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Senior Design Final Project Proposal

**GPS Bike-Finder**

**1 Introduction**

 On college campuses across the nation, students are either constantly preoccupied with the location of their bikes or are hesitant to buy a bike in the first place. Why? Because of the high likelihood that their bikes could be stolen, even while using bike locks or storing their bikes in inconspicuous locations. In order to eradicate these fears, it would be beneficial to many college students if a GPS device could attach to their bike to help them locate their bike in case of theft. Not only would this help them find their stolen bike, but it could also alert them at the time of the robbery so they could take action if desired. This concern led to the creation of GPS Bike Finder.

# **2 Problem Description**

In the United States, it is estimated that between 800,000 and two million bicycles are stolen each year. Many of these thefts occur because cyclists fail to lock their bike or use bike locks that are broken easily. In addition, once a bike is stolen, it is generally difficult to recover, especially in a city or on a college campus, because bikes can be transported so quickly and/or can easily blend in with other bicycles on a bike rack. Only about 5% of bicycles that are stolen are returned to their owners. [[1]](#footnote-0)

# **3 Proposed Solution**

In order to prevent bicycle theft and help more bikes be returned to their owners, we are proposing to make a smart bicycle finder. This product we are proposing is specifically targeted towards college campuses where wifi is prevalent and will be able to utilize a GPS signal.

First, the bike finder would include a GPS device that, when connected with a smartphone, could inform a user where their bike is located at any given time. This feature could also be used to track where the bike has been in order to track the most recent taken paths and whereabouts of it.

In addition, the device would include an accelerometer so that a user could be alerted if significant movement was noticed on the bike. This would be used as an alerting mechanism so a potential theft or robbery could be detected as quickly as possible.

Finally, a battery will be used to power the device. A battery will be used because in order to be able to keep the tracker in a discrete location on the bike, a smaller / more compact power source would need to be used, and a battery would fit this requirement.

# **4 Demonstrated Features**

* Ability to use GPS to locate a bicycle accurately from a smartphone device both after a certain time and when prompted by the user
* Ability to connect to wifi to enable GPS location device
* Ability to use accelerometer to alert user if bike has been moved
* Ability to power the device using batteries

# **5 Available Technologies**

* For making the circuit for the device, the cost will be around $50.
* For GPS technology, there are different GPS modules that we could incorporate into the receiver. We would have to be sure of the type of antenna that would go along with the system and make sure our packaging would be compatible. From the website below, it seems like the GPS modules usually run in the realm of $50-$60
<https://www.sparkfun.com/pages/GPS_Guide>
* For the motion readings, an accelerometer can be purchased for around $15. This device is very small and would not add much size to the bike finder. <http://www.adafruit.com/product/163>
* For wi-fi connections, a wifi transmitter can be purchased for around $7.

<https://www.sparkfun.com/products/13678>

* For powering the device, a battery holder will cost under $5. While the power requirements have yet to be decided, battery holders of all sizes can be purchased in this price range.

# **6 Engineering Content**

* Interconnectivity of all elements and technologies within device to allow for charging as well as GPS tracking seamlessly
* Implement a GPS and accelerometer to device
* Create application to interface with GPS and accelerometer
* Use batteries to power device and set alert for low battery
* Use the timer to set a distinct time increment, for example every 5 minutes, to call the GPS module to send the location of the bike
* Design durable weather-proof case to ensure technology will not be damaged during outdoor use
* Discrete and/or hard to remove design so the device will not be removed by a thief

# **7 Conclusions**

 College students heavily use their transportation (in many cases, a bike) and smartphone devices. Having a technology that would connect these two aspects of the college students’ lives would dramatically increase the quality of life of the average college student. This bike GPS tracker will help students on college campuses eradicate an all-too-often occurring problem: bikes being stolen with no hope of having the bike returned. Its user-friendly software interface and reliable GPS and wifi technology will make it a product in which every college-aged bike owner will surely invest.

1. http://www.bicyclelaw.com/p.cfm/bicycle-safety/about-bike-theft [↑](#footnote-ref-0)