Section 1: Administrative and Core Identity

Project Title

Scootlite – Compact, Foldable, and Lightweight Electric Scooter

Student Team

Sl. No.	Student Name	Role in Project
1	Hemanth S	Design and Electronics Development
2	Prajwal Kumbar H M	Fabrication and Electronics Testing
3	Pranav Siddappa	Mechanical Assembly and System Testing

Academic Details

Student Name	Program	Department	Status
Hemanth S	B.E.	Electronics and Instrumentation Engineering	Graduated – 2025
Prajwal Kumbar H M	B.E.	Electronics and Communication Engineering	Graduated – 2025
Pranav Siddappa	B.E.	Computer Science and Business Systems	Currently in 2nd Semester

Institution

University/College: Malnad College of Engineering, Hassan

Project Duration

Project Dates: January 2025 – December 2025

Key Adviser / Mentor

Dr. Mohana Lakshmi J.

Associate Professor – Department of Electrical and Electronics Engineering

Malnad College of Engineering, Hassan

Grant Information

Grant Approved: ₹1,00,000

Section 2: Visual Assets

Student Profile Photo

Hemanth S Kumar

Pranav B P.

Prajwal Kumbar H M

Primary Project Image

Process Photos (2–3)

Section 3: Narratives

The Hook / One-Line Summary

> *A lightweight, foldable dual-motor electric scooter designed to provide efficient, eco-friendly last-mile urban mobility.*

The Problem Statement

Urban mobility is increasingly challenged by traffic congestion, rising air pollution, and limited last-mile transportation options. While electric scooters and bicycles have emerged as alternatives to conventional fuel-based transport, many existing models are either bulky, heavy, or lack

portability, making them inconvenient for daily commuters who rely on public transport or limited storage space. In densely populated urban environments, users require a compact, lightweight mobility solution that can easily be folded, carried, and stored without sacrificing performance or safety.

Most currently available electric scooters rely on single hub motors and rigid frame designs, which reduce their adaptability to varying terrains and make transportation cumbersome. Additionally, compromises in structural integrity or motor performance often lead to poor ride quality and reduced durability. These limitations highlight the need for a portable, powerful, and ergonomically designed electric scooter that supports sustainable urban commuting while improving user convenience and comfort.

The Solution

Scootlite is a next-generation micro-mobility solution designed to address the limitations of existing electric scooters by combining portability, performance, and durability in a compact form factor. The scooter incorporates a dual hub motor architecture that distributes power efficiently across the wheels, providing improved torque, stability, and hill-climbing capability compared to traditional single-motor systems.

The structural design uses an aerospace-grade aluminium alloy chassis, ensuring high strength while maintaining a lightweight frame that enhances portability. A specially engineered paddle-lock folding mechanism allows the scooter to be folded quickly and securely, making it convenient for users to carry it on public transportation or store it in small spaces such as offices or apartments.

Scootlite is equipped with a lithium-ion battery pack that delivers reliable power and extended riding range for short-distance urban travel. The integration of a dual suspension system with shock absorbers significantly improves rider comfort by minimizing vibrations on uneven city roads.

The scooter also includes an ergonomic control system with throttle input, responsive braking mechanisms, and a digital speed display. The system architecture connects the battery to a motor controller, which regulates power delivery to the hub motors. This integrated design ensures efficient energy utilization while maintaining safety and stability during operation.

Methodology and Key Technology

The Scootlite prototype was developed through a combination of mechanical design, electrical integration, and iterative prototyping. The chassis was fabricated using mild steel for the initial prototype to validate the folding mechanism and structural stability. A manually operated folding lock system was developed and tested to ensure durability and user safety.

Key technologies involved in the project include:

- Dual hub motor electric drive system
- Lithium-ion battery module with Battery Management System (BMS)
- Motor controller for power regulation
- Aluminium/mild steel lightweight chassis fabrication
- Dual suspension shock absorber mechanism
- Integrated throttle and braking control system

The development process included frame fabrication, component assembly, wiring integration, and functional testing of the drive system.

Key Findings / Results

The initial prototype development demonstrated the feasibility of a foldable electric scooter platform designed for compact urban mobility. Using the first tranche of NAIN 2.0 funding, the team successfully fabricated a robust mild steel chassis and developed a functional folding mechanism capable of supporting the scooter's structural requirements.

Preliminary testing confirmed that the folding mechanism enables quick transformation between riding and storage configurations without compromising frame stability. The mechanical braking system and wiring layout were also successfully integrated during the early assembly stage.

The second tranche of funding supported the integration of electrical components including the battery pack, motor controller, and motor drive system, enabling basic mobility functionality.

Future Scope / Next Steps

Future development of Scootlite will focus on improving performance, durability, and commercialization readiness. The next stage will include integration of higher-capacity lithium battery systems, dual hub motors with optimized torque output, and advanced motor controllers for improved energy efficiency.

Additional enhancements may include IoT-based smart features such as GPS tracking, mobile app connectivity, and battery health monitoring. Upgrading the chassis material to aerospace-grade aluminium will further reduce weight while maintaining structural strength.

With continued prototyping, testing, and industrial design improvements, Scootlite has the potential to evolve into a market-ready product for urban commuters, last-mile logistics, and shared micro-mobility platforms.