G
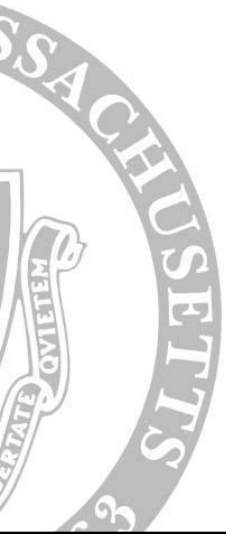
Senior Design Project: WaterMainia

April 20th, 2017
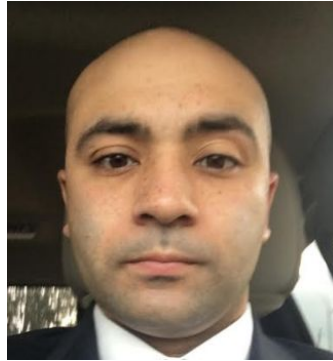
WaterMainia

Greg Boudreau	Michael Moran	Jon McAvoy	Professor Hollot

Team Manager

Advisor

What is the Problem?

Water Conservation

Water Pipe Damage

UMassAmherst

Our Solution - WaterMainia
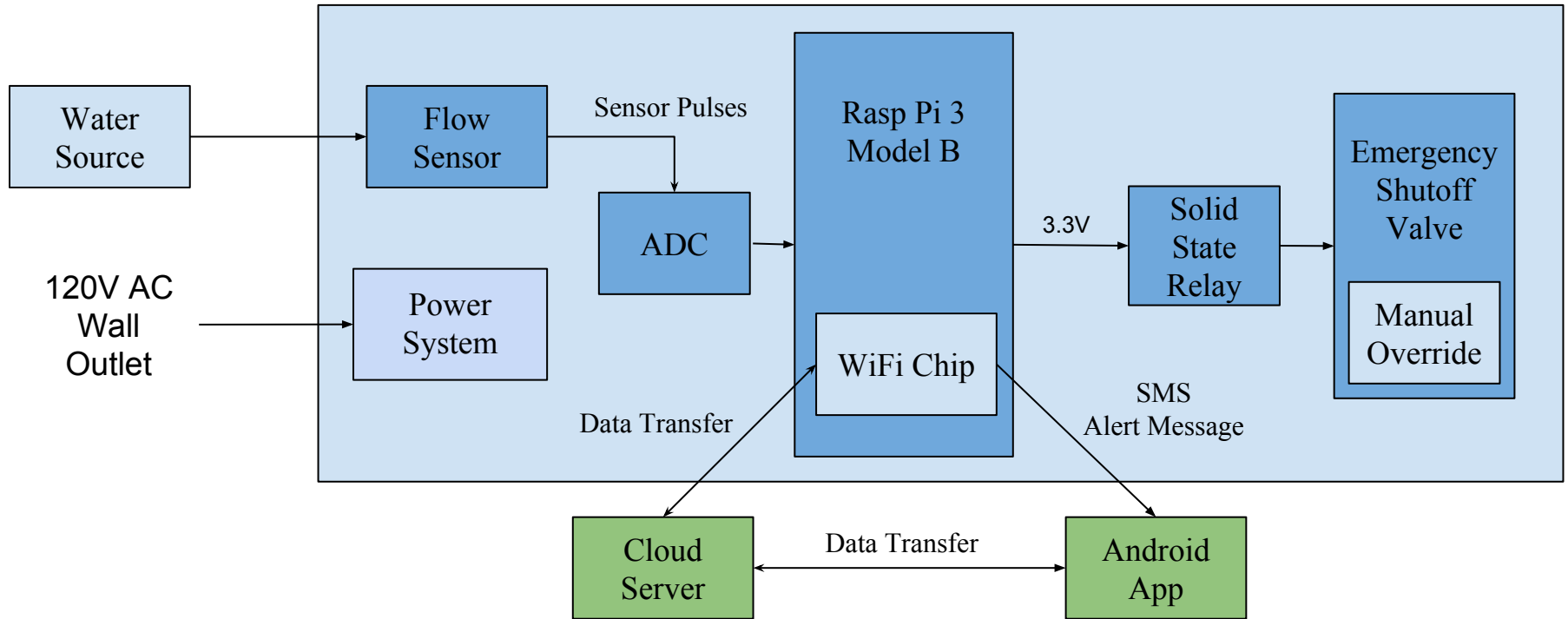
Sense

Detect

Alert

System Specifications and Deliverables

✓

1. Implemented using 3/4'' pipe
2. Water flow data is metered and recorded
3. Store data for previous two years
4. Display water consumption data in tables, line charts and scatter plots
5. Close water main & notify owner within one minute from pipe burst
6. Alerts owner of leaks and provides options
7. Power < 50W
8. Cost <$500 budget

