducing trust                   |
| 5  | Appeal                      | Opportunity to                                                      | Not fully    | No formal legal                                                 |

|   | Mechanism                | challenge<br>sanction formally             | available | appeal system (no<br>hearing or judicial<br>review before<br>sanction)      |
|---|--------------------------|--------------------------------------------|-----------|-----------------------------------------------------------------------------|
| 6 | Access to<br>Information | Users receive<br>evidence<br>(photo/video) | Available | No explanation of<br>how<br>system/algorithm<br>works (low<br>transparency) |

The study also reveals that these means of submitting complaints or raising objections are not accompanied by clear procedural standards. While there may be an opportunity for individuals to challenge or provide clarification, the process does not include a formalized appeals mechanism akin to a judicial review or administrative hearing. As shown in table 4, the lack of institutionalized appellate processes leads to ambiguity around how challenges are adjudicated, who reviews them, and what standards are applied when making decisions. Such vagueness undermines system accountability and diminishes public confidence regarding ETLE enforcement fairness.

Furthermore, it has been revealed as another crucial challenge that the community lacks sufficient legal awareness concerning their procedural rights in the ETLE system. Most people see the electronic ticket as a verdict, not a punishment that can be challenged. The system design reinforces this perception: legal processes big and small are effective but not participatory (Özden, 2024). As a result, people avoid taking a stand of their own accord and just follow sanctions instead of exercising the right to understand or legally question. And then there is the discomfort that arises from a big gap between procedural safeguards on paper and their actual accessibility.

These findings, from an analytical perspective, indicate that the ETLE system in Malang Regency has not yet fully upheld the principles of due process of law, especially concerning the right to be heard (*audi alteram partem*) and the right to appeal administrative decisions. The system, however, not only modernizes and streamlines traffic law enforcement but also curtails the amount of procedural protection available to individuals. Thus, as outlined in Table 4, the current guarantees are partial and procedural-administrative but not comprehensive and rights-based, which reveals that further institutional and regulatory development is needed to provide a more balanced integration of technological efficiency with legal efficiency.

Faced with the access to justice perspective, the research found in this process (e-tilang) evidence of procedural safeguards being implemented but having the strongest orientation on administration rather than judicial (Aprianto et al., 2025). However, much of this process is managed through digital platforms and law enforcement institutions working to simplify procedures in order to improve the speed of handling traffic violations. But this administrative approach allows for rapid resolution and involves less red tape—with the trade-off being that it somewhat limits independent judicial oversight in the first place. Consequently, most of those affected by penalties lack immediate access to formal legal processes through which they can dispute or seek review of the decision before it is enforced.

Moreover, the lack of a robust and easy-to-exercise appeal process prior to the application or execution of sanctions clearly shows that adequate mechanisms for protecting citizens' rights are missing (Mendrofa & Fitriati, 2025). In the theory of access to justice, there is a need for such procedures, but there is also a need for sufficient opportunity for everyone in order to challenge decisions that could violate his individual rights. If one wishes to object or challenge the imposition of sanctions, there is often little recourse other than a vague complaint through an opaque process that is itself procedurally gruelling and rarely available after the fact. This state of affairs undermines citizens, essentially making them obligated to political issues that they cannot properly fight against in court.

On the other hand, analytically this condition also suggests that the electronic ticketing (e-tilang) system emphasizes compliance (*kepatuhan*) instead of legal contestability (*hak menggugat*). Having an efficient system helps make sure everything continues running smoothly and being productive, especially after the maintenance of discipline is established through fines or other administrative tools. But this kind of mindset does not capture important legal principles, especially the right to a hearing (*audi alteram partem*) and the right to trial. When compliance becomes the primary goal, the regime can accidentally push individual procedural rights to the margin.

This inequality is seen in the measures between enforcement and citizen rights. On the one hand, enforcement mechanisms are powerful, underpinned by digital evidence and automated systems that can mandate compliance, as well as institutional authority. In contrast, the protection of citizen rights seems underdeveloped when compared with access to judicial remedies and preventive review mechanisms. Emphasizing the difference, it results in a systemic asymmetry between state guidelines and the ability of citizens to appeal against them, opening up challenges around justice, accountability, and integrity of legal systems.

