Weather Triggered Wireless Telemetry

Lightning Talk

Prototyping

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Project Overview

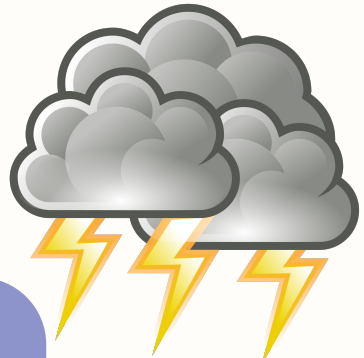
- ARA is an advanced wireless research platform covering Iowa State University, Ames, and nearby rural areas.
- Tasked with creating a system that will recognize and predict when a weather event is occurring.
- This trigger, signals data collection before a given weather event has begun and allows us to continue collecting data until the weather event has passed.
- This weather data will eventually allow researchers to determine how the performance from the ARA framework differs during different weather events.

Agronomy Farm

Wilson Hall

Problem Statement

- Want to intelligently collect a wide range of network data during a variety of weather events.
- Use forecast data to predict future weather events to gather data only when weather events we want to record are going to occur.
- Store collected data and allow for user queries to access and format selected data.



Prototype Description

Purpose:

- Understand the complexities that go into integrating multiple APIs and ARA weather instruments to correctly predict when a weather event will occur.
- Additionally, be able to trigger data collection and parsing when weather events are triggered.

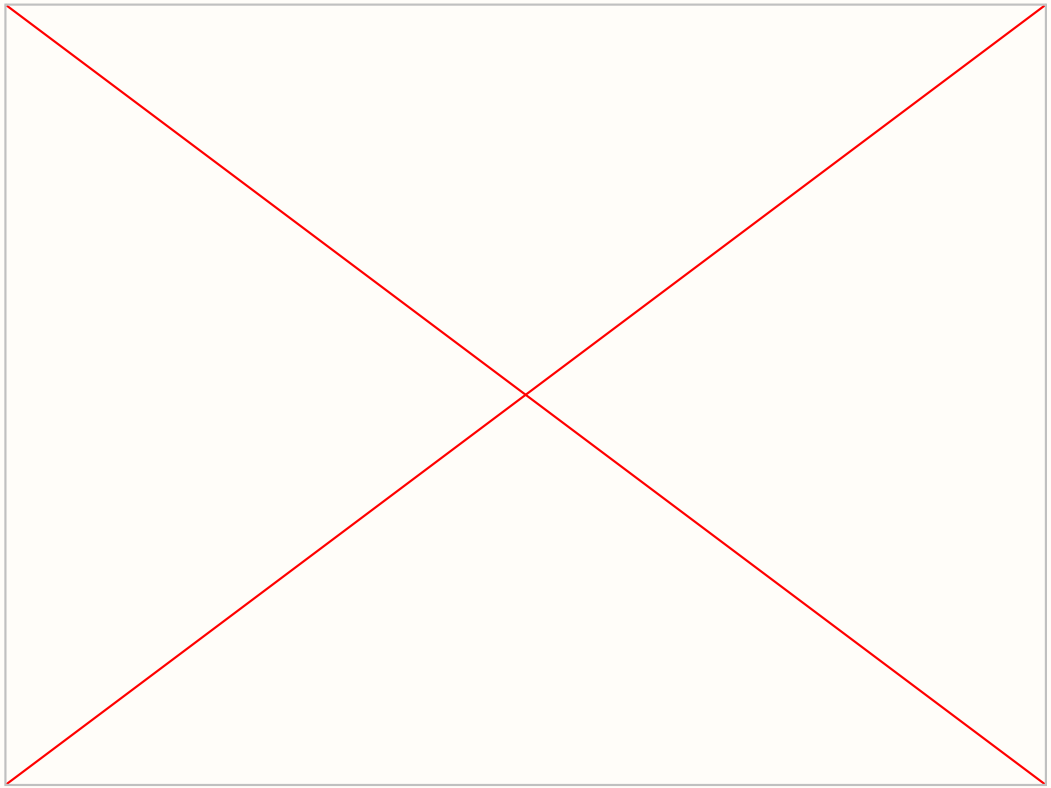
Design Story:

- Allows the teams to build the first phase in the design process
- This includes the prediction and data gathering phase

Takeaways:

- Team will analyze which APIs work best for weather predictions metrics
- How data is being parsed and being stored for weather data

Demonstrate



Reflection

Learned:

- Able store and analyze a variety of Weather APIs and their respective attributes
- Can compare and contrast each attribute to a variety of ground truths to determine accuracy
- Unable to gather forecasts at a higher frequency than 1 hour, due to both API and API key constraints

Next Step:

- Using local ARA devices, generate new ground truth to compare Weather API accuracy to ARA devices

Implications and Next Steps

- Integrating the ARA weather instruments into the prototype
- Begin taking weather event data from both the ARA instruments and the APIs
    - Allow for more accurate weather event prediction in ARA base station areas
- Learn and correct the way we are parsing data in order to allow for a smooth transition into the data processing phase of design
- Analyze if weather is being accurately predicted and begin determining data collection metrics
- Gain knowledge about wireless signal data metrics that shall also be collected from the ARA base stations

Conclusion

We have identified:

- Prototype
  - Purpose
  - Takeaways
  - Fit in overall design
- Prototype demonstration
- Reflections
- Next steps