Ski Resort Impacted by Climate Change

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Brief Description

Skiing is a famous sports activity loved by people around the world and has become one of the main economic activities for many mountain regions. However, due to human activity, climate change has become a challenge to ski tourism. The increasing melting of snow and ice could eventually destroy ski tourism. In this project, we want to find out how much ski tourism has been affected by climate change and visualize the result.

Past Work

There is a lot of research conducted on this topic. Some predictions show that under best circumstances, in the US by 2050, snow depth will be 26% less, ski season length will be 4%-7% less and artificial snowmaking will increase by 15% *[1]*. There is also research showing that the need for snowmaking in ski resorts is indeed sharply increasing recently *[2]*. However, snowmaking has a high cost and consumes a lot of water and energy, which may make global warming worse. On the other hand, there is also an opposite view that climate change did not affect American ski resorts in the past 20 years *[3]*.

For those researches, they only show the overall data across the country but sometimes it is not sufficient to analyze some specific locations. In this project, we aim to extend above research and visualize whether and how much climate change affects individual ski resorts across the country. Hopefully, we can also get

some conclusions on which kind of ski resorts are mostly affected by climate change with respect to variables like altitude or latitude.

Proposed Work

We will firstly consider the impact of climate change on the **ski ticket price**. Climate change will increase the operating cost of some ski resorts and hence increase the ski ticket price. Therefore, we would like to analyze and visualize the relationship between the ski ticket price and the climate after removing the influence of inflation. Since there isn't a comprehensive historic ski ticket price, we will search the price each year in the past 20 years and generate an integrated dataset. *[4]*

In addition, we consider that **snow depth, snowfall, and season length** of different ski resorts can also be valid data for quantitative analysis and visualization. These three data are related to the direct economic benefits of the ski area, and they may change annually due to the factor of climate change according to the geographical location of different ski resorts. For instance, in our hypothesis, as the latitude of the snow park decreases, with the intensification of global warming, the depth of snow that needs to be attained and the volume of snowfall will increase, while the length of the snow season will be reduced correspondingly, hence the financial benefits may decrease significantly. *[5]*

Finally, we also consider the influence of climate change to the customers of ski resort in lower elevation, since some research indicated that some lower elevation regions (such as Rocky Mountains and Sierras) are losing skiing and snowmobiling and almost completely by 2090, although snowmaking reliefs the warm climate in these regions. *[1].* However, the direct data of customers or revenue of ski resort are hard to get, so the "**Open Trails**" percentage will be an alternative metrics, which infers the number of customers, to analyze the performance change and trend of ski resort in lower elevation over year, and predict the activates of these ski resort in future.

Related Resource

Besides the literature and dataset (especially the ski resort dataset [5]) mentioned above and listed in the reference, we will also need to access a lot of US climate data, which can be found in US climate normals, a large dataset collected by national centers for environmental information.

Reference

[1] M. Gilaberte-Búrdalo and F. López-Martín and M.R. Pino-Otín and J.I. López-Moreno of Impacts of climate change on ski industry in 2014 from https://www.sciencedirect.com/science/article/pii/S1462901114001269?via%3Dihub

[2] Robert Steiger, Marius Mayer of Snowmaking and Climate Change on 1 August 2008 from

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[3] "Has climate change affected the American ski resorts?" from Ski-Resort-Stats.com on Novenbor 10, 2018 https://ski-resort-stats.com/articles/has-climate-change-affected-the-american-ski-resorts/

[4] US Ski Price Index: 2021-2022 https://www.holidu.com/magazine/ski-price-index-2021-2022

[5] Beaubellamy. (n.d.). Skiresort-analysis/skiresort.csv at master · Beaubellamy/Skiresort-analysis. GitHub. Retrieved February 26, 2023, from https://github.com/beaubellamy/SkiResort-Analysis/blob/master/skiResort.csv