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## DISCUSSION

This study contributes to the growing literature on digital law enforcement by examining the implementation of Electronic Traffic Law Enforcement (ETLE) in Indonesia through the integrated perspectives of due process of law and algorithmic justice. Previous studies on ETLE have predominantly focused on effectiveness, legal certainty, deterrence effects, public compliance, and administrative efficiency (Dahlan & Jalil, 2023; Fatmawati et al., 2025; Kristanto et al., 2024; Mendrofa & Fitriati, 2025). In contrast, the present study moves beyond evaluating operational performance and investigates whether ETLE complies with fundamental procedural rights and contemporary standards of algorithmic governance. Specifically, this research provides empirical evidence from Malang Regency concerning transparency, accountability, human oversight, access to remedies, and citizens' procedural rights within an automated enforcement environment. By combining socio-legal analysis with the concept of algorithmic justice, this study offers a novel framework for evaluating technology-driven law enforcement systems in developing countries where digital governance is rapidly expanding but procedural safeguards remain underdeveloped.

The findings demonstrate that ETLE has significantly improved administrative efficiency, reduced direct interactions between traffic officers and road users, strengthened evidence-based enforcement, and enhanced legal certainty in traffic law implementation. Nevertheless, the system only partially complies with due process requirements. Although ETLE satisfies legality principles through clear statutory foundations, substantial deficiencies remain concerning the right to be informed, the right to be heard, access to effective remedies, transparency of decision-making procedures, and meaningful human oversight. The findings further indicate that while human verification exists within the enforcement process, accountability mechanisms remain largely internal and lack independent scrutiny (Cazzamatta, 2026; Engin, 2026). Consequently, ETLE functions effectively as an administrative enforcement mechanism but has yet to fully embody the principles of procedural fairness and algorithmic justice that are increasingly recognized as essential components of digital governance.

The findings are generally consistent with international scholarship emphasizing that automated decision-making systems frequently improve efficiency while simultaneously generating concerns regarding transparency, fairness, and accountability. Studies by de Bruijn et al. (2022) found that explainability remains a central challenge in algorithmic decision-making because users often struggle to understand how decisions are generated. Similarly, Decker et al. (2025) argued that procedural fairness in automated systems depends not only on outcomes but also on public participation and transparency throughout the decision-making process. Research on algorithmic governance by Levy et al. (2021) highlighted that public-sector algorithms frequently create accountability gaps when responsibility is distributed between human operators and automated systems. Comparable concerns have also been identified in algorithmic fairness studies Starke et al. (2021), which reported that citizens generally perceive automated decisions as less fair when transparency and contestability mechanisms are limited. Furthermore, studies examining AI deployment in public administration emphasize the importance of explainability, accountability, and human-centered governance in maintaining public trust (Goldsmith & Yang, 2026; Wirtz et al., 2022; Zhu, 2026). Within the traffic enforcement context, recent Indonesian studies have similarly reported that ETLE improves compliance and reduces opportunities for corruption while facing challenges related to public understanding, procedural safeguards, and access to objections (Amiruddin et al., 2025; Fatmawati et al., 2025; Grasella et al., 2025; Sinurat et al., 2026). Thus, the present findings align with both international and national evidence indicating that technological efficiency does not automatically guarantee procedural justice.

