CASE STUDY

AUTOMOBILE SALES INDUSTRY

Sriya.AI
AI ANYWHERE ANYTIME

Objective

- To get the prediction accuracy of the potential loss faced by the manufacturer when selling vehicles using Auto-AI and SXI and compare.
- Precision AI using Target SXI based Random Forest trees. Target decrease in overall average loss/car is **20%** from current levels.

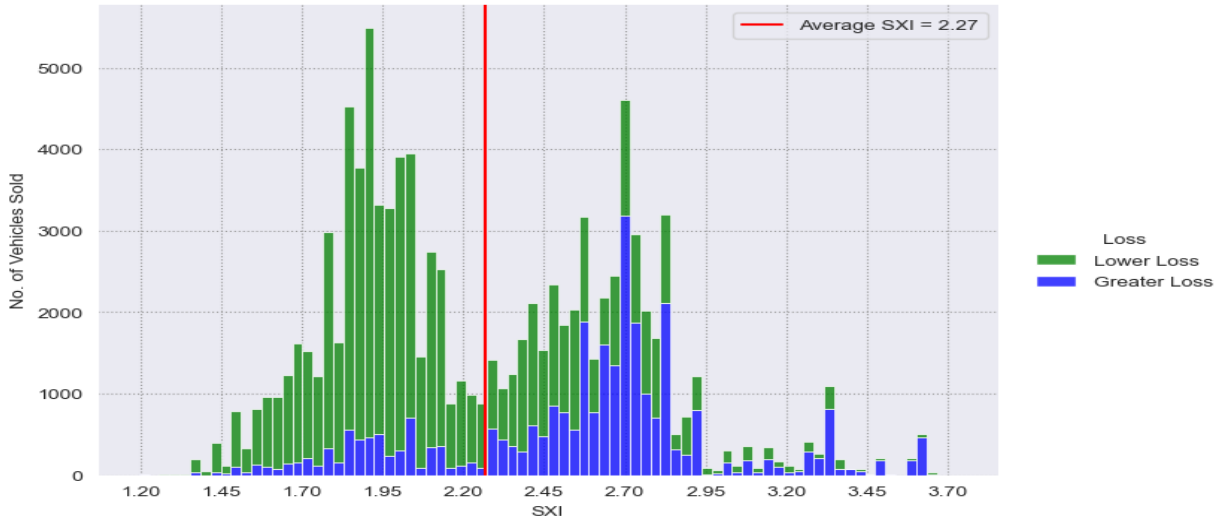
SXI Hypothesis

- SXI Score is a proxy/surrogate for all features responsible for ensuring Lower or Greater loss. The lower the SXI, lower is the average loss/car and hence decreasing SXI score should lead to minimization of the overall car sales losses for the car manufacturer.

SXI Definition

- **Sriya Expert Index (SXI):** Dynamic score/index obtained from a proprietary formula consisting of weights from 10 ML algorithms. SXI is a super feature and is a true weighted representative of all important features. Converts a multi-dimensional hard to solve problem into a simpler 2-dimensional solution (problem solved).
- **SCORE + CORRELATE = IMPROVE**

Discussion & Results



1. Exploratory Data Analysis

100,000 vehicles sold were distributed to **30,158** bad and **69842** good cases. Overall Average loss/car is **$1855.5**. A good case is when the loss/car is Lower than Average loss/car for all cars and Bad case is when the loss per car is > than Average loss/car for all cars. So, **69.84 %** is the Good (Lower loss) and **30.16%** is bad (Greater loss).

2. SXI - Exploratory Data Analysis

Current Average SXI is **2.27**. No. of total vehicles sold above 2.27 is **46373** and of these **22331** are vehicles sold for lower loss (GOOD) and **24042** are vehicles sold for greater loss (BAD). So, vehicles sold for lower loss (%) is **48.15**% and vehicles sold for greater loss (%) is **51.85**%.

