Order Execution Rate Optimized

Sriya.AI
AI ANYWHERE ANYTIME

Objective

- To obtain and compare the prediction accuracy of Order Execution Rate by Sriya's Auto-AI and Sriya's SXI (Precision AI²) technology solutions.
- To generate a minimum 20% target initial increase in Order Execution Rate from current levels.
- To determine the compounded maximum increase in Order Execution Rate from current levels.
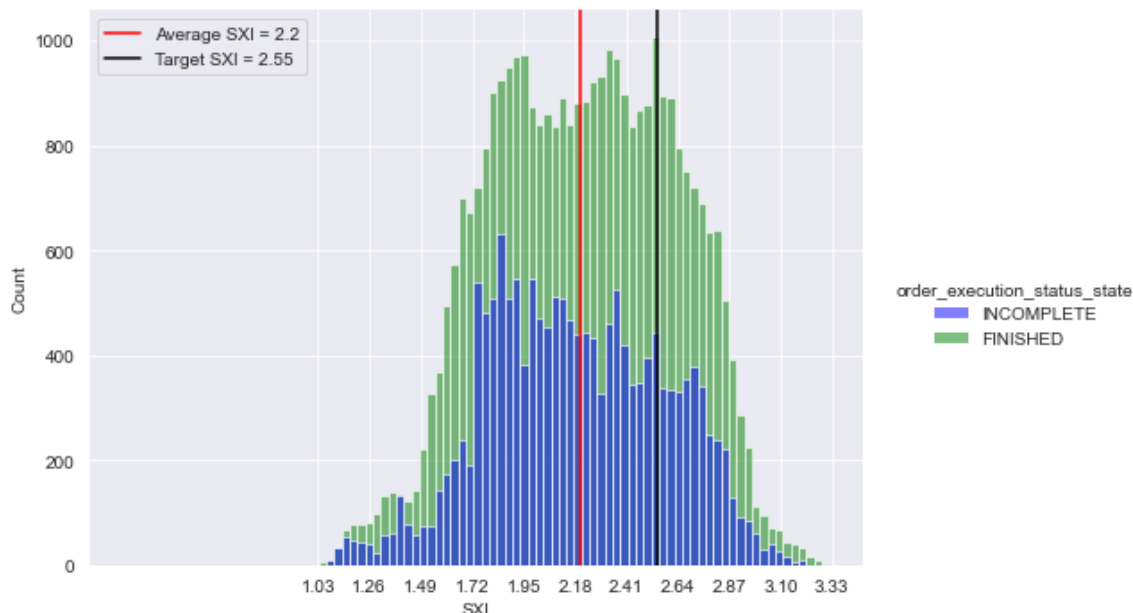
SXI Hypothesis

- SXI is a proxy/surrogate for all features responsible for ensuring increase in Order execution rate. The higher the SXI, the better is the likelihood of Order Execution rate and hence increasing SXI score

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

50,000 orders were distributed to **33,841** good and **16,159** bad. Good are orders successfully executed (finished) and Bad are orders incomplete. So, **67.69%** orders were successfully executed, and **32.31%** orders were incomplete.

2. SXI - Exploratory Data Analysis

Current Average SXI is **2.2**. No. of orders above 2.2 is **24,969** and of these **17,401** orders were successfully executed and **7,568** where orders were incomplete. So, orders successfully executed (%) is **69.69**% and orders incomplete rate is **30.31**%.

Correspondingly, No. of orders below 2.2 is **25,031** and of these **16,440** orders were successfully executed and **8,591** orders were incomplete. So, order successfully executed (%) is **65.68%** and order incomplete rate is **34.32%.**
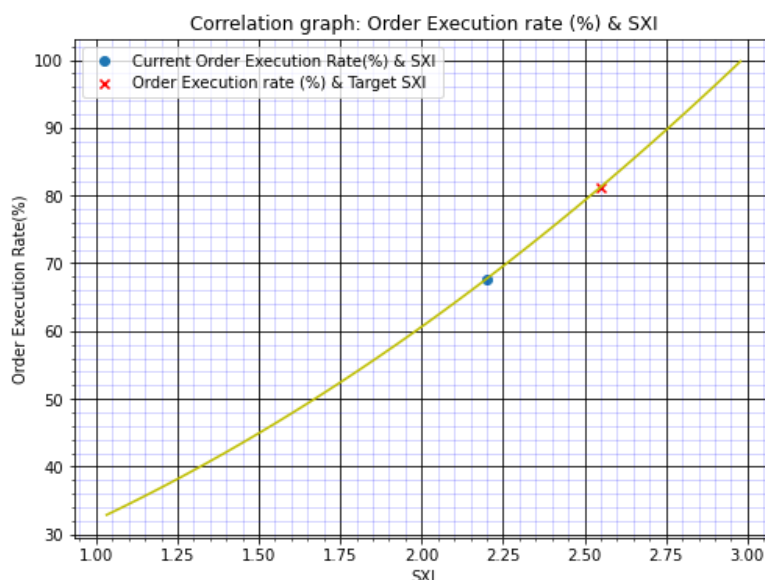
3. Predictive AI

