Development of a microcontroller system for a sensor network for the study of *Tachycineta bicolor*

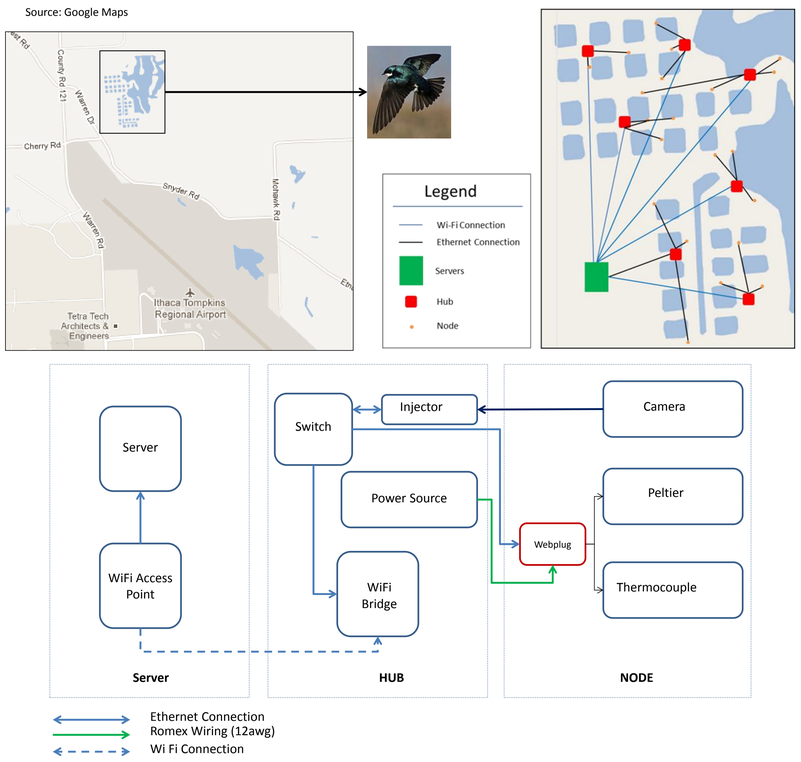
Yichi Zhang

OVERVIEW

The goal of this project is the development and implementation of a microcontroller (webplug) used to simulate climate change in artificial nestboxes of tree swallows (*Tachycineta bicolor*) and to collect data that reflect changes in their behavior.

BACKGROUND

A sensor network is deployed at a field site with nestboxes where tree swallows nest every year to collect data on their behavior. The webplug is part of equipment installed on each nest.



Location & layout of network (2012 field season)

Typical nestbox in the network

IMPLEMENTATION

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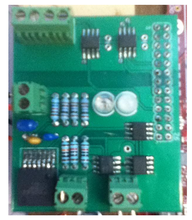

Single Board Computer with ARM9 processor running Linux
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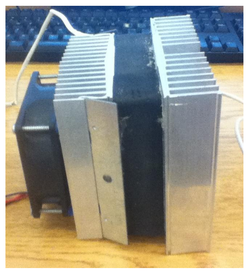
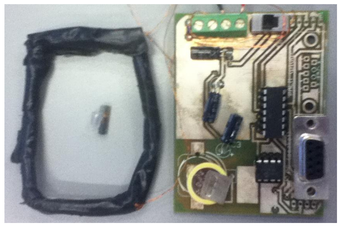
PCB Attachment

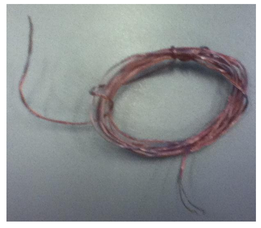
Simulate Climate Change



Peltier

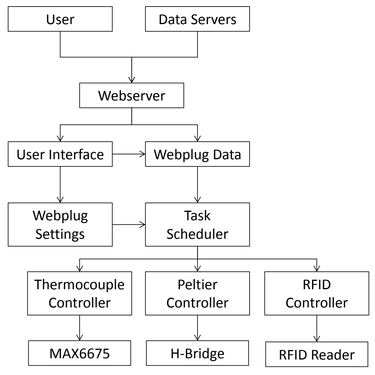
Data Collection





RFID & Thermocouples

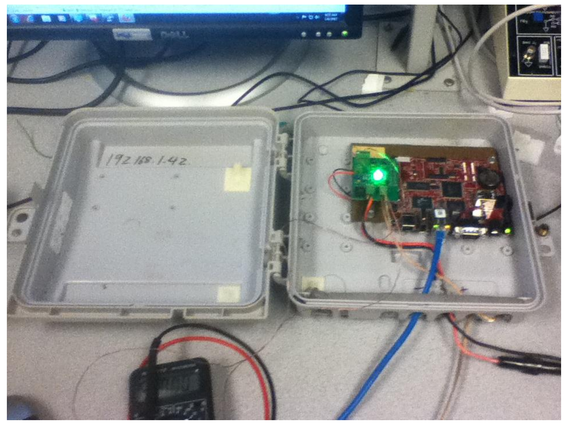
Software

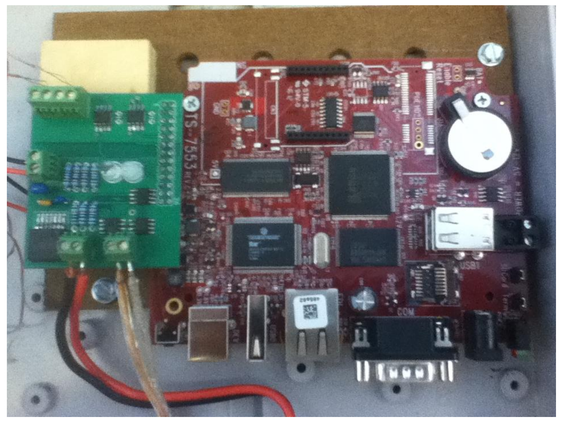


Implemented in C, Python, Bash, PHP

Total per unit cost: $200

RESULTS





FUTURE WORK

- Add a camera to the webplug
- Develop system using Raspberry Pi

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