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Next-Generation Automotive Solutions

Research Objective

To investigate challenges and technological advancements in Next-Generation Automotive Solutions under three subdomains:

- Electric and Sustainable Mobility
- Autonomous & Intelligent Driving Systems
- Connected & Smart Vehicle Ecosystems

Dharmik Vyas

PART 1: Electric and Sustainable Mobility

PICO 1

Title: Electric vehicles and renewable energy for sustainable mobility

Author: Hira Tahir, Hasan Erteza Gelani, Sami El-Ferik, Muhammad Tayyab, Nima Khosravi

Description: Overview of integrating electric vehicles and

renewable energy for sustainable transport and grid balancing.
PICO:

- P: Urban transport systems
- I: Electric vehicles + renewables
- C: Internal combustion vehicles
- O: Lower emissions & better grid support

PICO 2

Title: Data enabling digital ecosystem for sustainable shared electric mobility-as-a-service in smart cities-an innovative business model perspective
Author: Anthony Bokolo
Description: Investigates digital ecosystem solutions for sustainable shared electric mobility and MaaS.
PICO:

- P: Shared mobility in smart cities
- I: Digital ecosystem-enabled shared e-mobility
- C: Traditional transport models
- O: Business/efficiency gains and sustainability

PICO 3

Title: Electric mobility toward sustainable cities and road-freight logistics: A systematic review and future research directions
Author: Alarcón Frank E., Cawley Alejandro Mac, Sauma Enzo
Description: Systematic review on EV impact for urban freight and

city sustainability.
PICO:

- P: Urban logistics/freight operators
- I: Electric mobility integrations
- C: Conventional logistics
- O: Reduced emissions, improved efficiency

PICO 4
Title: Can electric vehicles deliver sustainable mobility in low-income countries?
Author: Zia Wadud
Description: Discusses opportunities and challenges of EV adoption in developing economies.
PICO:

- P: Low-income country commuters
- I: Adoption of electric vehicles
- C: Traditional gasoline vehicles
- O: Enhanced sustainability, possible policy & infrastructure challenges

PICO 5
Title: A sustainable mobility strategy based on electric vehicles and renewable energy for shopping centers
Author: Marco Antonucci, Pierluigi Barbieri, Antonio Ficarella, Annarita L. Rizzo, Giuseppe Spagna

Description: Proposes electric and renewable-based mobility concepts for dense commercial areas.
PICO:

- P: Shopping center transport users
- I: EVs combined with renewable charging
- C: Grid-only/carbon transport
- O: Improved environmental and cost savings

PICO 6
Title: The transition towards the implementation of sustainable mobility: A configurational approach
Author: Marcos Rodrigo Salazar, David Román, Marta Çubukçu
Description: Analyzes shifts in city-level policy and infrastructure for mobility transition.
PICO:

- P: City governments/policy makers
- I: Integrated sustainable mobility policies
- C: Non-coordinated individual solutions
- O: Greater implementation & adoption

Taher Barot

PART 2: Autonomous and Intelligent Driving Systems

PICO 7

Title: An efficient intelligent task management in autonomous vehicles using AIIOT and optimal kernel adaptive SVM

Author: R. Sethuraman, S. Jeyalakshmi, S. Sellappan, S. Chitra, T. Isaiyarasi, V. Nagarani

Description: Proposes an advanced AI-IoT architecture for real-time decision and task management in autonomous vehicles.

PICO:

- P: Autonomous vehicle systems
- I: AIIOT + adaptive SVM models
- C: Legacy autonomous system logics
- O: Improved task efficiency and robustness

PICO 8

Title: Path planning algorithms in the autonomous driving system

Author: Xiaoqiang Li, Congcong Dong, Xiao Mi, Dongbin Zhao

Description: Comprehensive review of state-of-art path planning and trajectory control approaches in AVs.

PICO:

- P: Autonomous vehicles in complex environments
- I: Advanced path planning algorithms
- C: Standard navigation/pathfinding
- O: Safer, more efficient path execution

PICO 9

Title: Intelligent vehicle driving decision-making model based on variational autoencoder and deep reinforcement learning

Author: Rongxin Wang, Weiguo Wu, Qizhao Zhang, Qianhui Zheng, Guodong Zhang

Description: Introduces a variational autoencoder and DRL-based model for E2E intelligent driving.

