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LEVERAGING AI FOR IMPROVED ROAD CARE AND SAFETY

By Thulasy Suppiah, Managing Partner of Suppiah & Partners & Ramakrishna Damodharan of Robomy Sdn Bhd (<https://robo.my/>) a company which has developed AI solutions for road and highway maintenance and management.

While Peninsula Malaysia boasts excellent connectivity through its network of roads and expressways, some sectors are poorly maintained. Between 2022 and July 2024, the Road Accident Management System (RAMS) under the Works Ministry reported 181 road accidents caused by potholes, including 23 fatal ones. Of 223 accidents recorded in Selangor between 2018 and 2020 due to poor road conditions, 148 resulted in death.

In April last year, the Johor Baru Sessions court awarded RM721,000 to a 49-year-old man who suffered injuries when his motorcycle hit a pothole in 2021. This incident highlighted failures of state-appointed private companies to fulfil their road maintenance duties. Infrastructure management can be challenging, and traditional methods of road inspection, tedious and time consuming. Solutions are usually reactive. They result in bad road-patching practices, the use of inferior materials and ignore issues caused by water flow.

Robomy, an AI R&D firm, emphasises that if properly executed, the use of AI in road infrastructure management could transform road safety in Malaysia. Through data analytics, computer vision, and advanced sensor technologies, AI-powered road assessment systems can provide real-time insights by processing large datasets within minutes. For instance, Robomy's proprietary solution, Robolyze, is designed to monitor road conditions, detect defects such as potholes, cracks, and sunken patches, and even predict potential hazards. This provides proactive, cost-efficient solutions to inspect, monitor, and maintain roads.

An important AI feature is its predictive capability, enabling strategic and preventive maintenance. Predictive analytics, a core component of one of Robomy's products, allows early detection of road deterioration, optimising maintenance schedules, and reducing repair costs. This approach prevents catastrophic failures.

As our cities grow and road networks expand, the need for smart, innovative technologies to maintain road infrastructure efficiently has never been greater. AI can perform this role. In Singapore where manpower is limited, AI powered solutions help detect potholes, water ponding, slanted lamp posts, damaged traffic signs or grille covers, and broken manholes. Machine learning automatically detects defects from smartphone footage, grades their severity and highlights those in need of repairs. As a result, Singapore has one of the best maintained road networks in the world.

Robomy has brought similar innovations to Malaysia. Robolyze is tailored to address local challenges such as tropical weather impacts, varying road construction standards, and diverse urban-rural landscapes. It integrates cutting-edge AI capabilities, and allows real-time data processing directly from sensors and cameras installed on vehicles or road infrastructure.



This reduces reliance on centralized data centers, enhances response times, and ensures continuous monitoring even in remote areas.

As more organisations and state entities look to deploy AI in road infrastructure management, there are important legal considerations. Advancements in machine learning, computer vision, and use of autonomous vehicles and sensor technology raise issues related to data privacy, algorithmic transparency, liability and ethics.

While Malaysia has no clear AI regulatory framework or policy yet, stakeholders are required to analyse existing laws and regulations governing AI applications across various sectors.

The Ministry of Science, Technology, and Innovation (MOSTI) is responsible for establishing AI governance and launched the National Artificial Intelligence Roadmap 2021–2025 to address risks associated with AI; and in December 2024, the government established the National AI Office (NAIO) to drive AI-based digital transformation.

Meanwhile, the Ministry of Communications, as the implementer of the Communication and Multimedia Act (CMA), holds the legislative power and governs activities in digital spaces in addition to the hardware that enables their functions.

The Cyber Security Act 2024 addresses the management of cyber security threats and incidents related to the National Critical Information Infrastructure (NCII). This is particularly relevant as AI-driven road infrastructure applications—such as pothole management systems—require access to government-maintained databases, including mapping systems, traffic flow data, and road maintenance records at both Federal and State levels. Ensuring secure and authorized access to these databases is crucial to prevent cyber threats that could compromise public safety.

