AI-Powered Predictive Maintenance for Electric Vehicle Fleets

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Abstract:
For operational effectiveness and cost savings, electric vehicle (EV) fleets must receive proper maintenance. However, reactive repairs and scheduled inspections are frequently the mainstays of traditional maintenance methods, which raises costs and results in more downtime. The predictive maintenance solution for electric vehicle fleets that the research proposes uses artificial intelligence (AI) and real-time data analysis to predict possible faults. The proposed system gathers and analyzes data from different car components to predict maintenance needs ahead of time by integrating IoT devices and machine learning techniques. Comparing the proposed system with existing systems, the study shows that it performs better in terms of accuracy (9 0%), lower rates of false positives (10) and negatives (5), and improved performance metrics (accuracy: 90%, precision: 88%, recall: 85%, F1-score: 86%). The proposed system presents a viable way to improve fleet management in electric vehicle operations, ensuring higher uptime, sustainability, and dependability. Higher cross-validation findings (average accuracy: 88%, average F1-score: 85% and improved maintenance effectiveness further support the claim.

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