Big Mountain Resort: A Data-Driven Path to Revenue Optimization

Introduction

Big Mountain Resort is poised to revolutionize its pricing strategy by leveraging data analytics to better reflect the value of its exceptional facilities and maximize revenue. The resort aims to achieve a 10% increase in revenue by the end of the current ski season and offset the operating costs of a newly installed chair lift within the next six months. This ambitious goal will be achieved by identifying key factors influencing ticket prices and making informed adjustments, all while ensuring an exceptional visitor experience.

Current Challenge

At present, Big Mountain Resort charges $81.00 per ticket. However, our data-driven model suggests that a ticket price of $95.87 could be supported, given the resort's amenities. This discrepancy highlights a significant opportunity for revenue enhancement. The recent addition of a new chair lift has increased the resort's operating costs by $1,540,000 this season, making it imperative to adopt a more sophisticated pricing strategy to ensure sustainable growth.

Criteria for Success

1. Achieve a 10% increase in total revenue by the end of the current ski season.
2. Fully offset the additional operating costs of $1,540,000 for the new chair lift within six months.
3. Develop and implement a dynamic pricing model that reflects the value of the resort's facilities and adjusts based on demand, usage, and market conditions.
4. Maintain or improve customer satisfaction levels, ensuring the new pricing strategy does not negatively impact the visitor experience.
5. Increase utilization rates of key facilities, particularly the new chair lift, to ensure effective distribution of visitors across the mountain.

Data Analysis and Modeling

Our data wrangling process began with a comprehensive dataset of 330 rows and 27 columns, encompassing various ski resorts, including Big Mountain. After addressing significant missing data issues and ensuring data integrity, we proceeded with exploratory data analysis (EDA). This analysis revealed key features influencing ticket prices, such as vertical drop, snowmaking area, total chairs, fast quads, runs, longest run, trams, and skiable terrain.