System Structure - Block Diagram

Water Flow Detection
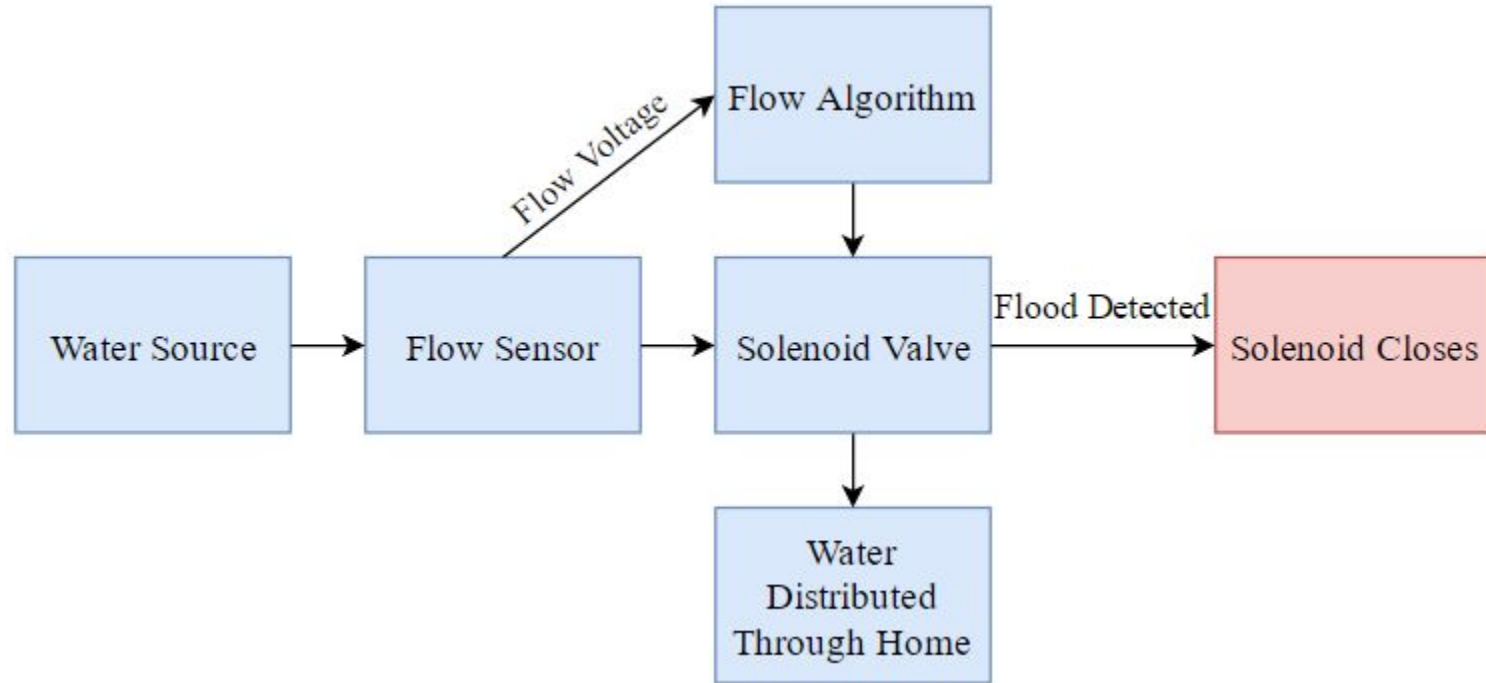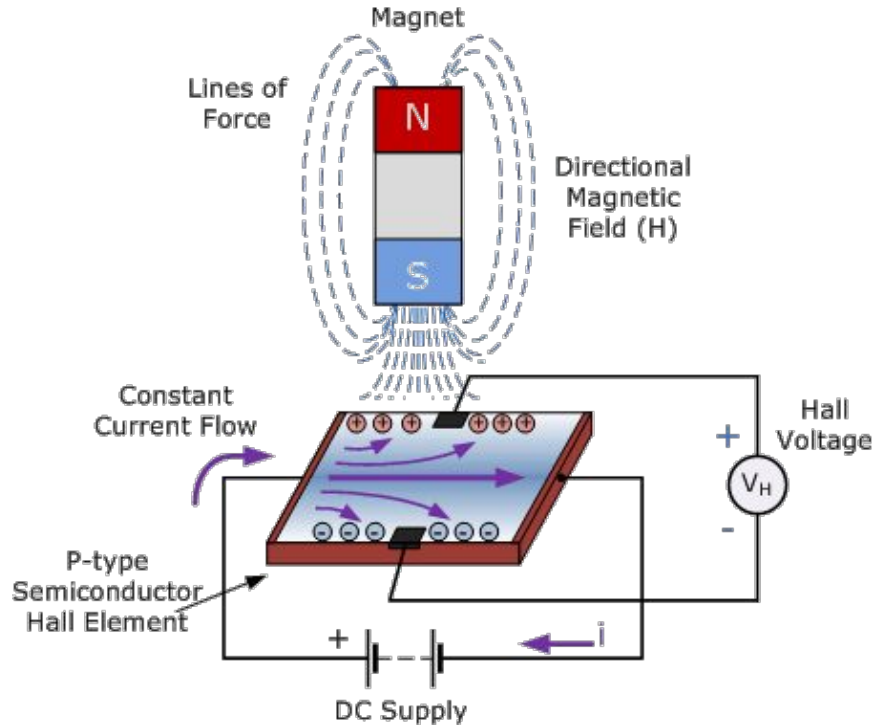
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Hall Effect Sensor

