EBIKES

- Expensive
- Prone to Theft
- Heavy and Bulky

DIY KITS

- Tedious to Install
- Unsafe
- No Servicing
Solution

An Electric Wheel That Transforms Any Bike to An Ebike
System Block Diagram

Five Primary Subsystems:

- Mechanical
- Throttle Assembly
- Powertrain Electronics
- Control Electronics
- Smartphone App
Mechanical
Motor
Axle
Batteries
Electronics (behind sprocket)
Throttle
Throttle Housing

The throttle activates the wheel and controls its speed.

It encloses the throttle MCU, an NFC reader, and slots an OLED display.
Throttle Housing Demo
Throttle - OLED Reader

The OLED display is used to display the power state and battery percentage of the wheel.
Demo of OLED
Throttle - NFC Reader

NFC Reader - NXP PN532

Authenticates user to wheel to improve security
Powertrain
Component Selection - Powertrain

Motor - Flipsky BLDC 2450W
Component Selection - Powertrain

ESC - Flipsky VESC 4.12

- 50A continuous, 150A burst
- UART serial port for command and telemetry
Component Selection - Powertrain

BMS - JBD Smart BMS

- 50A continuous
- UART serial port for telemetry
**Component Selection - Powertrain**

Battery - 39x INR18650-30Q

- “13s3p” (9 Ah / 444 Wh)
- ~48V (nominal) or ~55V (full)
Control Electronics
Component Selection - Embedded

Raspberry Pi Pico W

- ARM M0+ MCU
- Integrated BT(LE)/WiFi
- FreeRTOS middleware
Component Selection - Embedded

GNSS - uBlox SAM-M10Q

- GNSS: all countries’ GPS
- Low power receiver
Phone Application
Phone app - Demo

Tracks performance parameters
- Speed
- Total Distance
- Duration

Performs basic geolocation tracking
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