**Guided Capstone Project Report**

Big Mountain Resort with spectacular views of Glacier National Park wants to maintain the premium market it has carved for itself, with ticket prices to correctly reflect the quality of facilities plus further investments to support the niche business strategy of maintaining premium rates over the market.

We began by digging into Ski Resort data for 330 resorts with 27 columns shared by the database manager. We began with the cleaning and transformation stage, during which we also added state-specific statistical data using Wikipedia. We handled columns with missing values while shaping the data in a more user-friendly format for the next stages.

After data cleaning, we began the exploration stage. We began by exploring prices as dependent on the state. However, clustering and looking at patterns for correlation ruled out state as a driving factor but this is also where certain factors began to stand out as candidates to have a bigger say in ticket prices.

During this stage tools like scaling to balance the impact of different columns and the size of numbers, along with Principal Component Analysis to combine all the factors to create two components for visualization and pattern recognition were used.

After all the clean data, we still had work to do before we could predict ticket prices. From taking the average value as a predictor to running two models as pipelines being optimized by cross validations i.e., splitting available data for building and testing the model randomly 5 times. We ended up with Random Forest as the best prediction model, working best with median as fill values and 69 decision trees.

The winning model predicts the ticket prices with an error of about +/- 10 dollars and notes 4 facilities with higher importance compared to the rest.

A graph with blue and white bars

Description automatically generated

The selected model was used to recommend a price of $ 95.87 with a predicted range of [$85.48 - $106.56], a significant increase from the current price of $ 81.

Scenario 2 and Scenario 3 support a healthy return on investment with an $8.61 and $9.90 increase in ticket prices respectively. The increase in revenue needs to be balanced against the costs to make the final decision.

At the end of the project, we have a tool to gauge our ticket prices relative to the market.

This tool can be used to make adjustments to ticket prices for optimized revenue or even select the right investment scenario by projecting updated ticket prices/ revenue.