PICO:

- P: Intelligent vehicle decision-making
- I: VAE+DRL neural model
- C: Conventional rule-based logic
- O: Smarter, safer real-time decisions

PICO 10

Title: Autonomous driving system: A comprehensive survey

Author: Wang, H., et al.

Description: Evaluates the technology stack for perception, planning, and control in autonomous vehicles.

PICO:

- P: Developers/researchers in autonomous driving
- I: Full-stack AV systems survey
- C: Siloed/partial technologies
- O: Insights for integrated system improvements

PICO 11

Title: Vehicle-to-everything (V2X) in the autonomous vehicles domain – A technical review of communication, sensor, and AI technologies for road user safety

Author: Adnan Yusuf Syed, Khan Arshad, Souissi Riad

Description: Reviews V2X communication and their impact on AV safety.

PICO:

- P: Autonomous vehicle user ecosystem
- I: V2X integration and tech stack
- C: Isolated vehicle perception
- O: Safer navigation & fewer accidents

PICO 12

Title: Enhancing autonomous driving through intelligent navigation

Author: Junzhi Zhang, Zhigang Liu, and colleagues

Description: Develops AI-powered intelligent navigation for faster, more accurate AV operation.

PICO:

- P: Autonomous vehicle navigation tasks
- I: AI/ML-enhanced navigation
- C: Classic non-AI navigation
- O: Better accuracy and speed

Swarnim Dhyani

PART 3: Connected and Smart Vehicle Ecosystems

PICO 13

Title: Revolutionizing the road: How sustainable, autonomous, and connected vehicles are changing digital mobility business models
Authors: Pérez-Moure Hugo, Lampón Jesús F., Velando-Rodriguez Maria-Elena, Rodríguez-Comesaña Lorenzo
Description: Explores new digital models for carmakers implementing sustainable, autonomous, and connected systems.
PICO:

- P: Connected smart vehicle manufacturers
- I: Digital platforms and connected ecosystems
- C: Traditional business models
- O: New value creation and mobility efficiency

PICO 14

Title: The deceitful Connected and Autonomous Vehicle: Defining the concept, contextualising its dimensions and proposing mitigation policies
Authors: Alexandros Nikitas, Simon Parkinson, Mauro Vallati
Description: Defines CAV technology, risks, and mitigation strategies for AI-driven connectivity.
PICO:

- P: Connected & Autonomous Vehicles ecosystem
- I: Conceptual and policy framework
- C: Technological-only management
- O: Improved clarity and better risk mitigation

PICO 15

Title: Impacts of connected and autonomous vehicles on urban transportation and environment: A comprehensive review

Authors: Rahman Md. Mokhlesur, Thill Jean-Claude

Description: Holistic review on CAVs' role in urban development, travel, and sustainability

PICO:

- P: Urban planners, smart cities
- I: Integrated CAV deployment
- C: Non-connected, manually driven vehicles
- O: Enhanced efficiency, emissions, urban flow

PICO 16

Title: Acceptance of connected vehicle technology in emerging markets

Author: Mehak Arora, et al.

Description: Examines consumer acceptance and factors influencing adoption in India's CVT market

PICO:

- P: Vehicle consumers in emerging markets
- I: Connected vehicle technology
- C: Standard vehicle features
- O: Higher adoption due to influence factors

PICO 17

Title: Spatial–temporal transformer-based ecological car-following strategy for connected and autonomous vehicles

Authors: (see article)

Description: Proposes an advanced ecological car-following model using deep learning in CAVs

PICO:

- P: Connected & autonomous traffic
- I: Transformer-based eco-driving strategy
- C: Traditional or rule-based car following
- O: Lower energy consumption, better safety

PICO 18

Title: Connecting smart mobility and car sharing using a systematic review

Authors: (see article)

Description: Links smart mobility, car sharing, and connected vehicle innovations

PICO:

- P: Smart mobility/car share environments
- I: Systemic connectivity and sharing
- C: Standalone service models
- O: Improved service efficiency, adoption