Outage Prediction

Predicting outage risk to assist resident preparation

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November 28, 2017

Project Recap

- Business Problem: Extreme weather events result in economic, social, and physical disruptions and inconvenience and loss of critical lifeline systems for residents living in disaster areas

- Project Objective: Use weather and power datasets to predict outages and their potential magnitude to inform residents and assist in preparation

Final Steel Thread Data Flow

Learning Data

xlsx → csv → RDD

csv → RDD

1) query for past outages due to severe weather

2) label historical weather data

3) teach power outage classifier

Prediction Data

json → raw data → RDD

4) predict outages based on current forecast

5) surface predictions in viz layer

Questions/Challenges

- outage data could be messy
  - openrefine
- pyspark dataframes
  - python objects vs RDDs
    - difficulty with transformations on RDDs
- imprecise location of power outages
  - how to determine which weather station(s) to use
- streaming forecast data

Progress on Steel Thread

CSV

CSV

run_steel_thread.py

- Create RDDs from csv files and filter out outage data for Rhode Island
- Create table dataframe with defined schema
- Query with Spark SQL:

Additional pieces:

Steel_thread.py:

- Logistic regression predictor

Forecast_data.py:

- Loads the forecast for the upcoming 3 days from weather underground api for Providence, RI

DT	maxTemp	minTemp	aveTemp	aveHumidity	WeatherCodes	Precip	Snowfall	SnowDepth	aveStationPressure	aveSeaLevelPressure	aveWindSpeed	maxWindSpeed	SustainedWindSpeed	OutageIND
2016-02-01	66	41	54			T	0.0	0	29.71		10.8	29	21	0
2016-02-02	51	29	40			0.00	0.0	0	30.16		4.6	20	16	0
2016-02-03	58	29	44		RA:16 BR:13	0.94	0.0	0	30.13		10.9	36	29	0
2016-02-04	57	42	50		RA:16 DZ:14 BR:13	0.19	0.0	0	29.89		7.7	23	17	0
2016-02-05	42	26	34		RA:16 SN:18 PL:04...	1.02	5.1	0	29.96		12.5	34	25	1
2016-02-06	35	16	26			0.00	0.0	5	30.25		6.7	19	16	0
2016-02-07	44	26	35			0.00	0.0	2	30.09		5.5	20	15	0
2016-02-08	37	20	28		SN:18 FZFG:22 BR:...	0.58	5.6	2	29.73		20.9	47	36	0