

Criminal Law in ALPR Technology

Ying Zhang ^{1,*}

Ih Zasag University, Law, Ulaanbaatar 14200, Mongolia

* Corresponding Author

Abstract

As a model application within the intelligent traffic management system, ALPR effectively achieves dynamic vehicle tracking and preventive monitoring of criminal activities through advanced image processing technology and deep learning algorithms. However, with its widespread deployment, issues such as data misuse, violations of personal privacy, and discriminatory treatment resulting from algorithmic bias have become increasingly prominent, necessitating a comprehensive and systematic response from the perspective of criminal law. This article focuses on the application scenarios of ALPR technology in criminal justice practices, analyzing the numerous controversies and challenges it raises within the framework of criminal law, and further exploring the construction of a comprehensive governance strategy that combines technological constraints and legal regulations.

Keywords

Criminal Law, Privacy, ALPR.

1. Introduction

ALPR captures license plate information in real-time using cameras and quickly compares it with a huge database, shining in various fields like traffic violation enforcement and tracking of suspect vehicles. For example, many cities in our country have adopted the ALPR system, achieving "remote law enforcement" for traffic violations. Data from 2024 shows that this technology is 300% more efficient than manual methods. However, with deeper application of the technology, boundary issues are surfacing: one U.S. state faced a class-action lawsuit for the misuse of ALPR data in unauthorized commercial activities, while a city in the UK experienced algorithmic misjudgments, leading to innocent car owners facing criminal investigations. These events highlight the tension between tech application and criminal law principles.

2. Criminal application scenarios of ALPR technology

2.1. Crime Investigation and Evidence Fixation

ALPR can accurately track the movements of vehicles involved in cases through real-time monitoring and historical data analysis. For example, in cases like theft or kidnapping, this system can quickly identify suspect vehicles and generate a time-space related evidence chain, significantly shortening the investigation period. When the German police used ALPR technology to crack down on cross-border smuggling, they successfully intercepted 78% of the cases by analyzing vehicle movement patterns and predicting criminal routes.

2.2. Intelligent support for preventive policing

The fusion of ALPR technology and crime prediction models has shifted police work from "reacting after the fact" to "proactive deployment." In a pilot program in a certain area of China, ALPR data works closely with public safety risk assessment maps to provide instant monitoring

and alerts for vehicles frequently seen in high-crime areas, effectively leading to a 42% decrease in vehicle-related crime rates.

3. Criminal Law Controversies and Challenges of ALPR Technology

3.1. Boundaries of legitimacy for data collection

The ALPR system automatically records information on all past vehicles, including many that aren't involved in any case, which might go against the criminal law's principle that information collection should stick to a "minimum necessary" standard. The GDPR in the EU clearly states that data storage must have strict time limits. However, in some cities in China, the data collected by ALPR systems can be kept for up to five years, which clearly exceeds what's reasonably needed for criminal investigations and might cross the indirect legal line about "violating citizens' personal information rights" in Article 253 of the Criminal Law.

3.2. Attribution of criminal liability for algorithmic misjudgment

The misidentification problem of ALPR systems shouldn't be overlooked; it could lead to innocent people facing wrongful accountability. For instance, in a 2023 case in Australia, a similar license plate vehicle was mistakenly identified as involved in a case, causing the real owner to suffer the ordeal of detention. Right now, there's a legal grey area regarding responsibility between tech developers, application companies, and operators, making it tough for current criminal laws to directly apply the clause about "causing harm to others due to negligence" in these situations.

3.3. Surveillance generalization and privacy erosion

The widespread deployment of Automatic License Plate Recognition (ALPR) technology is like building an invisible "panoramic surveillance cage." Research by American scholars shows that over-reliance on ALPR can trigger a phenomenon of "reverse discrimination"—in low-income communities, the density of surveillance equipment increases the chances of vehicles being wrongly labeled as "high risk," which further worsens unfairness in the criminal justice process.

4. The path of criminal law enforcement of ALPR technology

4.1. Build hierarchical authorization and data lifecycle management

Regarding the authorization mechanism, our country's Criminal Law Article 285 clearly states the "crime of illegally obtaining data from computer information systems," which means that the retrieval of ALPR data needs to go through a strict three-level approval process: first, a grassroots officer submits an application, then it gets reviewed by the department head, and finally, it also needs approval from the prosecution, to ensure that ALPR data isn't misused. As for data timeliness, we've taken cues from the EU's Artificial Intelligence Act and adopted a differentiated storage strategy for regular vehicle data and involved case data: the former can be stored for no more than 30 days, while the latter can be retained for the long term, utilizing blockchain technology to automatically verify data destruction, ensuring compliance with timeliness regulations.

4.2. Improve mechanisms for accountability and remedies for algorithms

In order to conduct a technical audit of the ALPR (Automatic Number Plate Recognition) system, we explicitly require ALPR developers to publicly disclose the training dataset and decision-making logic of their algorithms. In addition, we recommend bringing in a third-party professional agency to conduct regular criminal compliance assessments on this data to ensure technical transparency and legality. On the issue of compensation for misjudgment, we suggest that the relevant provisions of "technical misjudgment cases" be added to the National

Compensation Law, clarifying the liability for misidentification caused by algorithm defects, and stipulating that technology users should bear the main liability for compensation, so as to ensure that citizens' rights and interests are effectively protected.

4.3. Promote public participation and balance of rights

Using the power of the "Technology Ethics Review Group," they brought in representatives from the public to participate together in the hearings and plan optimization for the Automatic License Plate Recognition (ALPR) deployment. For example, in Vancouver, Canada, the city reduced the installation density of ALPR cameras from 5 per kilometer to 2 through a public referendum, effectively balancing public safety and personal privacy needs.

5. Conclusion

ALPR technology is like a double-edged sword; it's a great helper in fighting crime but might also hide risks of rights infringement. We should break free from traditional regulatory constraints and look for a balance through flexible legislation, deep integration of technology, and collaboration among various stakeholders. Looking ahead, we need to stay alert to the risks that the fusion of ALPR technology and biometrics might bring, and actively explore effective solutions for conflicts in criminal law during cross-border data collaboration.

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Ih Zasag University.

References

- [1] LiangLiang Bai:Research on license plate recognition system(Electronic production, China 2020), p.25-27.
 - [2] Hsu G S, Chen J C, Chung Y z. Application-oriented license plate recognition[J].IEEE Transactions on Vehicular Technology, 2013, 62(2): 552-561.
 - [3] Jia W, Zhang H, He X. Region-based license plate detection[J]. Journal of Networkand Computer Applications, 2007, 30(4): 1324-1333.
- <https://juejin.cn/post/7452362508562300939>