Capstone 1 Proposal

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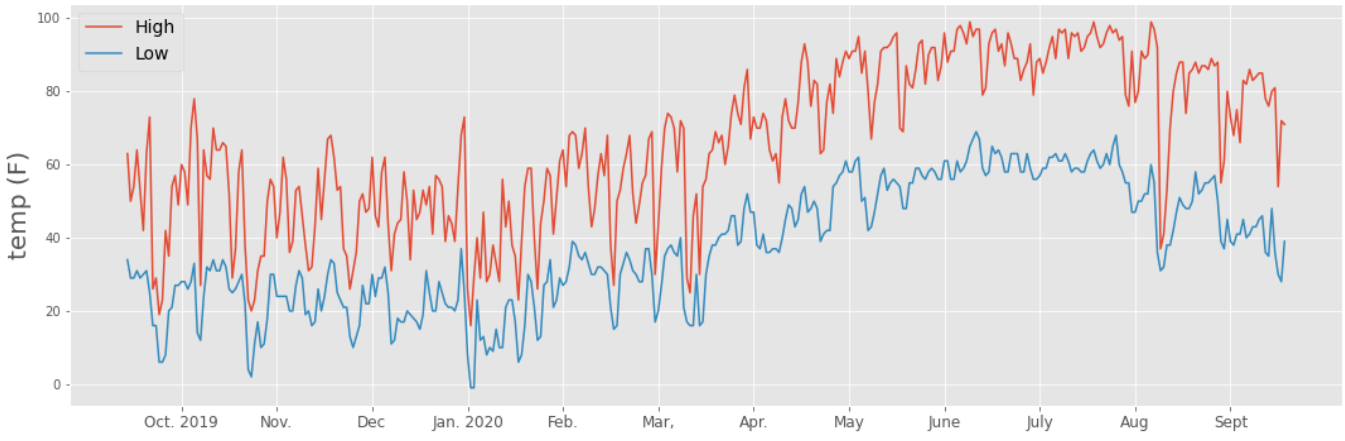
Seasonal weather trends in Denver since 1948

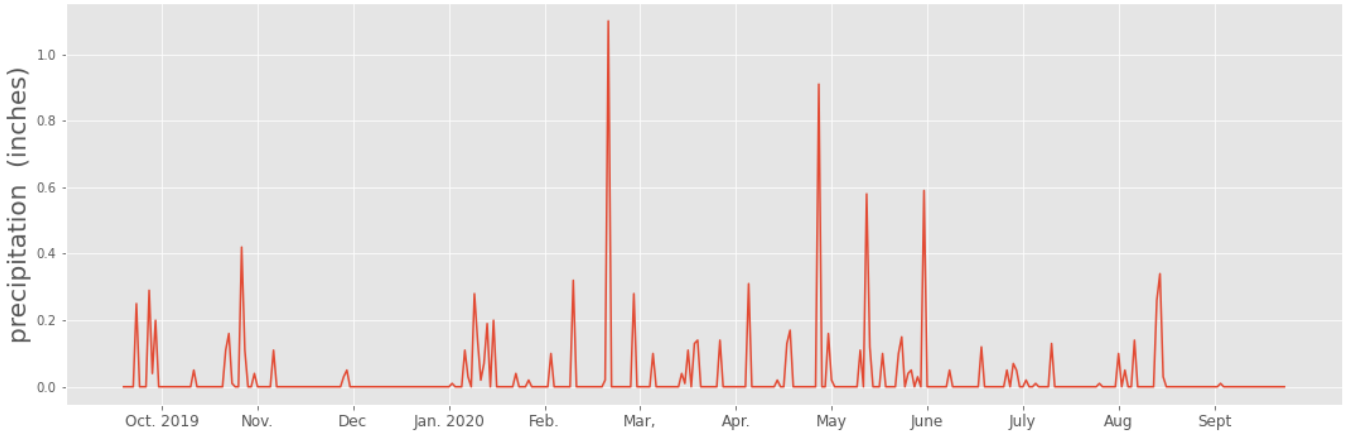
Many of the global trends of climate change are well known and there is a remarkable volume of data and analysis on this subject, however the trends from region to region are disparate. I've never lived in a single region long enough to notice significant changes though in Denver in particular I've met many locals confident that the weather patterns have changed substantially in this city in 30 years. This has made me curious what the significant effects of climate change are in our city and which trends I can confidently project into the coming decade.

In this exploratory study I would investigate long term weather trends within the city from temperature statistics to frequency of particular weather events using data from the 'Global Historical Climatology Network' (GHCN). I hypothesize that decade by decade weather trends have changed across the span of this dataset with the null hypothesis being that these statistcs have not changed.

The Dataset

In Denver County the GHCN provides longitudinal data collected across 109 stations over the past 80 years. Of all these the most complete set is from the Stapleton location with continuous daily recordings collected from 1948 to the present day including measures of precipitation, snowfall, snow depth, temp. statistics, and weather events among others. Below are examples of daily measures for the past year.





Modelling

This will be a fairly complex data set for statistical modelling as the statistical parameters change seasonally, and also year by year if the null hypothesis can be rejected. To simplify I may need to evaluate data in windows (monthly?), or learn how to apply more complex (non-stationary) models. For this reason I think it will be an interesting and challenging data set. If I have time I would like to investigate public satellite imaging data sets for regional land use metrics, together such datasets could be predictive of wildfire risk. Ultimately imaging & signals is a major interest of mine.