Bike Sentry

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How It's Used

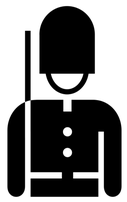
1. Lock your bike at a bike rack.

Just like normal, your daily routine is minimally changed.

2. Scan QR code, sign up for texts.

Instantly become a member of a network of bike owners watching out for one another.

3. Let Bike Sentry guard your bike.



Bike Sentry is always listening for a thief's power tools, ready to respond.

4. Listen for phone notifications!

If we detect a thief while you're away, Bike Sentry will inform you immediately via text message.

The Problem:

Modern bike thieves utilize power tools to cut locks in seconds. However, their distinct sound can be leveraged to determine when your bike is in danger.

If a thief dares to use a power tool near Bike Sentry...
- Bouncy Balls are shot at thieves
- Notifications are sent out to a network of users and authorities.

Bike Sentry is a tower installed near bike racks that listens for power tools.

How It Guards Bikes

Listening

- We trained an audio classification machine learning model to differentiate an angle grinder from ambient noise
- This model is applied to a constant stream of audio recordings from the device, waiting for an angle grinder to be heard.

Notifying

- Thefts in progress trigger alerts to the tower's subscribers
- We created an API on Google Cloud Platform to notify a network of bike owners when the tower detects a theft.

Raspberry Pi 4
- Classifies Audio, send text notifications.

Aiming

- Turret motors give feedback to the body recognition model.

Arduino Nano Every
- Direct control of the motors, gets ir from Jetson Nano.

Jetson Nano
- Aims the turret and fires.

Deterring

- Turret motors give feedback the body recognition model.
- Stepper motors for pan and tilt.
- Servo motor feeding balls.
- 2 brushed motors for fly wheels.