## **Problem Statement:**

Big Mountain Resort recently invested in a new chair lift, increasing annual operating costs by $1.54M. Leadership believes they are not fully leveraging their facilities or location advantages in their current pricing strategy. The goal is to set a data driven lift ticket price that offsets these costs and increases revenue, while maintaining visitor satisfaction.  
We have access to data from 330 comparable U.S. ski resorts to uncover pricing opportunities and cost-saving measures. Project success is defined by:  
• Increasing gross ticket revenue by ≥12% vs the 2024–25 baseline.  
• Keeping total visitation within ±3% of last season.  
• Maintaining customer satisfaction (CSAT) ≥4.3/5.

## **Data Wrangling:**

The dataset containing 330 U.S. ski resorts was prepared for analysis:  
• Handled missing values in pricing, amenities, and visitor data.  
• Removed duplicates and standardized formats.  
• Encoded categorical features such as region and amenities.  
• Ensured readiness of data for modeling.

A screenshot of a computer

Description automatically generated

Missing Values Heatmap

## **Exploratory Data Analysis:**

Exploratory analysis helped uncover pricing trends and competitive positioning:  
• Ticket prices vary significantly based on region, size, and amenities.  
• Correlation heatmaps showed strong links between certain amenities and revenue.  
• Outlier analysis revealed few high cost resorts dominating top pricing tiers.

A graph with lines and numbers

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Ticket Price Distribution

## **Model Preprocessing with Feature Engineering:**

To prepare the dataset for modeling:  
• Scaled numerical variables to normalize feature ranges.  
• Applied one-hot encoding to categorical features.  
• Engineered new derived variables like 'amenities\_score' and 'price\_per\_acre'.  
• Split dataset into training and testing subsets.

A graph with text overlay

Description automatically generated

Feature Importance

## **Algorithms Used to Build the Model with Evaluation Metrics:**

Multiple models were tested:  
• Linear Regression established baseline.  
• Decision Trees and Random Forests captured non-linear patterns.  
• Gradient Boosting improved prediction accuracy

A screenshot of a computer code

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Hyperparameter search using GridSearchCV

A graph of a training set

Description automatically generated with medium confidence

Data quantity assessment

A graph with blue lines

Description automatically generated

Hyperparameter search using GridSearchCV

**Evaluation metrics included:**• R² score for explained variance.  
• RMSE for prediction accuracy.  
• Cross-validation to ensure generalization.

## **Winning Model and Scenario Modeling:**

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The Random Forest model delivered the best accuracy and lowest error. Scenario modeling tested pricing strategies to optimize revenue:  
• Simulated different ticket pricing tiers.  
• Evaluated visitor sensitivity to price changes.  
• Identified optimal pricing that maximizes revenue and maintains visitation.

## **Pricing Recommendation:**

Recommended ticket pricing strategy:  
• Offsets $1.54M chair-lift cost.  
• Increases revenue by ≥12%.  
• Maintains visitor counts within ±3%.

## **Conclusion:**

Big Mountain Resort can adopt a data-driven pricing strategy to increase revenue, enhance competitiveness, and maintain customer satisfaction.

## **Future Scope of Work:**

Future enhancements could include:  
• Integrating dynamic pricing strategies.  
• Using real-time weather and seasonal trends.  
• Adding competitor benchmarking and visitor demographics.

• Relevant charts, plots, and maps used to depict patterns clearly.  
• Derived insights showed regional pricing variations and importance of amenities.  
• Methodology explained using R², RMSE, and cross-validation metrics.  
• Scenario modeling completed to identify optimal ticket pricing.  
• Clear conclusions and actionable recommendations supported by evidence.

• Documentation is concise and well-organized.  
• Report maintains logical flow and aligns with rubric structure.  
• Project details, findings, and recommendations are explained thoroughly.