**In context**

Big Mountain Resort recently installed a new chairlift to help spread visitors across the mountain. This installation blew a $1,540,000 hole in the company's revenue, threatening its investment strategy. Management suspects that the company's pricing policy, focused on a premium above the average price of resorts in its market segment, does not reflect the quality/price ratio of the company's facilities. This is why she entrusted the Data Science team with the mission of making appropriate proposals in this regard and to consider certain changes likely to reduce operational costs.

This document reports on the activity of this team, proposes a significant adjustment to ticket prices and makes recommendations on how to consider removing certain facilities to reduce costs.

**Implementation**

The study was conducted using data taken from the database manager, information on the resort market (ski\_resort\_data\_csv) and the list of United States states (List\_of\_U.S\_states&old 50x13). This data was merged then purified to rid it of unusable information and correct visibly erroneous entries. Thus 14.24% of resorts, without relevant information, and 2 columns were eliminated from the file and corrections were made to the wording of the names of certain states and resort opening dates.

The price of tickets paid for on weekends labeled “AdultWeekend” in the file was retained as a variable to define the model.

The application of statistical methods led to the following choices:

• Develop the model with the following 8 facilities which have the greatest impact on ticket prices: Vertical\_drop, Snow Making\_ac, Total\_chairs, fastQuads, Runs, LongestRun\_mi, Trams, SkiableTerrain\_ac

• Choose the “Random forest regression model” method as a regression model for projections

• Fill in unavailable information with the median corresponding to certain stages of the work.

The result is a model that predicts the ticket price based on the available facilities of a resort with an absolute error of $9.34.

The price provided is used to calculate revenue based on the average number of visitors and the assumption of purchasing 5 days of access per visitor.

**Big Mountain Case**

Applied to the case of Big Mountain Resort the model suggests a ticket price of $95.87, an increase of more than 18.31% compared to the current average price of $81.00

This increase is justified by the positioning in terms of the facilities likely to impact the price of the ticket as appears in the histograms below for the 4 of these facilities :

A graph of a graph

Description automatically generated with medium confidence A graph of a vertical drop

Description automatically generated

A graph of a number of runs

Description automatically generatedA graph of a graph

Description automatically generated with medium confidence

**Scenarios**

The following scenarios were considered:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Scenarios | Ticket price variation | Change in Income | Comments |
|  | * adding a run * increasing the vertical drop by 150 feet, * installing an additional chair lift | $1.99 | $ 3,474,638 | * to consider in the current context |
|  | * adding a run * increasing the vertical drop by 150 feet * installing an additional chair lift * increase of 2 to `Snow Making\_ac` | $1.99 | $ 3,474,638 | * a small increase in the snow making area makes no difference |
|  | * increasing the longest run by .2 miles * guaranteeing its snow coverage by adding 4 acres of snow making capability | $0.0 | $0.0 |  |
|  | * Closing a run | $0.0 | $0.0 | * can be implemented immediately |

Regarding the closure of runs, it should be emphasized:

* The closure of 2 or 3 runs will lead to a reduction in the price of the ticket and consequently the income
* Closure of 3, 4 and 5 runs will lead to a similar loss of income
* From the 6 runs closure, revenues will experience a sharp drop

Recommendations

The study was carried out only with the price of tickets as price data and the operating expenses of the new chairlift. The prices and expenses associated with each of the facilities would prove useful information for improving the model. It should also be noted that the average number of ticket days reserved per visitor would be additional information that could guide the working hypotheses. The company may consider a way to identify its visitors and collect information on the facilities they use and the number of days of tickets they purchase.

Furthermore, the model, after approbation, must be equipped with an interface that allows parameters to be entered and choices made for its full exploitation by business analysts.