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Project Proposal: **Brushless DC Electric Scooter**

Background

With growing populations in urban centers, more and more commuters shy away from the typical combustion car as a primary form of transportation. With average speeds as low as 15-20 miles an hour, bicycles seem to be dominating short ranged transportation. With the recent improvements in lithium ion battery technologies, highly efficient electric bicycle hybrids are a popular, albeit expensive replacement for the traditional bicycle. While bicycles can be used for commutes of several miles, not all commutes are this far. Many people, especially students at PSU live only a few miles from work or school, use a bicycle as their primary transportation, but find that leaving a bicycle outside leaves it prone to theft, or for secure parking, it requires a paid pass. An electric scooter fills the niche of lightweight and inexpensive short range transportation, with parts costs ranging only in the realm of a few hundred dollars, compared at the $1000 electric bicycles you can find today.

Objectives

- Develop a working electronic speed controller based on an AVR microcontroller
- Make use of PID control to create a smooth output drive for the electric scooter application
- Attach a sensored BLDC motor with a battery and the ESC and have a fully functioning electric scooter
- If time allows, attach a bluetooth HC-06 module and create a smartphone application to readout speed and battery data.

Scope

The end result should be a usable light transportation vehicle that functions at the flip of a switch, but could potentially have additional functionality with a smartphone as an output display.

Timeframe

	Task	Start and End Dates
Phase One	Learn and implement BLDC controller with Arduino	Oct 4th - Oct 17
Phase Two	Transfer Arduino code to atmega328p using atmel AVR - print new circuit board	Oct 17th - Nov 5th
Phase Three	Attach motor, ESC and battery to scooter, verify it will carry the load of a person	Nov 5th - Class end

Project Budget

Project budget is $200 for one finished product, which limits parts spending to about $150 for all the parts for the board as well as the scooter, so that we have some leftover money to purchase the PCB from OSHpark

Approval Signatures

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