IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 6.252
Volume 2, Issue 3, April 2022

Revolutionizing the Road: Advancements in Automotive Technology

Jerry A. Madrid
College of Technology, Surigao Del Norte State University, Surigao City, Philippines
jmadrid@ssct.edu.ph

Abstract: *In the ever-evolving landscape of automotive technology, significant advancements have ushered in a new era of transportation. This paper, presents a comprehensive exploration of these transformative innovations across five pivotal domains: autonomous vehicles, electrification, safety enhancements, connectivity, and sustainable materials. In the domain of autonomous vehicles, the paper underscores the remarkable progress achieved in enhancing road safety, reducing accidents attributable to human error, and the pursuit of Level 4 and 5 autonomies. However, challenges surrounding regulatory frameworks, ethical considerations, public trust, and robustness in complex environments demand careful attention. The transition to electrification highlights the potential to curb greenhouse gas emissions and accelerate the adoption of electric vehicles. Despite the positive strides in battery technology and charging infrastructure, addressing battery range, charging speed, and affordability remains paramount. The shift from passive to active safety systems is transforming road safety, notably reducing accidents and improving overall safety. Achieving widespread adoption, ongoing research, and preventing driver complacency are focal points in this domain. Connectivity in vehicles, integrated into the Internet of Things, enhances navigation and real-time data exchange. Yet, safeguarding data privacy and cybersecurity remains a critical concern. Lastly, the adoption of sustainable materials in manufacturing aligns with environmental responsibility goals, necessitating solutions for scalability and cost-effectiveness. This comprehensive overview emphasizes the interplay of these innovations, underscoring the need for interdisciplinary collaboration and proactive policymaking. As the automotive industry stands at the crossroads of change, the seamless integration of these advancements promises a safer, more sustainable, and technologically advanced future on the road.*

Keywords: Autonomous Vehicles, Electrification, Safety Enhancements, Connectivity, Sustainable Materials

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