# Electric Wheel-Chair Tricycle

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***Abstract*—The increasing demand for affordable and eco-friendly transportation has led to the development of electric mobility solutions. This project focuses on the design and development of a smart electric tricycle intended for specially-abed individuals and small delivery applications. Conventional two-wheel vehicles are often unstable and manual tricycles require significant physical effort, making mobility difficult for many users. The proposed electric tricycle uses a BLDC motor powered by a rechargeable battery system to provide smooth and efficient movement. The three-wheel design offers better stability and safety compared to two-wheel vehicles. The system includes essential components such as a motor controller, throttle control, braking mechanism, and battery management system. The vehicle is designed to achieve a speed of around 15–25 km/h with a range of approximately 25–50 km per charge, making it suitable for short-distance transportation and last-mile delivery services such as food or parcel transport. The design also supports a moderate payload capacity for carrying small goods. This project aims to provide an economical, energy-efficient, and user-friendly transportation solution that can improve mobility for specially-abed people while also supporting small business and delivery operations. The proposed system contributes to sustainable transportation and reduced environmental impact**

***Index Terms*—Electric Tricycle, BLDC Motor, Assistive Mobility, Electric Vehicle, Last-Mile Delivery, Sustainable Transportation.**

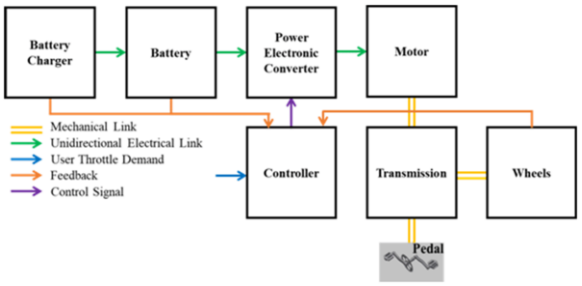
## I. INTRODUCTION

This study explores e-trikes as pollution-free city transport, assessing their urban commuting performance. Petrol tricycles contribute to air and noise pollution due to the combustion of fossil fuels in their engines, emitting greenhouse gases and pollutants such as carbon dioxide, nitrogen oxides, and particulate matter, which can harm both the environment and human health. Petrol tricycles rely on gasoline as fuel, derived from non-renewable fossil fuels. We designed a tricycle with a 650W motor and 24V battery for eco-friendly short to medium city trips. Switching to electric drive maintains performance and ensures comfortable rides. With around a 16km range per charge, they meet urban mobility needs while championing sustainability. Besides echo-benefits, e-trikes prioritize passenger comfort and safety through smart design and stability. Extensive testing covers energy efficiency, range, and reliability, confirming e-trikes as a viable alternative to gas vehicles. Integrating e-trikes into city transit could dramatically cut pollution and boost air quality, fostering healthier urban environments. This study advocates for e-trikes to lead green mobility efforts and shape future urban transport. Key components include a PMDC motor, Battery, Charge controller.

### Brief History of Electrical Tricycle

The design of the electric tricycle is adaptable to current hand-powered tricycles with minimal modification. It encompasses an electric motor, a drive system, a battery, an accelerator, a battery charger, and a power supply. A PMDC motor was chosen due to prohibitive fuel costs, rendering a combustion engine impractical. An intelligent battery charger handles battery charging. The first aspect addressed was the drive system, ensuring efficient power transmission from the motor to the front wheel. Secondly, a method of motor control was determined, incorporating speed and braking controls into a simple electrical accelerator. Thirdly, power is supplied to the motor via a battery pack. All components (motor, transmission, controls, and batteries) are designed for easy installation on existing hand-powered tricycles. The conversion to an Electric Tricycle is straightforward and reversible.

## II. BLOCK DIAGRAM




## III. FUTURE SCOPE

The electric tricycle can be improved by integrating solar panels for additional charging and improved energy efficiency. IoT technology can be implemented for real-time monitoring of battery status, vehicle performance, and maintenance alerts. A GPS tracking system can be added for navigation and safety, especially useful for delivery services. The battery capacity can be increased to achieve longer driving range and better performance. The design can be enhanced with advanced braking systems and improved suspension for better safety and comfort. The vehicle can be further developed for commercial delivery applications such as food delivery, parcel services, and small business transportation.

## IV. CONCLUSION

This project presents the design and development of a smart electric tricycle intended for assistive mobility and small-scale delivery applications. The vehicle is powered by a rechargeable battery and an electric motor, which provides smooth and efficient operation while reducing dependence on conventional fuel-based transportation. The three-wheel design offers better stability and safety compared to two-wheel vehicles, making it suitable for specially-abed individuals and short-distance transportation. The system is designed to be economical, eco-friendly, and easy to operate. The developed electric tricycle demonstrates that electric mobility can be an effective solution for sustainable transportation and last-mile delivery services. Overall, this project highlights the potential of electric vehicles to improve accessibility, reduce environmental impact, and provide a practical transportation solution for everyday use.

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