- Sriya's Auto-AI Prediction accuracy is **95.99%** and the best performing algorithm **is XGBoost.** Auto-AI is a standard AI-ML process and uses AI to learn from past data and predict future outcomes**.**

- SXI **AI^2** Prediction accuracy of Order execution rate is **100**%. **SXI uses AI 2 times instead of 1 and hence uses AI to improve AI's predictions accuracy with precision too.**

- Ratio of SXI/Auto-AI prediction accuracy is **1.042**

4. Precision AI

The desired increase in target variable which is order execution rate is 20%. The original order execution rate is **67.69** % so a **20**% increase should lead to **81.23%** overall Order Execution rate, which means **40,609** of the order from 50,000 would become the number of orders successfully executed than the current **33,841.**
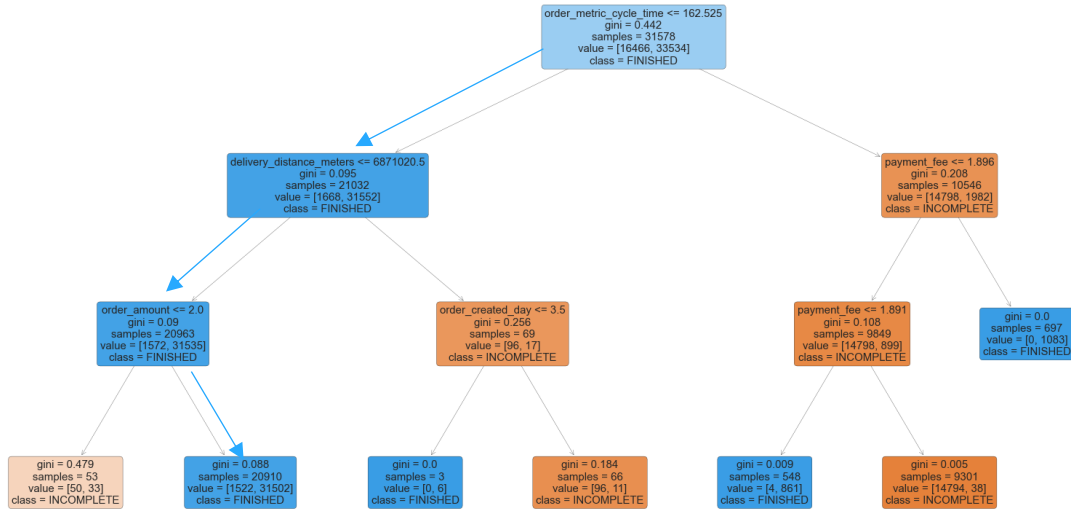
This would result in an initial increase of 6,768 orders from current levels.

The correlation between SXI and order execution rate is **1**. This implies that SXI and Order execution Rate are highly positively correlated to each other. Hence, an increase in SXI will result in increase in Order execution rate.

Correlation graph: Order Execution rate (%) & SXI

Current SXI and Target SXI Decision Trees

a. Current SXI Decision Tree

Interpretation: -

Node 1: order_metric_cycle_time < 161.525 hrs (No. of orders successfully executed in parent node: 33,534)

Left split: 31,552 - majority positive class; gini:0.095, **Right Split**: 1982; gini:0.208

(Total value for the next split: 31,552)