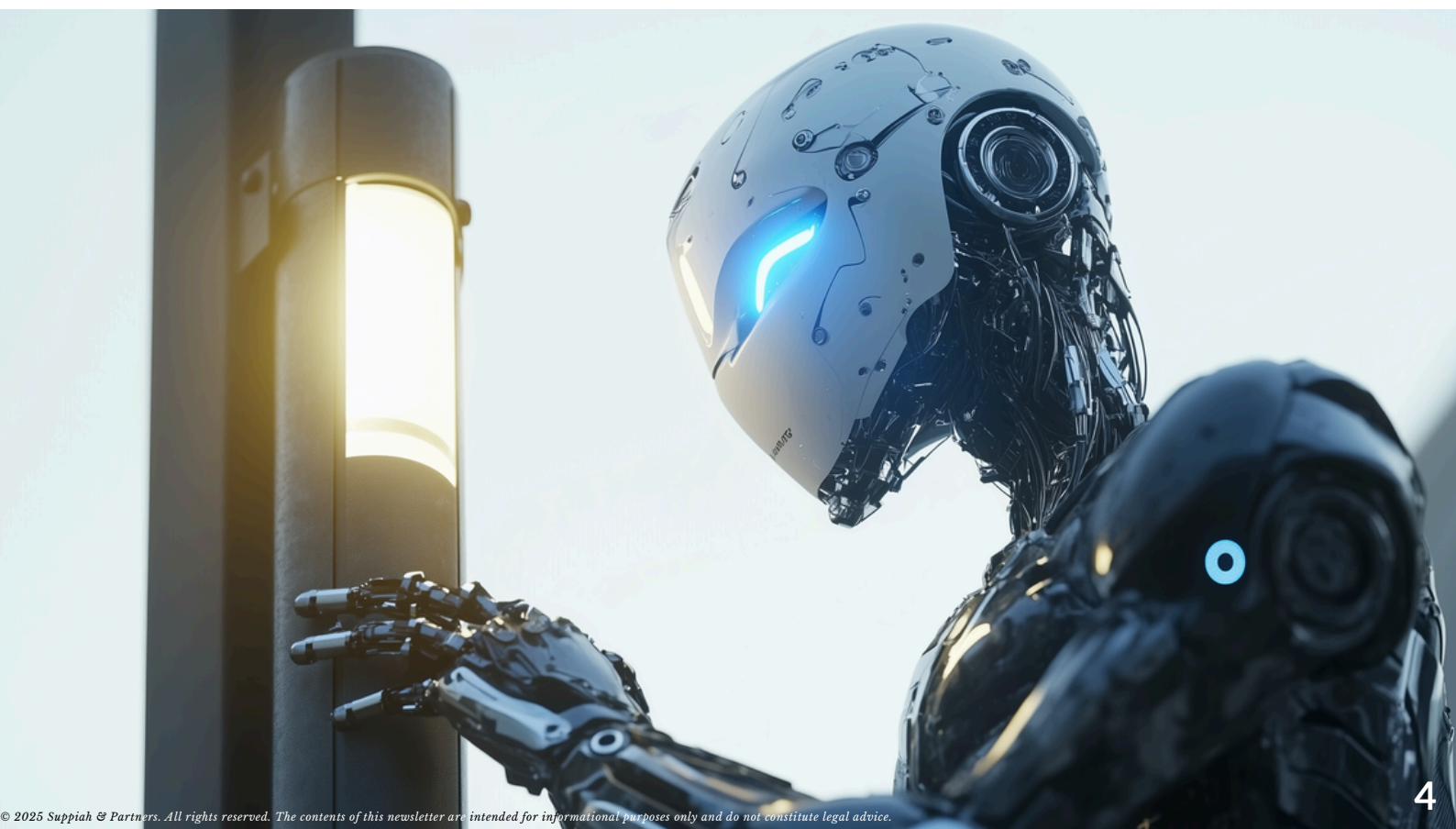


From a contractual standpoint, AI-powered road management solutions must align with the Contracts Act 1950, particularly in defining liability, accountability, and transparency in AI decision-making. Key legal considerations include the enforceability of AI-generated contracts, the attribution of liability for erroneous AI-driven maintenance recommendations, and the need to ensure fairness in automated decision-making processes, such as prioritizing road repairs without bias or undue influence.

Furthermore, AI-powered pothole detection and predictive maintenance systems process vast amounts of personal data, including vehicle movement patterns, dashcam feeds, and geolocation data. The Personal Data Protection Act 2010 (PDPA) remains the primary legislation regulating the processing of personal data in commercial transactions in Malaysia.

Any entity deploying AI in road infrastructure must comply with the seven Personal Data Protection Principles, ensuring data security, informed consent, and lawful processing of personal information. Compliance with these legal frameworks is essential to ensure AI-driven road infrastructure applications operate transparently, fairly, and within Malaysia's regulatory landscape.

AI is set to transform road infrastructure by enabling smarter, more efficient, and proactive maintenance solutions. From detecting potholes before they become hazards to optimizing repair schedules based on real-time data, AI enhances road safety and resource management. By integrating AI into road care, authorities and stakeholders can reduce costs, minimize disruptions, and improve overall road conditions for the public. At the same time, the legal landscape must evolve to support this shift—ensuring clear contractual frameworks with AI solution providers, addressing accountability in automated decision-making, and mitigating risks such as data security concerns. With the right balance of innovation and regulatory safeguards, AI-driven road infrastructure can pave the way for safer, more sustainable transportation networks.



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