BikeMe:
Safer, faster bike parking

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Connie Chen, Amy Fong, Mandy Kim, Annie Rosen, Jessie Wang
BikeMe Overview
Infrastructure and Sensing

- 4 analog sensors on Arduino
- XBee (mesh of 1)
- AA battery power
Sensor Design - Iteration I, II, III
Sensor Design - Iteration 1
Sensor Design - Iteration II
Sensor Design - Iteration III
Sensor Design - Wiring
Connectivity

- Tools:
  - Wall plug/battery power
  - XBee (connector)
  - Raspberry Pi Serial Port
  - SQLite Database
  - Wifi dongle
  - Heroku server
Connectivity

- Raspberry Pi:
  - RPi will actuate picamera based on past and present sensor data
  - RPi updates SQLite database:
    - All raw data
    - Predictions for each day of week
Connectivity

- Cyber Layer:
  - RPi updates Wallflower Atto stream on Heroku
    - One prediction stream for each day of week and live data
    - RPi updates the prediction based on old and incoming sensor data
Visualization

- Google Maps API to create map of bicycle racks throughout campus.
- HTML, CSS, Javascript

Live Feed

See how many bikes are currently at your bike rack of choice.

Bike rack location: Davis 6th Floor Mezzanine

There are currently 4 bikes parked at the rack!
Actuation

- piCamera for Raspberry Pi can be controlled through the command line or Python
- Photos saved to Google Drive folder via wifi - unlimited storage!
Impact

- Half of 700 New York City office workers living within 10 miles of their job said they would bike to work if provided with safe lanes, secure parking, and wash-up facilities. (Pucher, J. et al., 1999)

- About 86,000 adult New Yorkers, 2.5% of all commuting residents, usually bike to work or school (NYC.gov)
  - 3.4 million who DON’T bike → 1.7 million will begin biking
Impact

- The average commuter in New York City emits about seven pounds of carbon dioxide per round-trip commute for a total of 1,750 pounds of CO$_2$ each year (transalt.org)
  
  - 7 lb/commute/day * 1.7 mil commutes eliminated →

11.9 million pounds of CO$_2$ not emitted per day in NYC (5,400 tons)
Impact

- 5,400 tons of $CO_2$ is...
  - 600,000 gallons of gasoline
  - 0.16% of daily U.S. gasoline used
Deployment

- Successes
- Challenges
- Lessons learned

This is BikeMe
Help us with our CE 186 project to reduce bike theft!
Park on a pressure sensor as shown:

1) [Diagram of bike]
2) [Diagram of bike]

Find us at [URL]
Demonstration

- Pressure Sensor Demo
- BikeMe Website: bikeme.tk