Node 2: deliver_distance_meters < = 6,871,020.5 m

Left split: 31,535 - majority positive class; gini:0.09, **Right Split**: 17; gini:0.256.
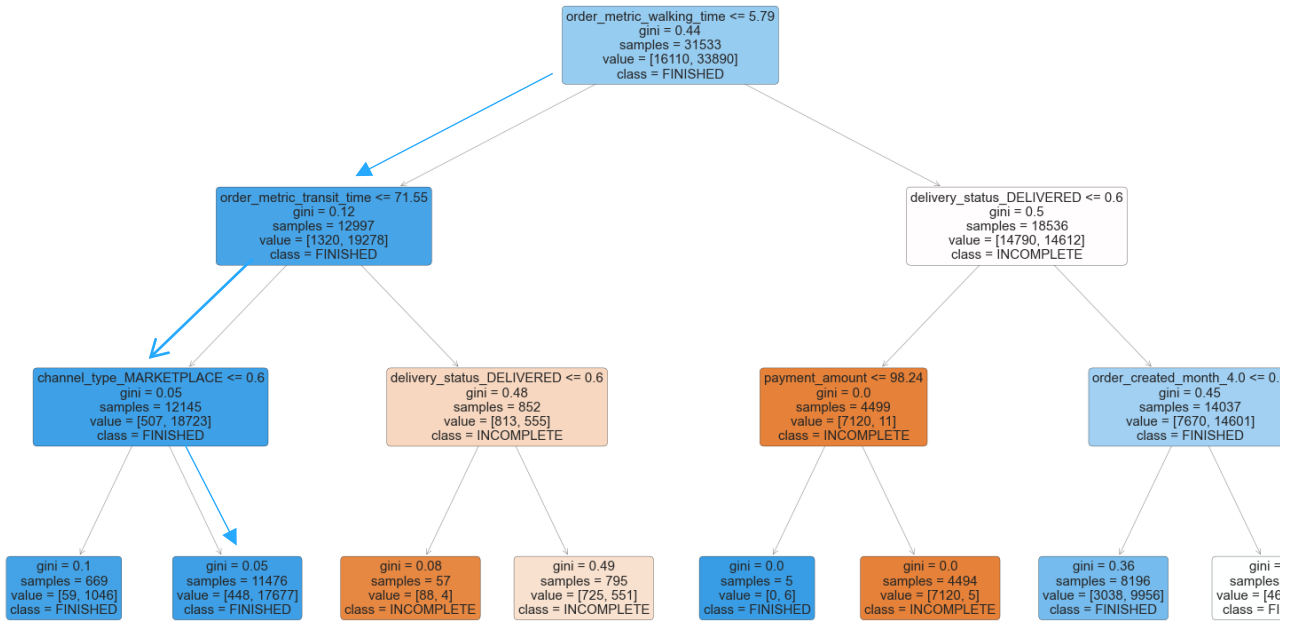
(Total value for the next split: 31,535)

Node 3: order_amount >= 2.

Left split: 33; gini:0.479, **Right Split**: 31502- majority positive class; gini:0.088– Final Leaf Node.

✓ Orders successfully executed / Orders incomplete ratio is **20.69.**

b. Target SXI Decision Tree

Target SXI from correlation curve for 20% increase in target outcome of Order Execution rate is **2.55.**

Interpretation: -

Node 1: order_metric_walking_time < 5.79 hrs. (No. of orders successfully executed in parent node: 33,890)

<mark>**Left split**: 19,278 - majority positive class; gini:0.12</mark>, **Right Split**: 14,612; gini:0.5.

(Total value for the next split: 19278)

Node 2: order_metric_transit_time > = 71.55 hrs.

<mark>**Left split**: 18,723- majority positive class; gini:0.05</mark>, **Right Split**: 555; gini:0.48.

(Total value for the next split: 18,273)

Node 3: Channel Type: 60% more likely is **Marketplace**.

Left split: 1,046; gini:0.11, <mark>**Right Split**: 17,677 - majority positive class; gini:0.05 – Final Leaf Node.</mark>

✓ Orders successfully executed / Orders incomplete ratio is **39.45.**

Conclusion

- SXI Prediction accuracy is **1.042x** Auto AI prediction accuracy and hence is **4.2%** superior.

- Orders whose SXI score is higher than current average SXI score of 2.2 have **3%** higher Order execution rates than overall Order execution rates average of all orders.

- Target **20**% increase in order execution rate is achievable by increasing target SXI to **2.55** from current **2.2** levels. This would result in **40,609** orders executed up from current 33,841 levels.

<table>
<tr><td>Initial Increase from current levels:
20% or 6,768</td><td>SXI Impact
<i>Potential</i></td></tr>
</table>

- Target Orders successfully executed / Orders incomplete ratio is **39.45** while the current ratio is **20.69.** This represents a **potential 90.67% compounded increase** if all recommendations in target SXI are completely implemented**.**

<table>
<tr><td>Compounding Increase from current levels:
90.67% or 30,684</td><td>SXI Impact
<i>Potential</i></td></tr>
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