ABSTRACT

The aim of this project is to develop a multi-utility electric bike (e-bike) incorporating an All-Wheel Drive (AWD) concept for enhanced traction and power distribution. The proposed design features two motors, with one mounted in the front wheel and another in the rear. This configuration enables improved performance, especially in challenging terrains and adverse weather conditions.

One of the key innovations is the utilization of the front motor as a generator during consistent cruising speeds. This regenerative braking system harnesses kinetic energy to generate electricity, which is then stored in a unique split battery configuration. The split battery consists of 80% and 20% capacity segments, allowing for optimized energy management and storage.

During operation, when the front motor functions as a generator, surplus power is stored in the 20% capacity battery segment. When additional power is required, such as during acceleration or uphill climbs, both the 80% and 20% capacity segments collaborate to provide ample energy to the front motor. Meanwhile, the rear motor draws power exclusively from the 80% capacity battery segment.

By integrating these innovative features, the multi-utility e-bike with AWD concept offers enhanced efficiency, performance, and versatility, making it suitable for a wide range of applications, including urban commuting, recreational riding, and off-road adventures.