SmartLock

Mechatronics & Software Engineering Capstone

Department of Computing and Software

PROBLEM STATEMENT

Students ride bicycles as a primary mode of transportation. They are easy to use, relatively cheap, are a great source of exercise and can allow one to spend time outdoors. They can help students commute to school quicker than public transportation, which can often be unreliable or crowded. However, there are some barriers to biking, the most important being theft because bikes are easy to steal and can be sold for parts. To protect a bike from being stolen, a lock can be used. However, locks can be bulky, heavy, slow and difficult to use, especially if they are not mounted directly on the bike. Furthermore, an individual can forget where they left their bike, needing a way to locate it. Therefore, we have designed and built the SmartLock, a smartphone application-controlled bicycle lock that disengages automatically with the touch of a button and is mountable to any bike.

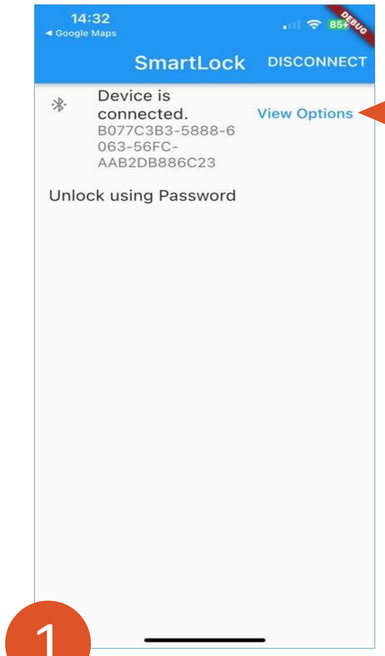
PRODUCT FEATURES

- Securely lock bike to external frame
  - Automatic disengagement mechanism from smartphone – 10s delay until re-engagement to secure lock
- Geotag parked location
  - Interactive, moveable map
  - Coordinate copying to pair with GPS software (Google or Apple Maps) for directions
- Password protection
- Simple mounting onto bicycle frame
- Flexible and sturdy chain to attach lock to external bike rack
- Battery status display on smartphone

TOOLS USED

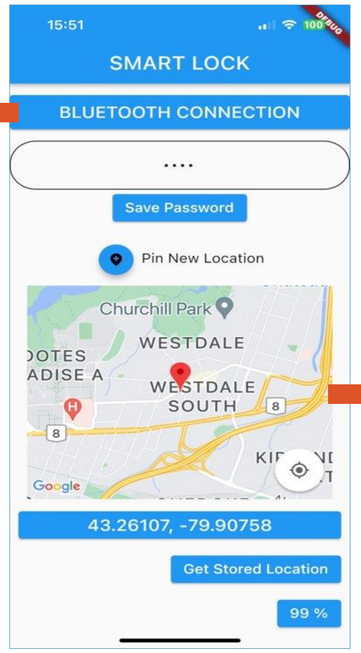
SOLIDWORKS, Flutter, Dart, GitHub, LaTeX, C++, ARDUINO

UNLOCK FEATURE



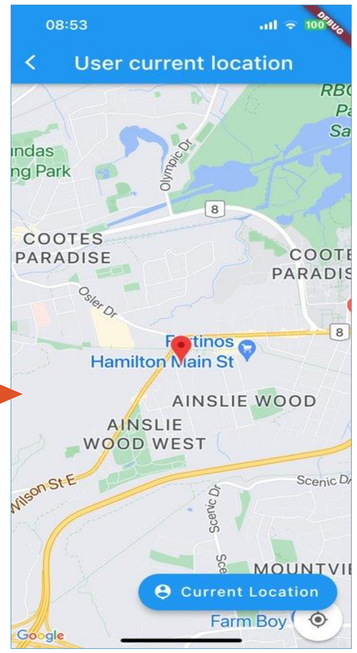
1 Bluetooth Connect

APP HOMEPAGE

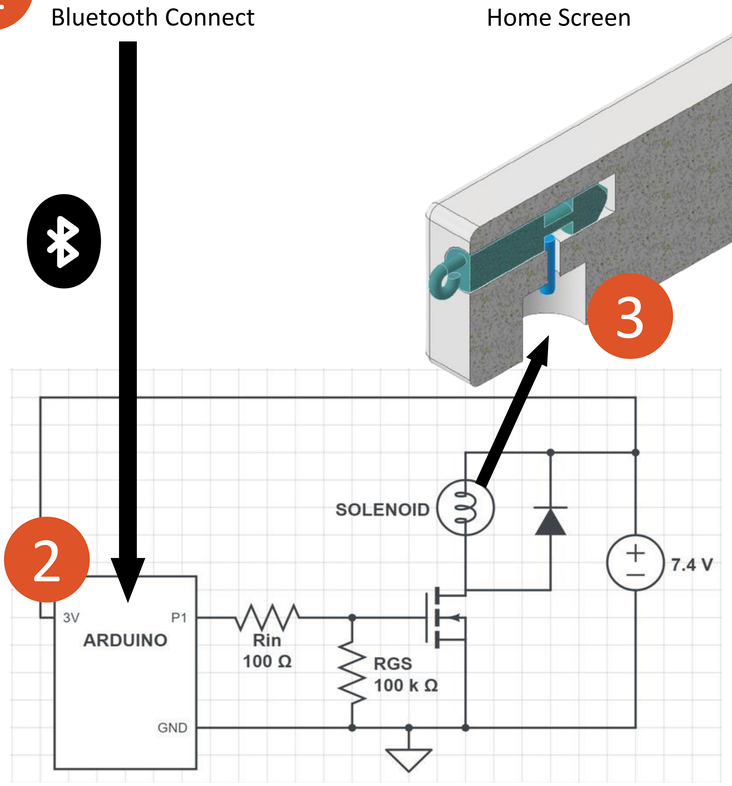


Home Screen

GEOTAG FEATURE



Save Location



UNLOCKING STEPS

1) Connect to SmartLock from the app via Bluetooth and send disengage signal
2) Arduino receives disengage signal and circuit disengages solenoid
3) Solenoid actuates, pulling back the small locking pin and disengaging the physical locking mechanism

GEOTAGGING STEPS

A. Press "Pin New Location" on Home Screen
B. Press "Current Location" on Save Location screen

To get stored location:

A. Press "Get Stored Location“ on Home Screen
B. Optionally, copy coordinates to get directions to tagged location

OUR TEAM

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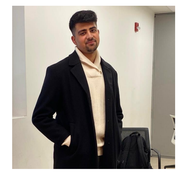

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