La Bicicleta:
Self Powered Safety Lights for Bicycles

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Project Goals

- Increase visibility of bikes at night
- Self Powered Project
- Lightweight
- Compact Design
- Waterproof Design
- Long Lifespan

Project Requirements

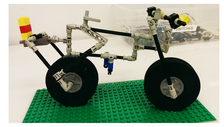
- Employ an Arduino single board microcontroller
- Useful for the everyday life of a college student
- Build and assemble our own parts for this project
- Incorporate Renewable Energy
- Easy and Simple to Use

Project Description

La bicicleta is a bicycle with turning signals and brake lights. The bicycle is powered by a 12 Volt rechargable battery that is powered by a DC Motor installed on the front tire of the bicycle. A box with directional arrows is installed on back tire carrying rack and a T shape in the above the front tire with LED strips. The bike has 3 conveniently placed buttons near the handles of the bike that activate the directional lights.

Models

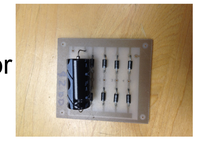
Bicycle Model



LED Box Board

Motor Model

Power Regulator Board



LED Box Model

Proto-Shield

Schedule & Costs

October 23rd – November 6th
- Make/Assemble circuit boards
- Coding LED's, sensors, buttons
- Solidworks assembly
- Exit protyping phase

November 6th – November 20th
- Cut final pieces for LED Box
- Assembling of the project
- Generator installed on the bike
- Battery Installed on the Bike
- Solder all cables to Arduino Protoshield

December 2nd – December 6th
- Testing for any issues with code and wiring

Materials	Cost
LED Strips (1 meter)	$10.00
6 SuperBright LED lights	$12.00
Wire	$10.00
2 Flex Potentiometers	$30.00
Arduino Uno	$25.00
Arduino Protoshield	$10.00
Acrylic	$40.00
Circuit Boards	$12.00
Lenses/ Light Diffuser	$10.00
Poster	$60.00
Miscellaneous	$10
Aluminum (scrap metal)	$0.00
Bike	Donated
Bike Carrying Rack	$13.00
Total	$242

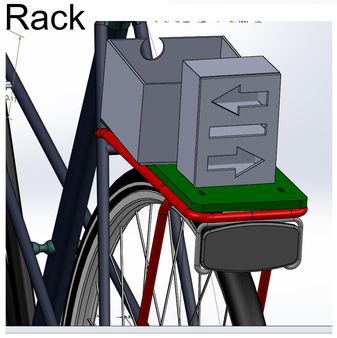
Design Process

- Developed code for brake sensors, LED strips, and turning signals
- Drew schematic map for LED box circuit board and power circuit board.
- Created an acrylic enclosure for rear LED's, designed three different compartments. (Left, stop, right)
- Created a circuit board designs using ExpressPCB
- Acquired Motor and used aluminum block to create a custom-made clamp
- Created four 0.12 inch thick acrylic circles to attach rubber wheel to motor.
- Attached completed motor to front wheel
- Soldered wires from motor, LED strips, LED box and buttons to the Arduino Protoshield.

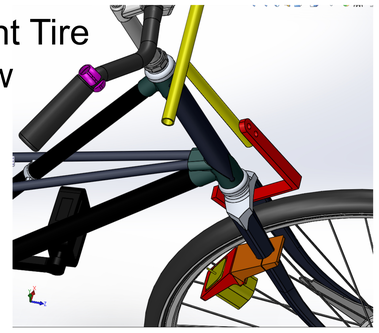
Solidworks

Side View

Carrying Rack



Front Tire View



Outcomes

- Increase the safety of bicyclists and decrease the number of bike accidents that can occur during the night
- A project that can be commercialized to the general public
- Promote bicycle safety