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Smart Speed Control of Switched Reluctance Motor in EVs Using Machine Learning Algorithms : A Review

Miss. Sujanwar Mohini Sanjay[1], Prof. A. B. Ghule [2], Prof. Dr. S. V. Yerigeri[3]
PG Student, College of Engineering, Ambajogai, Beed, Maharashtra, India[1]
Professor, College of Engineering, Ambajogai, Beed, Maharashtra, India[2,3]

Abstract: *Switched Reluctance Motors (SRMs) have emerged as a promising solution for Electric Vehicle (EV) propulsion due to their simple construction, high efficiency, and fault-tolerant capabilities. However, challenges such as torque ripple, acoustic noise, and nonlinear magnetic characteristics hinder their widespread adoption. Recent advancements in machine learning (ML) techniques provide novel opportunities for achieving smart and adaptive speed control of SRMs. This paper presents a comprehensive review of machine learning-based approaches, including Artificial Neural Networks (ANN), Fuzzy Logic, Reinforcement Learning, and Hybrid Intelligent Controllers, applied to SRM speed regulation in EV applications. The review highlights key control strategies, performance improvements in dynamic response, torque smoothening, energy efficiency, and real-time adaptability. Furthermore, the paper discusses the integration of data-driven models with conventional control methods, the scope of ML in predictive maintenance, and its role in advancing sustainable EV propulsion systems. Future research directions and potential challenges in deploying ML-based smart controllers for large-scale EV implementation are also outlined.*

Keywords: Switched Reluctance Motor (SRM), Electric Vehicles (EVs), Machine Learning (ML), Speed Control, Artificial Neural Networks (ANN), Fuzzy Logic, Reinforcement Learning, Smart Drive Systems

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