Arduino LED Controller Project

Winter 2014 Capstone Proposal

Natalie Vaughan

2013

Contents

[Project Success 2](#_Toc372284485)

[Target Users: 3](#_Toc372284486)

[User Stories: 3](#_Toc372284487)

[Two-Week Plan: 6](#_Toc372284488)

# Project Success

The goal of my project is to make an LED system that independently cycles through light patterns, a steady one color light, or a steady color wheel. If there is music around, the system can make the lights beat to the music. The system also can be controlled by a mobile app, inputting a single color to be shown through the LEDs or input your own beat for the lights to flash to.

# Target Users:

The LED project has a number of uses:

* Bikers can attach the board and LED into the wheel of the bike and use it to illuminate the wheels at night and have better visibility for riders and drivers alike.
* DJs – They can create a unique light show to accompany their set of music.
* Homeowners – create a home theater set up with a lights to accompany the movie or TV show.
* Roller Skaters – During a regular skating, people can have the lights at the bottom of their skates and adding flair to their skating and if there are multiple pairs of the arduino powered LEDs they would sync up and have the same lights under the skates.
* Skateboarders/Longboarders – They are a combination of both Bikers and roller skaters. At night time, they need to have visibility and flair for their boards. Like Roller Skaters, when at a skating park, most people like to put music on and the light can pick up the music and pulse to the beat.

# User Stories:

* As a home user, I can choose between a steady color wheel and a pattern based led to suit my personal taste.
  + The product can switch from the LED patterns to a steady light going through the color wheel.
* As a roller skater User, I can let my product choose its own patterns based on bpm or not.
  + If beats are detected, patterns will start pulsing to it through the BPM. If no BPMs are detected, it uses last BPM or the pre-programmed final BPM.
* As a user, using the product is easy to use without the mobile app.
  + Product can perform without using the mobile app. The Mobile app is something to enhance the experience with the product.
* As a mobile user, the mobile app is easy to use and pair with the arduino.
  + Using Bluetooth and a pin number, the phone can pair with the product easily and will blink twice when the device is paired with a phone.
* As a homeowner user, I can specify a color that can be used as a constant color until I change it through the mobile app.
  + A color wheel will show on the app and display the Hex value of the color and it will be the color on the LED.
  + Dragging your finger around on the color wheel will simultaneously change the color of the LEDs providing instant feedback.
  + A user can input their own Hex code.
* As a bike user, I can choose a pattern that suits my needs.
  + Mobile app would have the list of the light patens and you can choose one to play until you choose another one, or until timeout is reached.(10 minutes or so)
* As a roller skating user, I can use the app to manually set a BPM for the patterns.
  + User can tap the screen for 15 seconds in a natural rhythm and the BPM is shown on the app and given to the product and uses it in the pattern.
  + User can reset the beat sensor and have it resurvey the BPMs.
* As a multipurpose user, the product can grow and shrink to a size that fits what I need.
  + Build two sizes of the product, one that uses the Arduino Uno and one that uses the Arduino Micro. The larger for bikes and permanent fixtures. Smaller for skateboards and roller skates, and any small area that people want them in.

# Two-Week Plan:

* **During Break:**
  + As a user, the product is simple and easy to use.
    - Build Arduino circuit
    - Design and program a program that shows one color on the LED.
    - Reads and parses Hex codes to use for the LED colors.
    - Have a partial library of light patterns.
    - Beat detection, light flashing to beat.
* **Week One:**
  + As a roller skating user, the beat sensor can quickly get the BPM and use it to set the patterns tempo ad music can change quickly.
    - Able to pass in the BPM into light pattern and have the light pattern
    - Have the BPM passed around through the different pattern loop.
    - Have a max BPM and try to reach its limits.
* **Week Two:**
  + As a roller skating user, I do not want to have wires connecting my mobile app to the product.
    - Have phone communicate with Arduino platform through OTG connection.
    - Have third party color picker app, control the LEDs through phone.
    - Have phone communicate with Arduino platform through Bluetooth. or
    - Have TP Color Picker app control LED color through phone through Bluetooth.
  + Build own color picker app, with beat input control.