Correspondingly the No. of total vehicles sold below 2.27 is **53627** and of these **47511** are vehicles sold for lower loss (GOOD) and **6116** are vehicles sold for greater loss (BAD). So, vehicles sold for lower loss (%) is **88.59**% and vehicles sold for greater loss (%) is **11.41**%.

So SXI is a perfect proxy/surrogate for vehicles sold for lower loss (GOOD) and above average SXI the ratio of good outcome is **0.69x** overall average and below average SXI this ratio of good outcome is **1.27x** overall average.

So, decrease in SXI leads to minimizing the potential average loss/car faced by the manufacturers.

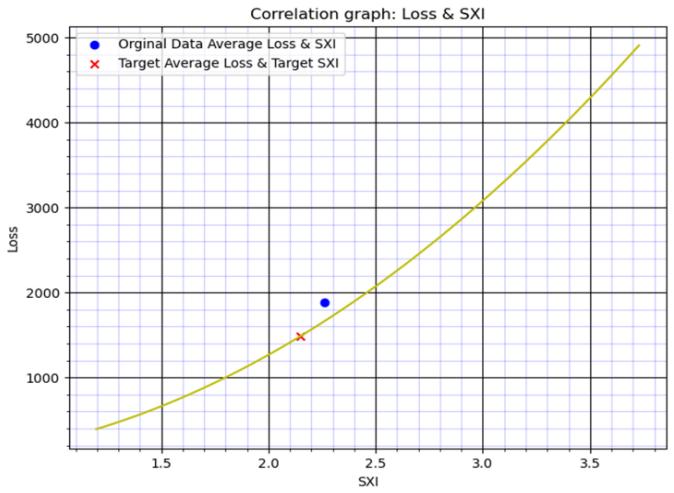
3. Predictive AI

- Auto-AI Prediction accuracy is **100%** and best performing algorithm is **Lasso**.
- SXI Prediction accuracy of loss faced by the manufacturer is **100%**.
- Ratio of SXI/Auto-AI prediction accuracy is **1.**

4. Precision AI

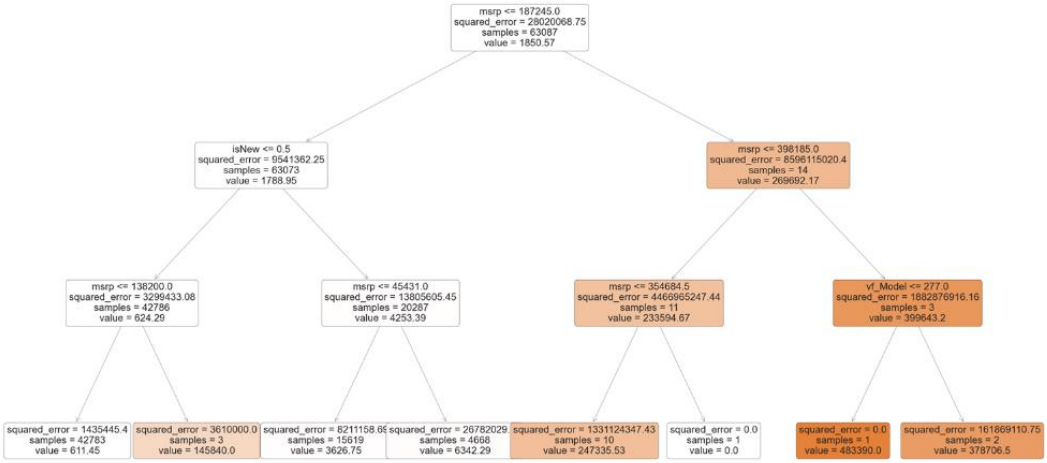
Desired decrease in target outcome which is minimizing the overall average loss/car by 20%. Original overall average loss/car is **$1855.5** so a **20**% decrease should lead to a overall average loss/car of **$1487.48** (**$1855.5*0.8**). Which means **83,810** of the vehicles sold from 100,000 would be vehicles sold for lower loss than current **69,842.**

The correlation between SXI and Loss is **0.85**. This implies that SXI and loss are highly, positively correlated to each other. Hence, a decrease in SXI will result in minimizing the overall average loss/car.