Magnet

Lines of Force

N

S

Directional Magnetic Field (H)

Constant Current Flow

Hall Voltage

+

V_H

-

P-type Semiconductor Hall Element

+

i

DC Supply

- Mechanical Flow Meter with a magnet attached to one fin of a turbine. On every revolution a square pulse is generated when the magnet passes the semiconductor mounted to the pipe.

PCB
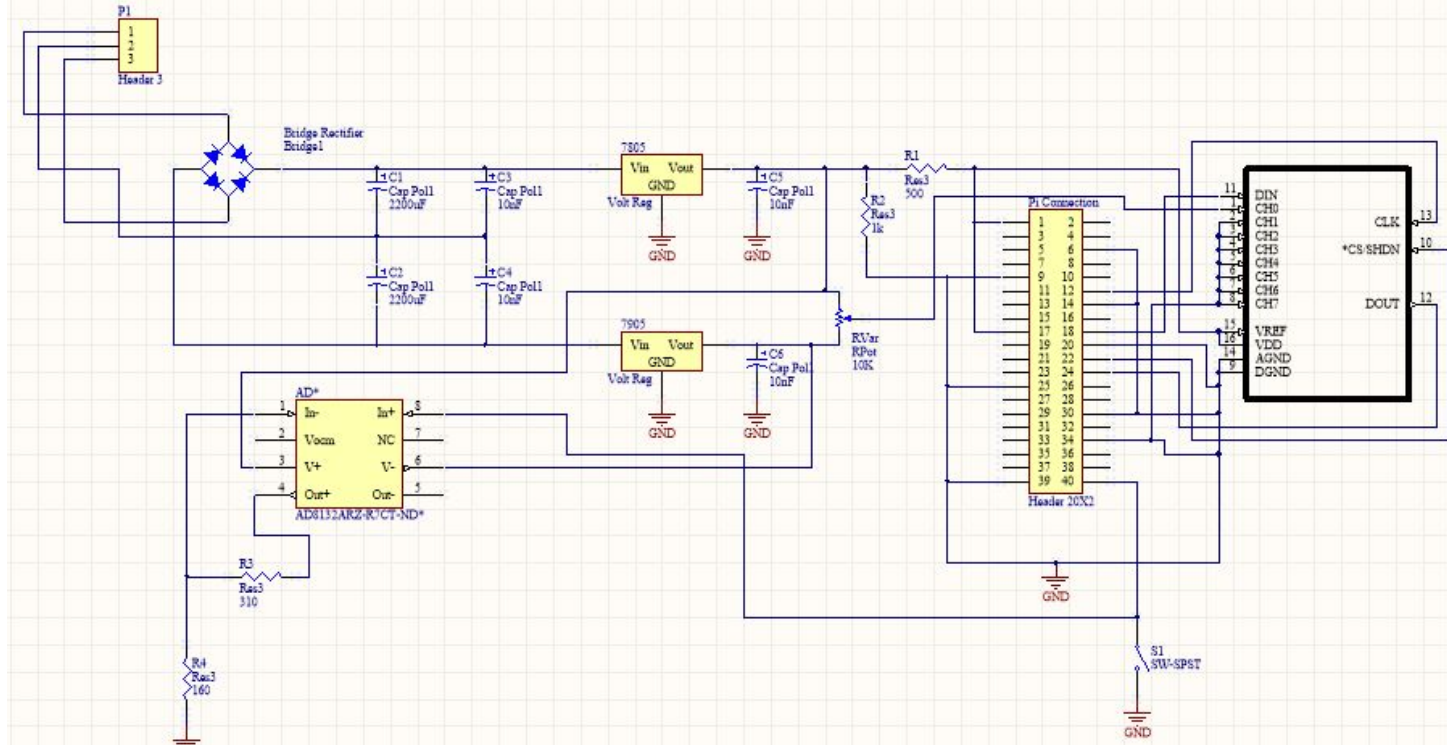
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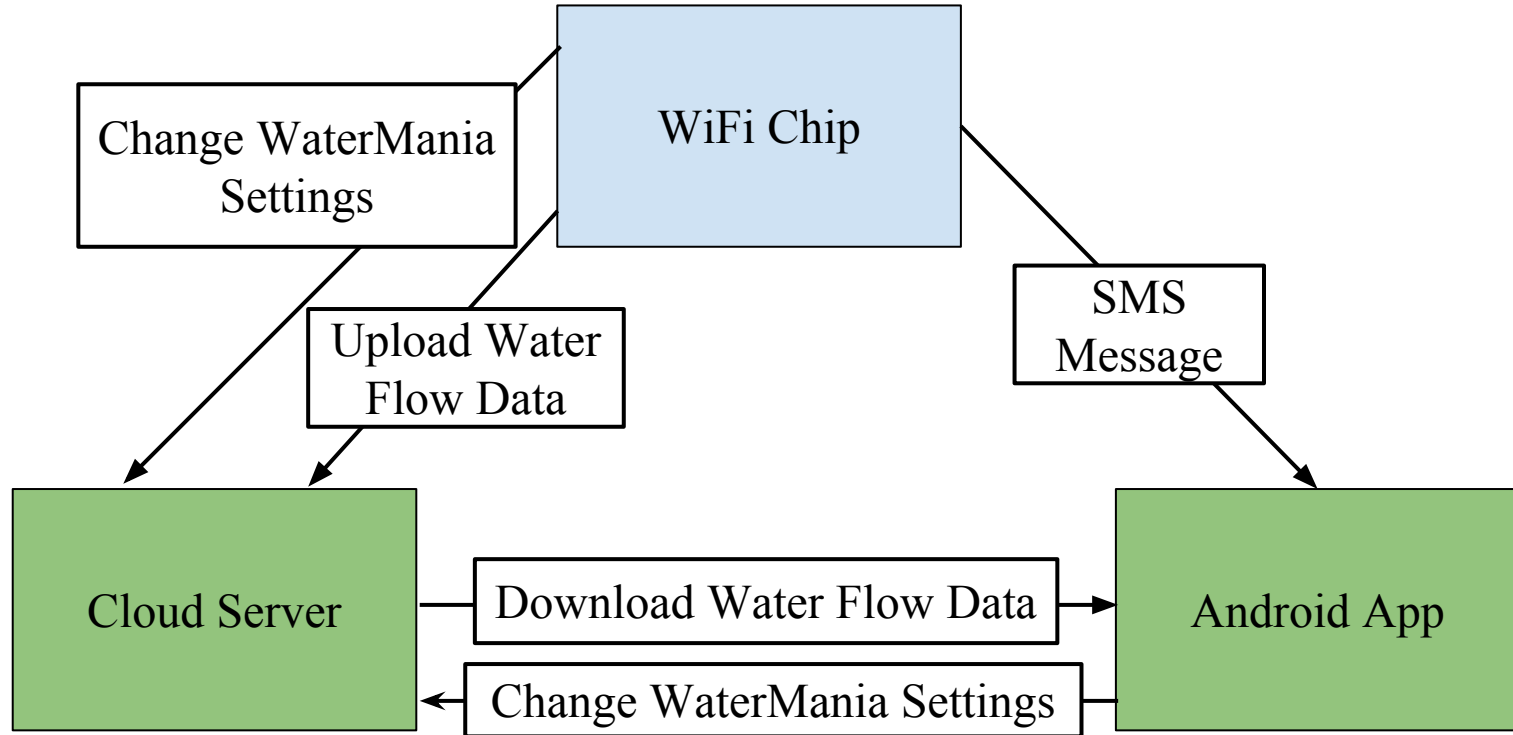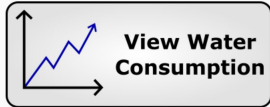✓ 7. Power < 50W
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Vacation Mode

