

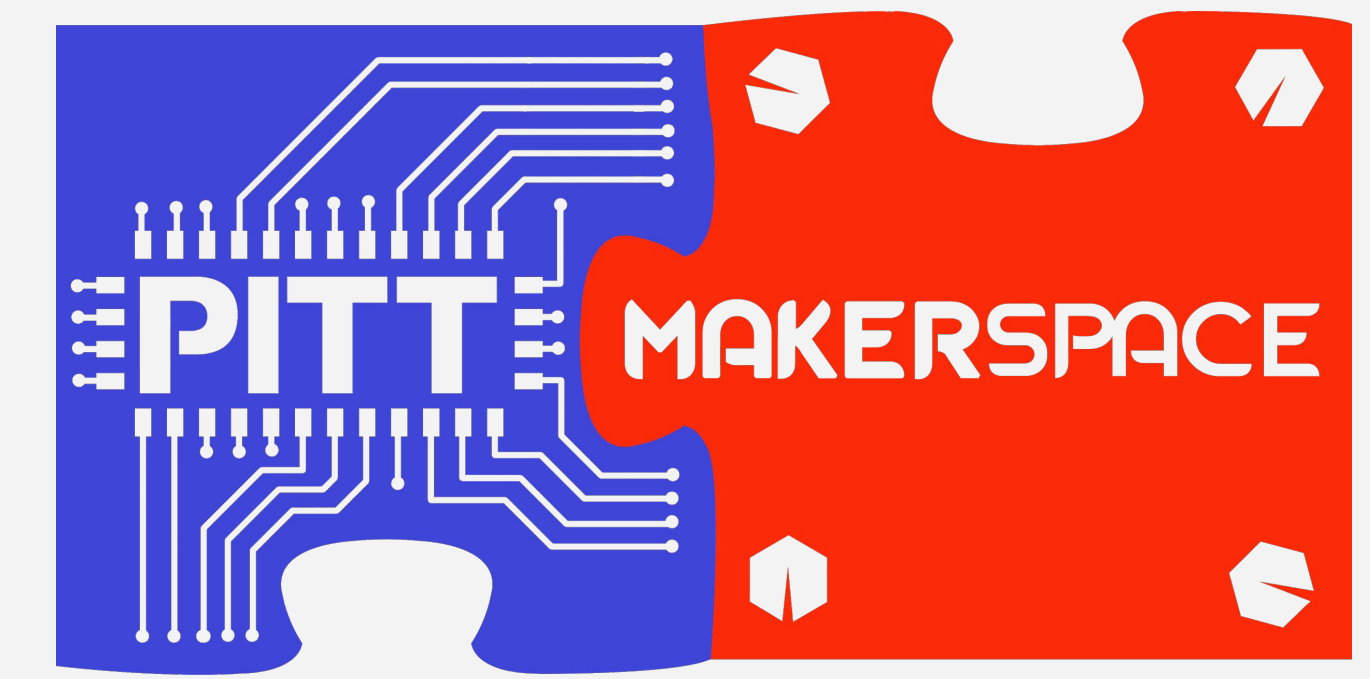


SWANSON school of
engineering

LOCKOUT

An RFID Safety Enforcing Mechanism for SSOE Makerspaces and Machine Shops

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Motivation and Methods

Makerspace staff exert much of their time watching over students and verifying safety training... a process that is mundane, imperfect, and begs for automation.

Our motivation was to non-obtrusively enforce the safe and sustainable use of machinery in the Makerspaces across campus through RF student ID verification against a user database - if a student is not trained, power is cut to the tool and it will not turn on.

