

Overview:

- A low-cost, low energy IoT system to detect early sign of wildfire
- Deployment of sensor nodes to collect hourly humidity and temperature
- The gateway system calculates for Forest Weather Index (FWI) and uploads to the database
- All hardwares communicate to each others through radio using LoraWan

Hardware/Software list:

- RaspberryPI Zero installed with LoRa radio transceiver module and AM2302 sensor module
- Raspberry Pi 3 B+ installed with LoRa radio transceiver module acting as gateway
- Software libraries used are CircuitPython, RasbianOS and API for Adafruit.io and Weatherbit.io

Methodology:

- Sensor nodes gather humidity and temperature hourly and send to gateway
- The gateway uses data from sensors and weatherbit.io in 24-hour intervals, from yesterday noon to today noon.
- Daily at 12pm, the gateway calculates the Fine Fuel Moisture Code (FFMC), Duff Moisture Code (DMC) and Drought Code (DC)
- The FWI is calculated using the above components and uploaded to AF.io

Results:

- Temperature and humidity data are tabulated on AF.io
- FWI is charted and used to predict wildfires

Conclusion:

- We were able to set up the system to work properly in an urban settings
- Gained familiarity working with LoraWab, Raspberry hardwares and CircuitPython

Future Directions:

- Deploy system in remote rural area without geostation
- Implement a downscaling algorithm for satellite data