PANIMALAR ENGINEERING COLLEGE

An Autonomous Institution

[JAISAKTHI EDUCATIONAL TRUST]

Approved by AICTE | Affiliated to Anna University | Recognized by UGC

All Eligible UG Programs are Accredited by NBA

Bangalore Trunk Road,Varadharajapuram, Poonamallee, Chennai- 600 123

TECHDIVATHON

Empower, Innovate, Elevate: Code the Future Together

Domain: E-VEHICLES

Problem Statements:

S. No	Title	Problem Statement	Description
1	Efficient Battery Cooling Systems	Design advanced thermal management systems to prevent overheating in lithium-ion batteries in EVs.	Uses innovative cooling techniques to maintain optimal temperatures, ensuring safety and extending battery life.
2	Lightweight Chassis for E-Vehicles	Develop a lightweight and durable chassis using composite materials to improve range and efficiency.	Reduces vehicle mass with materials like carbon fiber, enhancing energy efficiency and crash resistance.
3	Wireless Charging Infrastructure	Build inductive charging pads for wireless EV recharging, improving convenience and reducing cables.	Uses electromagnetic fields for seamless energy transfer, eliminating cable wear and enhancing charging ease.
4	Advanced Regenerative Braking Systems	Create regenerative braking systems to maximize energy recovery without compromising braking.	Converts kinetic energy into electrical energy, enhancing recovery and smooth braking performance.
5	Real-Time Battery Health Monitoring	Design sensors for continuous battery health monitoring and proactive issue alerts.	Tracks parameters like temperature and charge cycles for real-time maintenance, reducing failure risks.
6	Swappable Battery Modules	Develop modular battery systems for quick swaps at service stations, reducing downtime.	Allows exchanging of depleted batteries with pre-charged ones, enhancing EV convenience and flexibility.
7	High-Efficiency Electric Motors	Create compact and energy-efficient motors with improved torque for better EV performance.	Enhances power delivery and energy conversion efficiency, improving acceleration and driving dynamics.
8	Solar-Assisted EV Charging Stations	Design solar-powered chargers to reduce grid dependency and emissions.	Harnesses renewable energy with battery storage for continuous EV charging, even in low sunlight.
9	Multi-Axle Drive Systems for Heavy-Duty EVs	Develop systems to support multi-axle electric drivetrains for trucks and buses.	Distributes power effectively across axles, improving traction, stability, and performance under heavy loads.
10	Integrated Safety Sensors for EVs	Build sensors to detect and prevent short circuits, fires, and overheating in EVs.	Enhances safety by monitoring critical parameters in real time, activating fail-safes as needed.

11	Energy Optimization Algorithms	Develop AI-powered tools for analyzing driving patterns to optimize energy consumption.	Uses ML to study behaviors and traffic patterns, adjusting energy use for efficiency and range.
12	EV Fleet Management Systems	Create software for centralized fleet monitoring, charging schedules, and maintenance.	Provides insights to optimize operations, reducing downtime and costs.
13	Battery Lifecycle Prediction Tools	Build ML models to predict battery performance and lifespan.	Analyzes data to forecast degradation trends, improving maintenance schedules and safety.
14	Autonomous Parking for EVs	Design AI-powered software for self-parking in crowded spaces.	Uses sensors and cameras for precise, autonomous parking, enhancing convenience and safety.
15	Smart Navigation for EV Charging	Develop tools to guide EV users to nearby stations based on traffic and availability.	Optimizes routes with real-time station capacity and charging speed, reducing range anxiety.
16	Over-The-Air Software Updates	Create secure platforms for remote EV firmware updates.	Enables continuous performance enhancements and bug fixes without physical intervention.
17	Predictive Maintenance Alerts	Design IoT-based systems for early failure detection and maintenance.	Monitors vehicle components, predicting wear or malfunctions to reduce unexpected breakdowns.
18	Load Balancing for Charging Networks	Develop algorithms for power load distribution across EV charging stations.	Dynamically allocates energy during peak hours, minimizing grid strain and optimizing efficiency.
19	Vehicle-to-Grid Communication Systems	Build tools for EV-grid communication, enabling dynamic energy storage and supply.	Allows EVs to act as decentralized energy resources, supporting grid stability during surges.
20	Eco-Driving Assistant	Create apps providing real-time feedback to improve driving efficiency.	Monitors behaviors like acceleration and braking, offering actionable insights for better energy conservation.
21	Bidirectional Charging Systems	Enable EVs to act as energy sources for homes or feeding back into the grid.	Supports energy storage solutions, reducing dependency on conventional power sources.
22	Smart Charging Stations with IoT	Develop IoT-integrated chargers for real-time monitoring and dynamic pricing.	Optimizes charging sessions based on demand and grid conditions, enhancing user convenience.
23	Self-Adjusting Suspension for EVs	Build AI-driven suspension systems for dynamic adjustments.	Improves ride comfort and energy efficiency by adapting to road conditions and vehicle load.
24	Dynamic Range Estimation Systems	Design systems combining real-time hardware and AI for accurate range predictions.	Accounts for factors like terrain and weather, offering precise range estimates under varying conditions.
25	Renewable Energy-Driven EV Chargers	Create solutions combining renewable power generation with optimized charging schedules.	Integrates solar or wind energy, maximizing clean energy use for EV charging infrastructure.

Reviewer's Digital Signature

Reviewer's Name:
Position:
Organization:
Date:

Digital Signature: