Avalanche Risk Prediction Model for Salt Lake County - Justin Olcott [9/10]

Description

Skiing is extremely popular in Utah and is home to many backcountry skiers and travelers. Predicting avalanche risk can be very beneficial to backcountry enthusiasts and help travelers plan accordingly. Currently, the Utah Avalanche Center releases their report early day-of, but we could use the weather forecast and predict the avalanche risk, so backcountry travelers can plan trips more accurately in advance. There is a lot of data available around this topic including enormous amounts of weather data, avalanche forecast reports, and avalanche sightings.

Features

The features that are most relevant revolve around the weather and actual avalanches, so an example data instance might look like:

Input						**Output**
date	temperature	snow depth	recent snowfall	snow density	recent avalanche danger	avalanche danger
2/22/2023	20	220	22	.15	moderate (3)	moderate (3)

This is just an example of what a dataset instance might look like. We include the same data for multiple locations, so instead of using just Alta's weather, we could get the weather from all the ski resorts in the Wasatch Front. We could also include a larger window of historical data like the weather from the past week, summary data for the past month, and summary data for the whole season. There are a lot of potential input features that could be looked into, but there are also different output features. The simplest output feature is the avalanche danger as a rating, but we could also output a number of expected avalanche sightings (since reported avalanches is an available statistic) or we could output an avalanche danger rose (a tool indicating avalanche danger for different elevations and directions). Lastly, we could output what type of avalanche danger there is such as wind slabs or other avalanche phenomenon. All of this type of data is available in some fashion on the Utah Avalanche Center website.

The ideal model would be one that could take all available information and predict avalanche danger for a few days out. This would mean training it on data that would be available a few days before the target date such as weather forecast and current conditions. This model would prove useful to backcountry travelers and the Utah Avalanche Center. We could also create a model that predicts day-of avalanche danger which would help serve as tool before any in-person observations or reports are made.

Data Gathering

The data for this project is all available on the internet, but it would be in different places and some basic scraping and cleaning would be necessary. Historical weather and snow data can be found in a variety of places like https://www.ncei.noaa.gov/. This data is extremely clean and will be easy to obtain and use. Avalanche data can be found through https://utahavalanchecenter.org/archives/forecasts/salt-lake, but it will

require significant data wrangling. The idea would be to scrape each of the reports for a date and the avalanche danger at the very least. More data from each report can be scraped like the different avalanche problems. If we wanted to use actual avalanche reports, we can obtain the data from https://utahavalanchecenter.org/avalanches which could give us the frequency of avalanches, cause of avalanche, and size of avalanche.