Current SXI and Target SXI Decision Trees

a. Current SXI Decision Tree



Interpretation

Node 1: Manufacturer Suggested Retail Price <= 187245 dollar

Left Split: loss= $1788.95, **Right Split:** loss= $269692.17

Node 2: New Car <= 50% probability

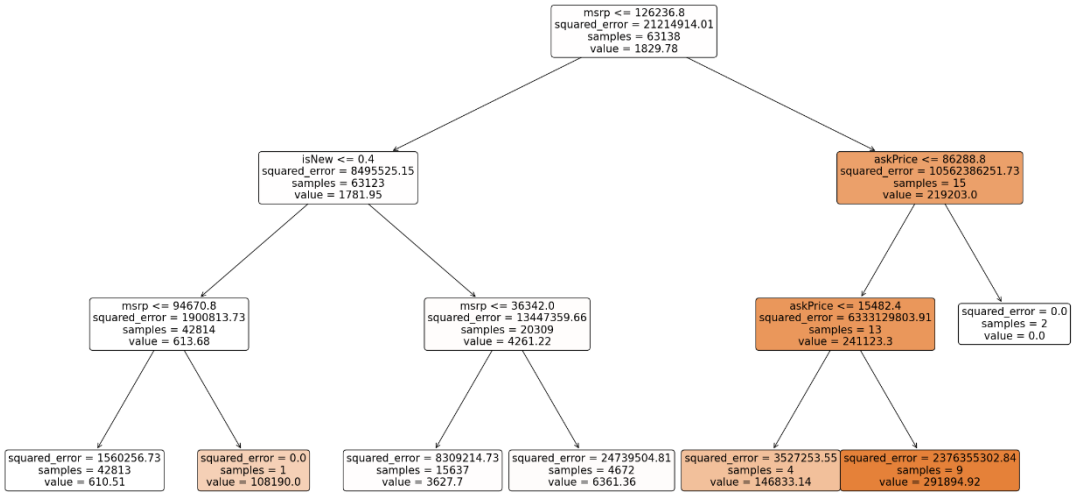
Left Split: loss= $624.29, **Right Split:** loss= $4253.39

Node 3: Manufacturer Suggested Retail Price <= 1382000 dollar.

Left Split: loss= $611.45, **Right Split:** loss= $145840

- ✓ **42783** samples leading to Vehicles that can be sold for minimum loss of **$611.45.**

b. Target SXI Decision Tree



Target SXI from correlation curve for 20% decrease in target outcome of minimizing overall average loss/car is **2.15.**

Interpretation

Node 1: Manufacturer Suggested Retail Price <= 126236.8 dollars

Left Split: loss= $1781.95**, Right Split:** loss= $219203

Node 2: New Car <= 40% probability

Left Split: loss= $613.68**, Right Split:** loss= $4261.22

Node 3: Manufacturer Suggested Retail Price <= 94670.8 dollars.

Left Split: loss= $610.51**, Right Split:** loss= $108190

- ✓ **42813** samples leading to Vehicles that can be sold for minimum loss of **$610.51.**

Conclusion

1. Cars whose SXI score is lower than current average SXI score of **2.27** have **27%** lower losses than the overall average loss/car.
2. Target **20**% decrease in average loss/car is achievable by decreasing target SXI to **2.15** from current **2.27** levels. This would result in **83,810** vehicles sold up for lower loss from current 69,842 levels.

Initial Increase of vehicles sold for lower loss from current levels:	SXI Impact
20% or 13,968 vehicles	*Potential*

3. Based on the inference from the correlation graph w.r.t SXI there is a **potential 86.55 % compounded increase of vehicles that can be sold up for lower loss** if all recommendations in target SXI are completely implemented**.**

Compounding Increase of vehicles sold for lower loss from current levels:	SXI Impact
86.55% or 60,448 vehicles	*Potential*