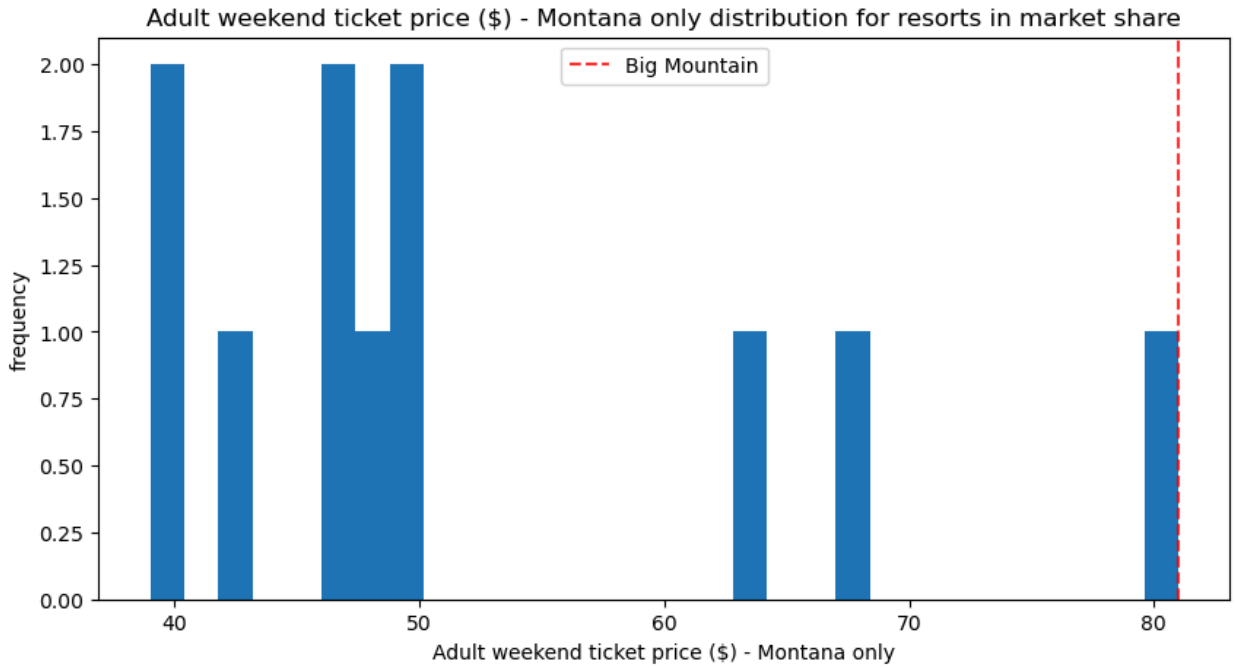
Model Selection

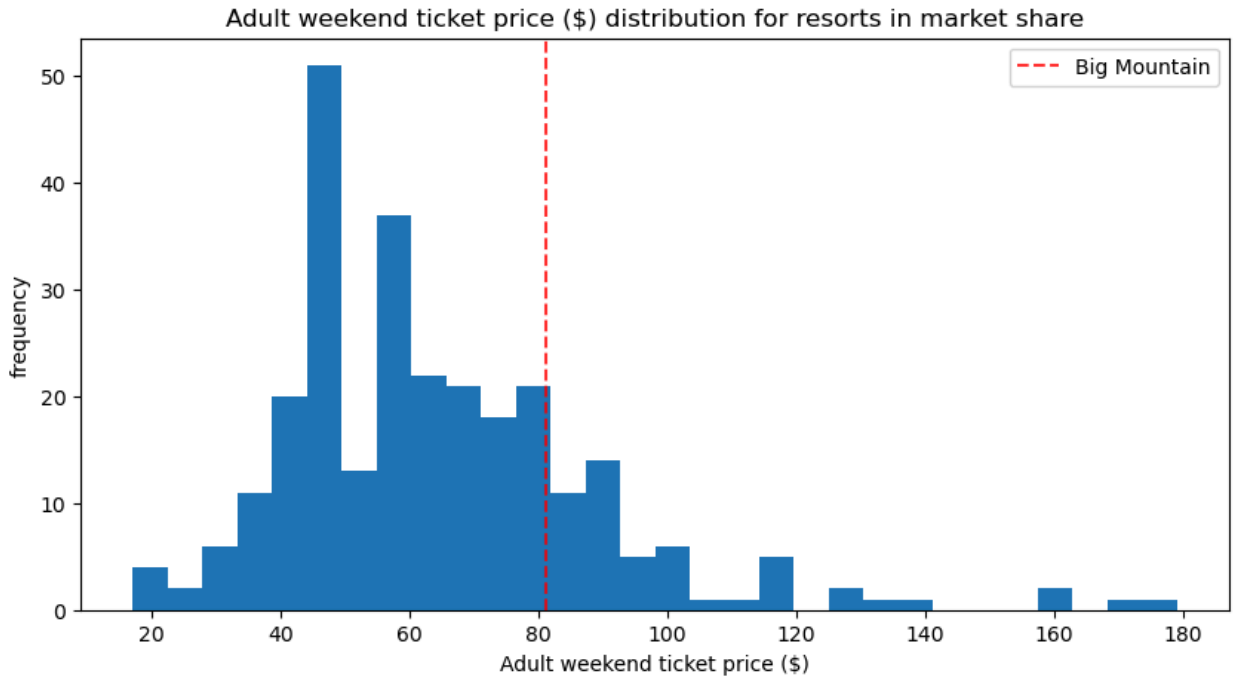
We initially built a linear regression model, identifying key features such as vertical drop, snow-making area, skiable terrain, fast quads, and runs. While the linear model showed consistency, it had limitations. We then developed a random forest regressor, which achieved a lower mean absolute error and exhibited less variability. The random forest model's superior accuracy and consistency made it our preferred choice for guiding ski resort ticket pricing decisions.

Recommendations

Current Pricing and Potential

Big Mountain Resort currently charges $81.00 per ticket, while our model suggests a price of $95.87 could be supported given the resort's facilities. This indicates potential for a price increase, even accounting for a mean absolute error of $10.39. Amongst all resorts and within Montana, Big Mountain is well-positioned, particularly in terms of snowmaking area and the number of chairs and fast quads.

