Pedal-Powered Smart Bike

Problem and Project Solution

Our project would look to convert energy from biking to power an HUD display capable of informing your location, lighting your way, and signaling your turns and stops to cars on the road, all while making your ride a bit more challenging. With the ability to extract useful exercise statistics, users will be able to see a visualization of their route as well as see the amount of power exerted at different parts of the trip.

Solution Components

- Mechanical Energy Converter System:
  - Brush Motor
  - Chain
  - Metal rods to fix it to bike
- Ambient Light Sensor
- Two Push or Flip Buttons for Left/Right Signals
- HUD or RGB Screen
- Arduino Board
- SD Card for local map storage
- Map Data (from Google Maps or variety of different sources)
- GPS Module
- White and Red LEDs for Headlights and Rear Lights
- Li-Ion Rechargeable Battery (Minimum 6Watts)
- ICs to monitor battery level/ overcurrent protect
- Bicycle

Criterion for Success

Generator and converter effectively produce enough energy to power the system within minutes of getting moving by mechanically powering through a brush motor. Functional Peripherals: headlight turns on and has noticeable levels of brightness, turn signals are operational via triggers, LCD displays properly, generator is disabled once battery level exceeds 80% and restarts at 30% using an IC monitor. Calculations are properly made to determine expenditure at different segments of the ride. Using locally stored map data, the Arduino board should interface with GPS module, charging pedals, and the battery in order to display current street as well as mark position, speed, distance, and power exerted/consumed. This data can then generate valuable exercise statistics for the user.

Team Members

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Link to Webboard Thread: Pedal-Powered Smart Bike Display and Lighting