At Home Mode
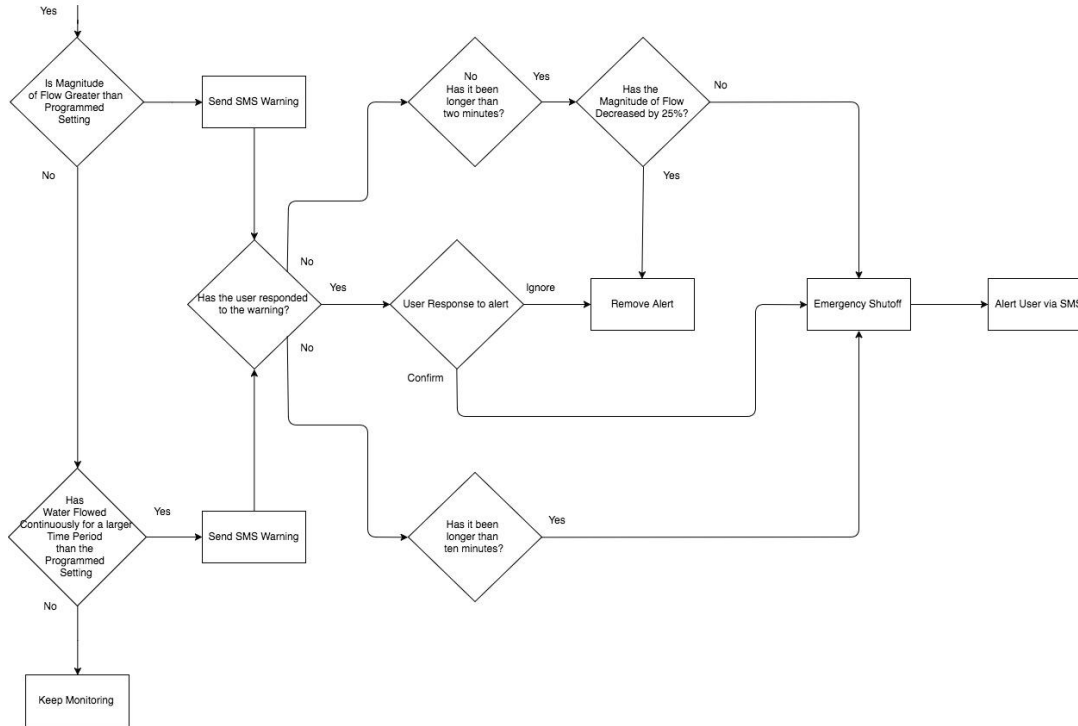
Data Transfer

Android App
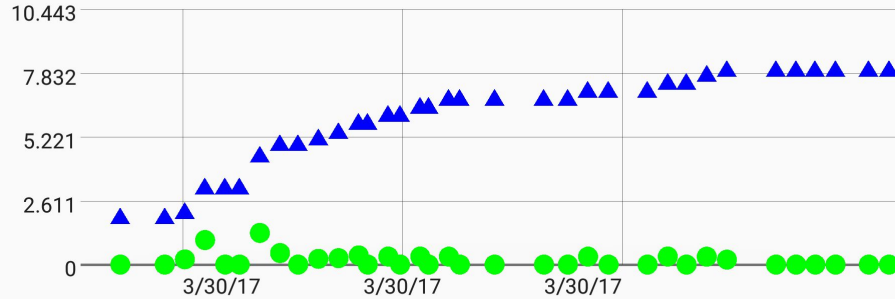
Budget

- Solid State Relay - $11.28
- MCP3008 ADC - $19.86
- Raspberry Pi 3 SBC - $41.99
- GPIO Expansion board - $9.90
- 110V AC Solenoid Valve - $26.99
- Hall effect sensor - $10.00
- Power Cord - $15.64
- Bridge Rectifier - $6.75
- 5V Voltage regulators - $6.45
- PEX pipe fittings - $28.00
- Transformer - $16.56
- Micro USB Charging Cable - $7.15
- Micro SD card - $20.99
- Server - $25.00
- Raspberry Pi 3 case - $7.75

Total: **$243.00**

Demo Costs: **$180**

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Demo

Thank you!
Any Questions?