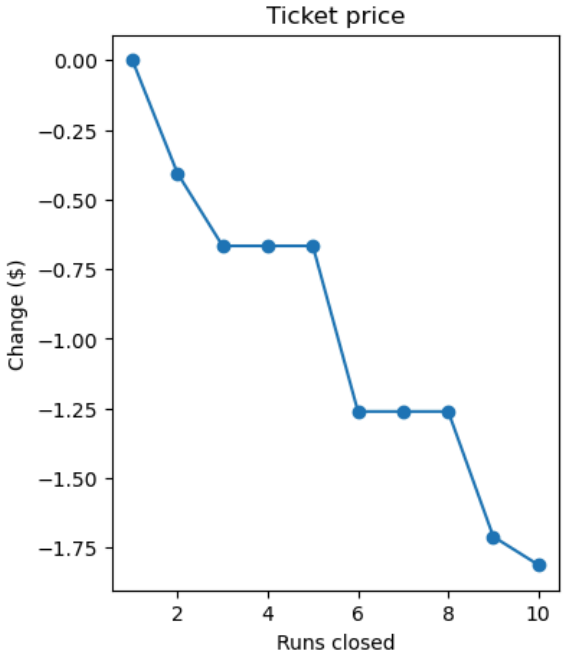


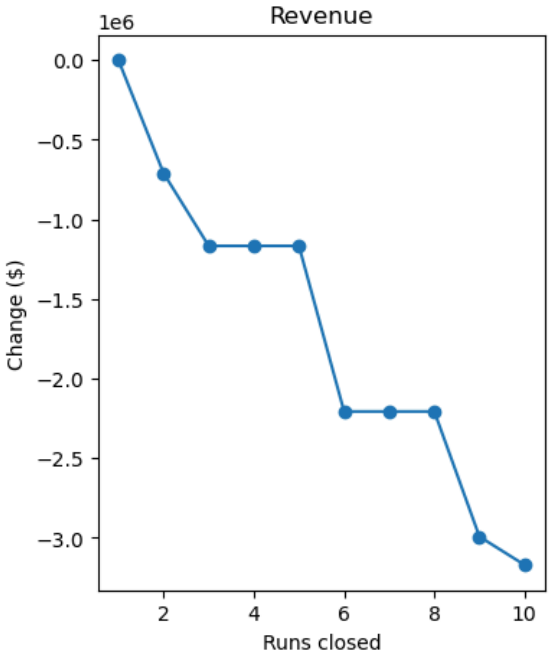


Scenario Analysis

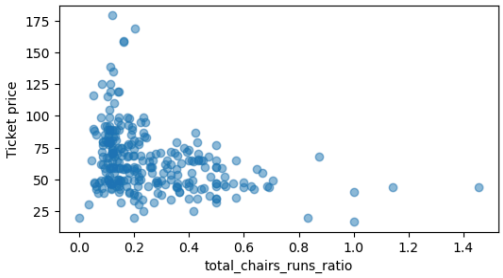
The resort has reviewed several scenarios for cost-cutting or revenue increase:

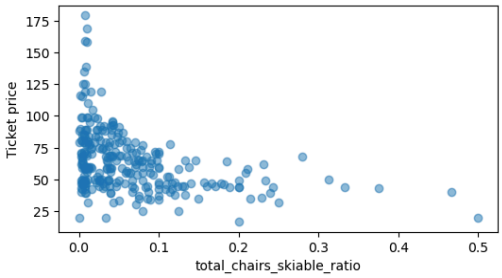
1. **Permanently closing up to 10 least-used runs:** Closing one run makes no difference. Closing 2 and 3 successively reduces support for ticket price and so revenue. If Big Mountain closes down 3 runs, it seems they may as well close down 4 or 5 as there's no further loss in ticket price. Increasing the closures down to 6 or more leads to a large drop.

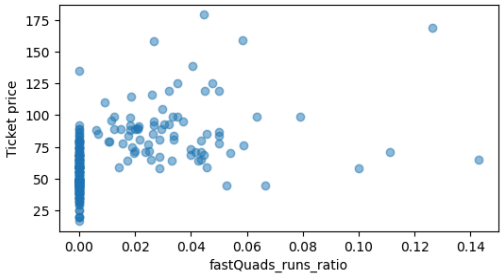


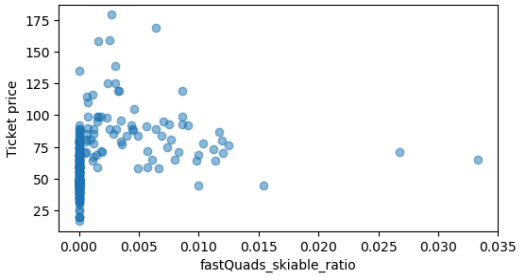


2. **Increasing vertical drop with a new run and an additional chair lift:** This scenario suggests an increase of $1.99 per ticket, potentially generating an additional $3,474,638 over the season.