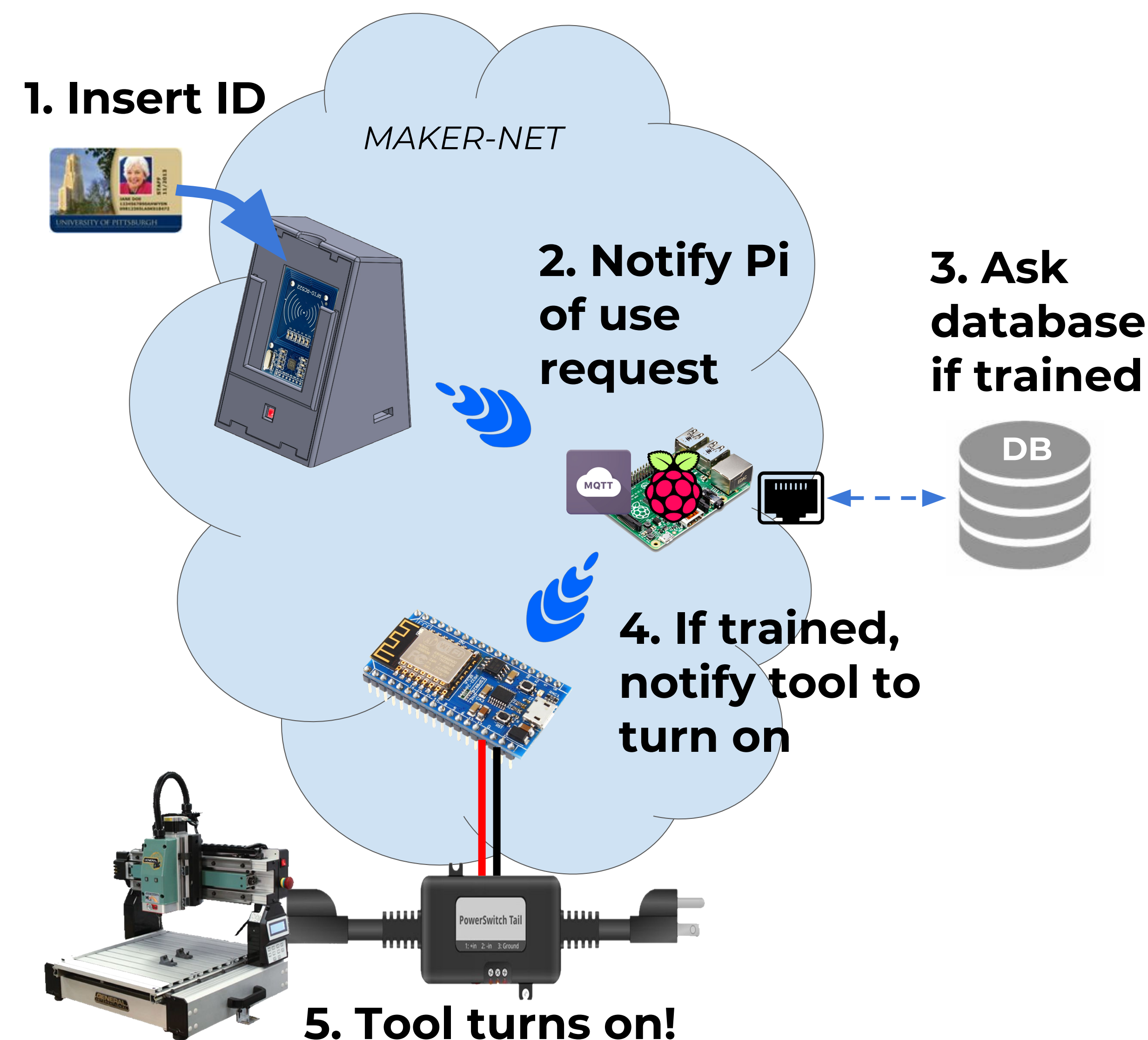
Use Cases & Goals

- Gate access to dangerous machines
- Enforce a “buddy system”
- Seamlessly integrate into existing machinery

Useful Features

1. Cut power to machine if untrained user tries to run machine
2. Cut power to machine if ID card removed while machine is running
 - a. Machine will not start again if on when card inserted
3. Send email to user if ID left behind

Overview



Material List

Component	Quantity	Cost
MCU - ESP8266 MCU	2	\$20
RFID Reader - MFRC522	1	\$4
LED - Adafruit Neopixel	1	\$2
Relay - PowerSwitch Tail II	1	\$26
Current Sensor - Split Core	1	\$10
		Per-Tool Cost: \$62

User Feedback

The *Lockout* device has been installed in Makerspace MS1 for approximately 1 month. During that time, the MS1 staff have enjoyed its simplicity and ease of use, allowing them to show which volunteer is on duty. Soon they plan to use it as a ‘Master Switch’ for the Makerspace tools and machinery.

Future Vision

Looking ahead, we aspire to expand to other locations across campus - including all three Makerspaces, plus the SCPI machine shop. Furthermore, our system could also be expanded to manufacturing factories and art studios.

We also aim to adapt a similar system for use with 3D printers and 220V tools, where we will need to target specific points-of-interest to disable the tool (rather than a 120V relay).

Acknowledgements

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