Guided Capstone Project Report

Objective:

- To provide a data-driven recommendation for adjusting ticket prices and optimizing revenue generation at Big Mountain Resort, aligning with the strategic goal of implementing a dynamic pricing strategy within the next quarter.

Context:

- Big Mountain Resort in Montana aims to optimize revenue, maximize profitability, and effectively utilize its facilities. The goal is to select an optimal ticket price, identify cost-saving opportunities, and enhance facility utilization.

Criteria for Success:

- Implementing a dynamic pricing strategy that adjusts based on demand, competitor pricing, and customer segmentation.
- Achieving revenue growth and increased profitability.
- Enhancing facility utilization and minimizing costs.

Scope of Solution Space:

- Develop a data-driven pricing strategy.
- Optimize facility utilization.
- Minimize costs to maximize revenue and improve profitability.

Constraints:

- Potential underutilization of facilities, limiting revenue and profitability.

Stakeholders:

- Jimmy Blackburn, Director of Operations
- Alesha Eisen, Database Manager

Key Data Sources:

- A CSV file provided by the database manager.

Data Overview:

The dataset included 27 columns and 330 rows, featuring information on various ski resorts, including Big Mountain Resort. After cleaning, 277 rows were suitable for modeling.

Data Features:

- **Numerical:** Summit elevation, vertical drop, base elevation, trams, fast sixes, fast quads, quads, triples, doubles, surface lifts, total chairs, runs, terrain parks, longest run (miles), skiable terrain (acres), snow-making area (acres), days open last year, years open, average snowfall, adult weekend ticket price, projected days open, night skiing area (acres).

- **Categorical:** Name, region, state.

Exploratory Data Analysis:

Significant correlations were found between ticket prices and features like the number of fast quads, total runs, snow-making area, and vertical drop. No correlation was found between state and ticket price.

Model Development:

- Linear Regression Model: Used for imputing missing values, scaling, feature selection, and fitting. Key features included vertical drop, snow-making area, total chairs, fast quads, runs, longest run, trams, and skiable terrain.
- Random Forest Regressor: Yielded an average R-squared score of approximately 0.71 and a consistent mean absolute error (MAE) of 9.54 across 5-fold cross-validation and test data.

Model Selection:
The Random Forest Regressor was chosen for its superior performance and consistency in predictions.

Current Ticket Price:
$81.00 for an adult weekend ticket.

Recommended Ticket Price:
$94.25, supported by Big Mountain Resort's facilities.

Recommendation to Business Leadership:
- Gradual Price Adjustment: Implement the new price incrementally.
- Facility Enhancements: Invest in improvements like new chair lifts and expanded snow-making capabilities.
- Dynamic Pricing Strategy: Adjust prices based on real-time demand, competitor pricing, and customer segmentation.
- Marketing Strategy: Communicate the value of enhanced services and facilities to customers.

Considerations:
- Operational Costs: Incorporate detailed operational costs in future analyses.
- Customer Feedback: Gather feedback post-implementation to assess satisfaction and willingness to pay the new prices.