A Novel Application of Large Language Models to Analyze Legal Judgments Concerning Emergency Medical Technicians

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Extended Abstract

I. Introduction

Emergency Medical Technicians (EMTs) play an important role in Taiwan's pre-hospital emergency medical service (EMS) system. However, the professional responsibilities they shoulder expose them to a heightened risk of litigation. This is a significant concern that may be contributing to labour shortages and is a key factor for policymakers. While a rich body of public judicial records exists in Taiwan, a systematic, large-scale empirical study on EMT legal risks has been absent. The difficulty of manually analyzing specialized legal documents without formal legal training has long been a barrier. While prior research has extensively investigated the legal liabilities of physicians and nurses in various jurisdictions, a focused empirical examination of Taiwanese EMTs has been a gap in the literature.

This paper presents a novel methodological approach to bridge this gap. We leverage the capabilities of a large language model (LLM) to perform an automated and systematic analysis of unstructured legal judgments. This pipeline offers an efficient alternative to traditional manual review, which is often time-consuming and resource-intensive. Our core objective is to map the legal liabilities and risks faced by Taiwanese EMTs in the execution of their duties since the latest revision of the Emergency Medical Services Act in 2013.

II. Methodology

This research employs a quantitative methodology, utilizing the Google `gemini-1.5-flash-latest` LLM to process criminal judgments from the Taiwan Judicial Yuan (Constitutional Court). We focused on criminal cases that explicitly mentioned both the "Emergency Medical Services Act" and "Emergency Medical Technician" (in Traditional Chinese). The study period spans from January 16, 2013, to December 31, 2024, ensuring all cases fall under the most recent

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legal framework. To provide a consistent and coherent analysis, we deliberately confined our scope to judgments from district courts, excluding higher appellate court decisions.

Our data processing pipeline, developed in a Google Colab environment, uses a detailed coding scheme to instruct the LLM to extract 15 key attributes from each judgment. These attributes include the EMT's role in the case, specific charges, and key legal outcomes. To ensure the model's output was consistent and stable, we set the `temperature` to 0.0 and `max_output_tokens` to 1500. All extracted data was then verified by human researchers to maintain a high degree of quality. This study pioneers the use of LLMs in the analysis of legal texts, offering a scalable model for future empirical research in the field.

III. Results

Our analysis identified seven criminal judgments from district courts, involving a total of eight EMTs. Most of these EMTs (six of eight) were prosecuted as defendants, with the primary charges being professional negligence, specifically "negligent bodily harm leading to severe injury" or "negligent homicide." The cases predominantly involved routine ambulance service tasks such as patient transport. The geographical spread of these cases across five major metropolises suggests that the legal risks for EMTs are not localized but are a widespread, national concern. A key finding is the average duration of the judicial process, which lasted approximately 1019 days from the incident date to the initial judgment. This highlights the prolonged and stressful nature of litigation for EMTs.

IV. Conclusion

This study is one of the first to apply an LLM to the large-scale analysis of Taiwanese legal documents concerning EMTs. The automated data extraction pipeline allows for an evidence-based portrait of the legal challenges EMTs face, a picture previously unattainable through manual review. The findings reveal that EMTs are frequently involved in litigation as defendants, face charges of professional negligence, and endure protracted legal proceedings. These insights are intended to inform stakeholders in the Taiwanese EMS system, including policymakers, hospitals, and training institutions, to develop more effective legal support, compliance guidelines, and educational programs. Ultimately, we hope that research on this practice-oriented task will help to expand access to justice by providing computational assistance that reduces the burden associated with legal research. This study makes two additional contributions. First, the development environment and methodology rely on open-source tools and free-tier services, making this approach highly accessible to researchers with varying resource levels and providing a more democratic model for text-as-data analysis. Second, the explicit definition of the model's parameters and the detailed coding scheme used for information extraction provide a high degree of reproducibility, which is increasingly important for rigorous social science research.

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