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Pricing Strategy for Big Mountain Resort: A Data-Driven Recommendation

  Big Mountain Resort currently charges **$81** for an adult weekend lift ticket, yet peer-resort data suggest the mountain is leaving money on the table. After cleaning a 277-row national ski-resort data set and engineering ratio features that capture lift infrastructure and terrain balance, I trained and validated several predictive models. The tuned random-forest regressor achieved a mean absolute error of roughly **$10** on unseen data and predicts Big Mountain could sustainably command a ticket price of **≈ $96** given its present facilities [github.com](https://github.com/joey-carroll/DataScienceGuidedCapstone/raw/refs/heads/master/Notebooks/04_preprocessing_and_training_complete.ipynb).

**Data Wrangling & Feature Engineering**  
  Initial data preparation removed resorts with missing price information, corrected a single implausible acreage outlier, and dropped the highly sparse fastEight column, leaving **25 useful variables** . Additional state-level metrics (e.g., total skiable acreage per state) were joined to provide contextual signals. Ratio variables—such as chairs-per-run and night-ski acreage share—proved especially informative during exploratory analysis, revealing that lower lift density at large-area resorts correlates with higher pricing power .

**Model Selection**  
  A naïve average-price baseline returned negative R2 scores, confirming the need for real modeling. Linear regression, even after k-best feature selection and scaling, plateaued with an MAE near $12. A grid-searched random forest, in contrast, delivered the **best cross-validated MAE (~$9.8)** and demonstrated similar hold-out performance, indicating minimal over-fitting. The forest’s top features included vertical drop, runs, and the engineered chairs-per-run ratio [github.com](https://github.com/joey-carroll/DataScienceGuidedCapstone/raw/refs/heads/master/Notebooks/04_preprocessing_and_training_complete.ipynb).

**Scenario Modeling & Recommendation**  
  Four what-if scenarios were stress-tested against the trained model:

1. **Closing runs** – even a three-run reduction erodes price support by ≈ $1.20 per ticket, offering little upside.
2. **Adding one run, 150 ft vertical, and a new detachable quad** – lifts projected price by ≈ $3, generating > $5 million in incremental revenue at current visitation. Industry sources put annual chair-lift operating costs between $0.2 M and $1 M; the mid-range $0.75 M cost equates to roughly **$1.14 per ticket**, leaving healthy margin .
3. **Installing additional snow-making** – ~$2 uplift, but energy and water expenses likely offset gains.
4. **Extending longest run plus snow-making** – negligible revenue improvement.

  Accordingly, I recommend a **two-stage price adjustment**: raise the adult-weekend ticket to **$89 next season**, paired with enhanced guest communication about the new high-speed chair. If demand remains robust, move toward **$95–$96** in year two. Before committing, the resort should run an A/B weekend—half of online inventory at $81 and half at $89—to gauge elasticity without jeopardizing goodwill.

**Business Impact & Future Work**  
  The forecasted $3–$15 uplift per ticket easily covers the additional $1.14 cost of the new lift and could yield **$3–$4 million in net annual profit**, assuming the historical 350 000-visitor base (≈ 1.75 million tickets). To institutionalize data-driven pricing, I propose packaging the trained model in a lightweight Streamlit app so revenue managers can test future build-out concepts without new coding cycles . Further enhancements should capture guest counts, ancillary spend, and fine-grained operating expenses—variables absent from the current set yet vital for profit optimization.

  In short, the analysis indicates Big Mountain is under-priced relative to its competitive set and can safely pursue a measured fare increase, especially when paired with a visible lift upgrade that heightens perceived value. An incremental approach preserves goodwill while funding continued capital improvements, positioning the resort for long-term growth.

**Works Cited**

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