The similarities between the present findings and previous studies can be attributed to the inherent characteristics of automated enforcement systems. Across different jurisdictions, digital

enforcement technologies are designed primarily to enhance efficiency, standardization, and objectivity, which naturally leads to reduced human discretion and improved consistency in law enforcement outcomes (de Bruijn et al., 2022; Halford, 2024; Widiyanto & Budianto, 2024; Wirtz et al., 2022). Consequently, many countries experience comparable benefits in terms of compliance and administrative effectiveness. However, several differences also emerge. International studies often examine algorithmic decision-making in mature digital governance environments where transparency frameworks, independent auditing mechanisms, and regulatory oversight are relatively well established (Decker et al., 2025; García-Llorente & Olmeda, 2026; Levy et al., 2021; Li & Zhu, 2026). In contrast, the Indonesian ETLE system operates within a developing digital governance context where institutional safeguards for algorithmic accountability remain limited. Furthermore, differences in legal culture, public digital literacy, administrative capacity, and regulatory maturity may explain why procedural protections in Malang Regency remain less developed than those reported in some advanced jurisdictions. Methodological differences may also contribute to variations, as many previous studies relied on conceptual or policy analyses, whereas the present study employed an empirical socio-legal approach involving interviews, observations, and institutional data.

This study contributes to the literature in three important ways. First, it extends the application of algorithmic justice theory into the field of traffic law enforcement, an area that remains underexplored compared with criminal justice, welfare administration, and predictive policing. Second, it demonstrates that evaluating digital governance systems requires more than measuring effectiveness and efficiency; assessments must also incorporate procedural fairness, transparency, accountability, and citizen participation. Third, the study proposes the concept of a “semi-due process model” to describe enforcement systems that satisfy formal legality requirements but only partially fulfill substantive procedural rights. This conceptual contribution provides a useful analytical framework for future research examining the legitimacy of automated governance systems in emerging economies. By integrating socio-legal analysis with algorithmic governance scholarship, the study bridges a gap between traditional legal theories of due process and contemporary debates on automated decision-making.

The findings have several practical, academic, and policy implications. Practically, policymakers should strengthen procedural safeguards within ETLE by improving notification systems, establishing transparent appeal mechanisms, enhancing public access to evidence, and ensuring meaningful human review of automated decisions. Independent auditing mechanisms should also be introduced to increase accountability and public trust. Academically, this study highlights the importance of integrating legal theory, public administration, and algorithmic governance perspectives when evaluating digital law enforcement systems. Theoretically, future studies should further explore the relationship between procedural justice and algorithmic accountability in automated public-sector decision-making. Future research may employ comparative cross-country analyses, longitudinal studies, or mixed-method approaches to examine how different governance models influence public perceptions of fairness and legitimacy in automated enforcement systems. Such investigations would contribute to the development of a more comprehensive framework for ensuring that technological innovation advances both administrative efficiency and fundamental legal rights in democratic societies.

## CONCLUSION

The implementation of ETLE in SATLANTAS Polres Malang is finally a form of transformation of the traffic law enforcement system due to its switch from a conventional to a technology-based system that offers electronic-based efficiency, objectivity, and administrative control. It is considered beneficial to reduce violations, as its functioning was very effective in reducing violations, with both static and mobile systems providing their effectiveness, particularly visible in terms of compliance improvement and deterrent effect. Yet, according to the study, it demonstrates how this technology raises measures in terms of procedural presence vis-à-vis due process and respect for individual rights. While ETLE does provide essential procedural protections like notification and administrative response mechanisms, those measures fall short of guaranteeing robust legal remedies that are fair and accessible to all users. The lack of transparency, both public and institutional knowledge about the process, and mechanisms for individuals to appropriately contest decisions shows that much of the process remains an administrative enforcement arm of our justice system rather than a comprehensive procedural

aspect. Additionally, from a standpoint of algorithmic justice, the usage of digital evidence and automated detection raises issues related to accuracy, accountability, and fairness, especially when it turns out that the identified violator is not in fact the driver. These conditions demonstrate that ETLE has successfully helped to bolster enforcement efficiency; however, it is not yet fully upholding the principles of procedural fairness and protection afforded by human rights law in digital governance.

Thus, it is advised that the simple functional application of ETLE should be fortified through increased procedural transparency, broader public access to objection and appeal mechanisms, greater legal literacy for road use, and, more significantly, meaningful human oversight in decision-making either by way of regulation or policy so that integration between technological performance and law enforcement leaning towards a justice-based direction can be achieved.

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