SAS®
GLOBAL FORUM
2020
MARCH 29 - APRIL 1
WASHINGTON, DC
The Super Bowl has been a great platform for companies to market their products or services through 30-60 second commercials. These commercials are not only famous for their entertainment factor, but also their high costs. A significant question raised is whether these multimillion-dollar investments substantially impact the growth of a company?

In 2020, the average cost of a 30 second Super Bowl commercial was $5.6 million.

Since, the focus of these ads is both increase in sales and brand awareness, the return of investment of these ads can be inferred using its impact on the stock price of the companies. The goal of this research is to understand the impact of various factors related to advertisements on the stock price of the companies soon after the event and one week later.

**Feature Engineering**

<table>
<thead>
<tr>
<th>Product Category Variable</th>
<th>Number of Commercials</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

Fiat, Honda, Hyundai, Toyota etc. are grouped together as Automobile

**Target Variable**

- **Immediate Change in Stock Price (SP0)**
  - Stock Price after the event - Stock Price before the event
- **Change in Stock Price after a week (SP5)**
  - Stock Price one week after the event - Stock Price before the event

Both target variables were converted into binary variables based on positive (1) and negative (0) difference. Categories like Automobile, Alcohol saw a decline in the stock price whereas Food and Technology saw growth in the stock price after game day.

**Methodology**

- **Data Partition**
- **Imputation**
- **Modeling**

- Logistic Regression
- Decision Tree with K fold cross validation

**Results**

**SP0 - Decision Tree**

- Probability that the stock price goes up immediately after the game is 45.45%

**SP5 - Logistic Regression**

- Product Category = Alcohol, Automobile, Entertainment
- Average Rating
- Ranking

Accuracy = 68%

**Conclusion**

- **Product Categories** such as Automobile, Entertainment, CPG have the highest number of advertisements at the Super Bowl. The model shows that these generally have a positive impact on the stock price soon after the game. Whereas product categories like Alcohol and Lifestyle do not show a gain in stock price soon after the game.

Along with product category, the Air Time of an advertisement is also important. The analysis showed that the ads that were aired during the second quarter are more likely to make a positive impact on the immediate change in stock price.

Likeability also plays an important role in this analysis. Generally the ads having a Rating of 18 or below tend to reap more benefits for the brands.

The research can also be performed to analyze change in stock price over a month to gain more meaningful insights and to improve model accuracy.

**Acknowledgment**

I am thankful to SAS Global Forum for giving an opportunity to present my research at this event. Special thanks to Dr. Goutam Chakraborty for his continued guidance and mentorship.