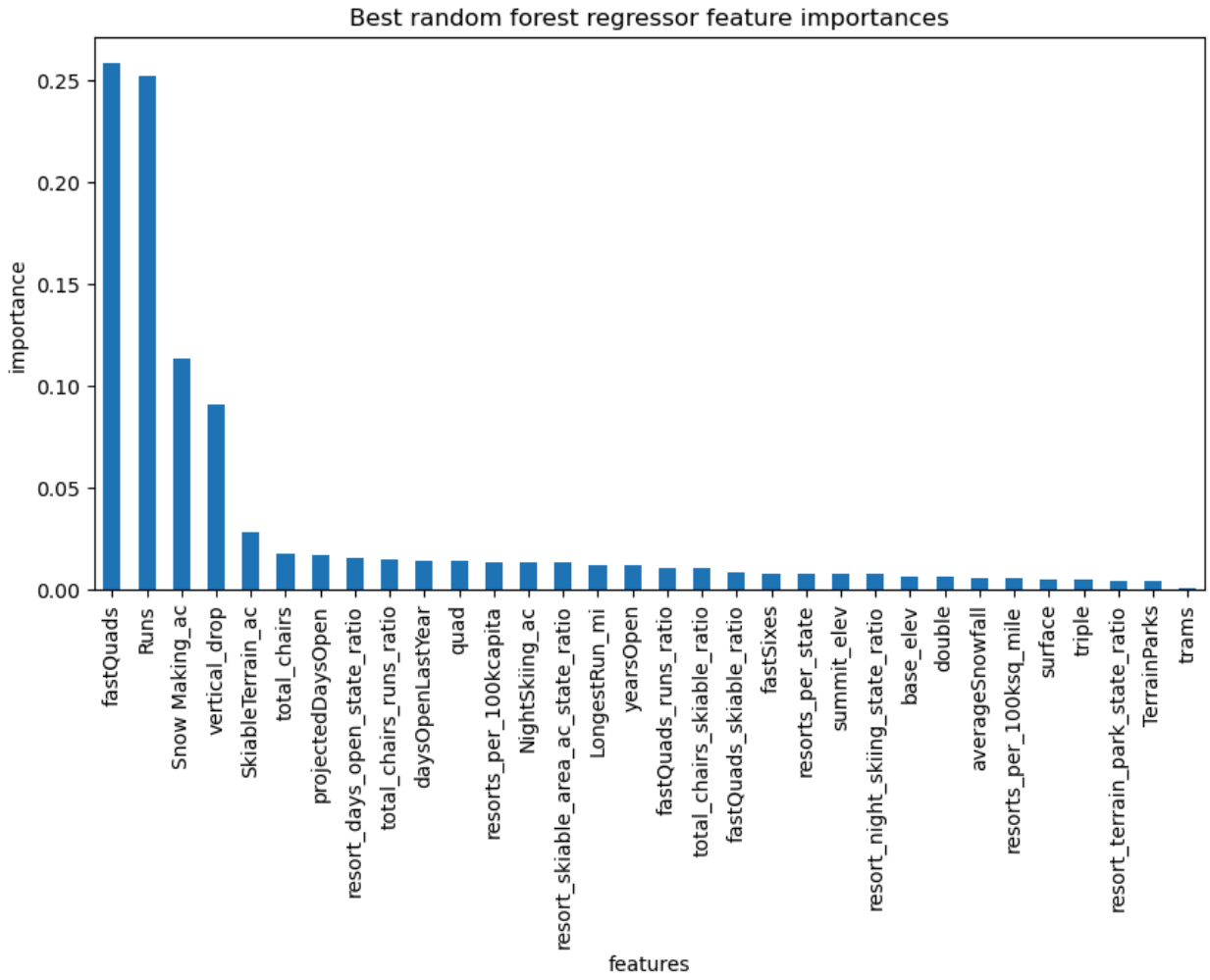








3. **Adding 2 acres of snowmaking to the scenario above:** Such a small increase in the snowmaking area makes no difference!
4. **Extending the longest run by 0.2 miles with 4 additional acres of snowmaking:** No price change, indicating this feature's lesser importance in our final model.



Conclusion

This summary highlights the journey from a simple baseline model to a more sophisticated random forest model, emphasizing the significant features and the rationale behind the final model selection. This model will aid in making informed business decisions, ensuring better pricing strategies for maximizing revenue while meeting customer expectations.

For future improvements, the second scenario (increasing vertical drop and adding a chair lift) is recommended. Testing run closures should be approached cautiously, considering the diminishing returns and potential revenue drops indicated by the model.