

Objective

- To obtain and compare the prediction accuracy of employee churn by Sriya's Auto-AI and Sriya's **SXI** (Precision AI^2).
- Precision AI^2 using Target SXI based Random Forest trees. Minimum 10% target increase in number of employees who did not leave the company from current levels.

SXI Hypothesis

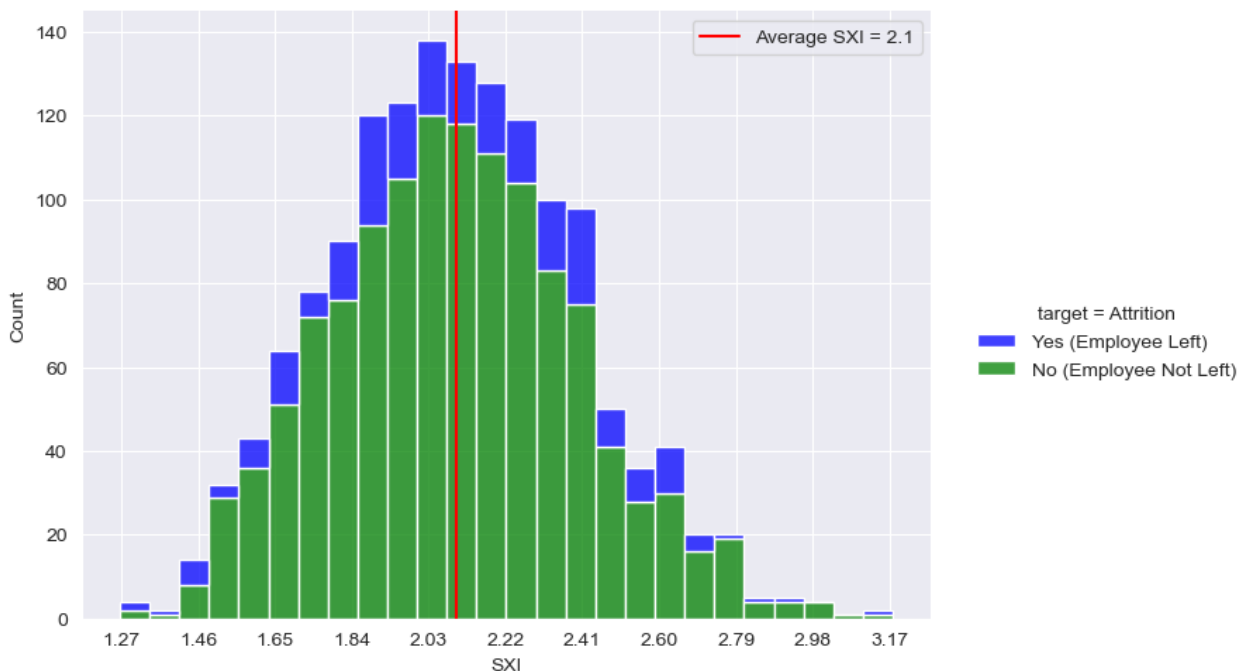
- SXI is a proxy/surrogate for all features responsible for ensuring employees who either left or stayed with the company. The higher the SXI, the better is the prediction of employees who stayed and hence increasing SXI score should lead to increase in the number employees who stayed or who did not leave.
- Higher the SXI = Lower the Churn

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**

Data Source from Kaggle.com, IBM HR Analytics Employee Attrition & Performance.

Discussion & Results



1. Exploratory Data Analysis

1470 employees were distributed to 237 bad and 1233 good. Good are employees who didn't leave and Bad are employees who left. So, **83.87%** is the current number of employees who did not leave and **16.13%** is number of employees who left.

2. SXI - Exploratory Data Analysis

Current Average SXI is **2.1**. The total number of employees above **2.1** is **718** and of these **118** are employees who left and **600** are the number of employees who did not leave. So, the number of employees who did not leave (%) is **83.6%** and number of employees who left are **16.4%**.

Correspondingly total numbers of employees below are **2.1** is **752** and of these **119** are employees who left and **633** are the number of employees who did not leave. So, employees who left (%) is **15.82%** and employees who did not leave (%) is **84.18%**.

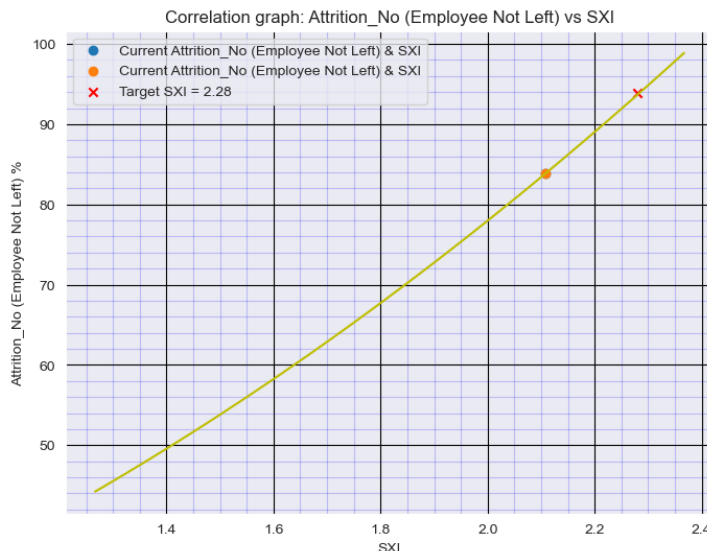
3. Predictive AI

- Sriya's Auto-AI Prediction accuracy is **75.94%** and the best performing algorithm is **Random Forest**. **Auto-AI is a standard AI-ML process and uses AI to learn from past data and predict future outcomes.**
- SXI AI² Prediction accuracy of number of employees who did not leave is **95.95%**. **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 **1.26**. **SXI is 26% more accurate than standard AI.**

4. Precision AI

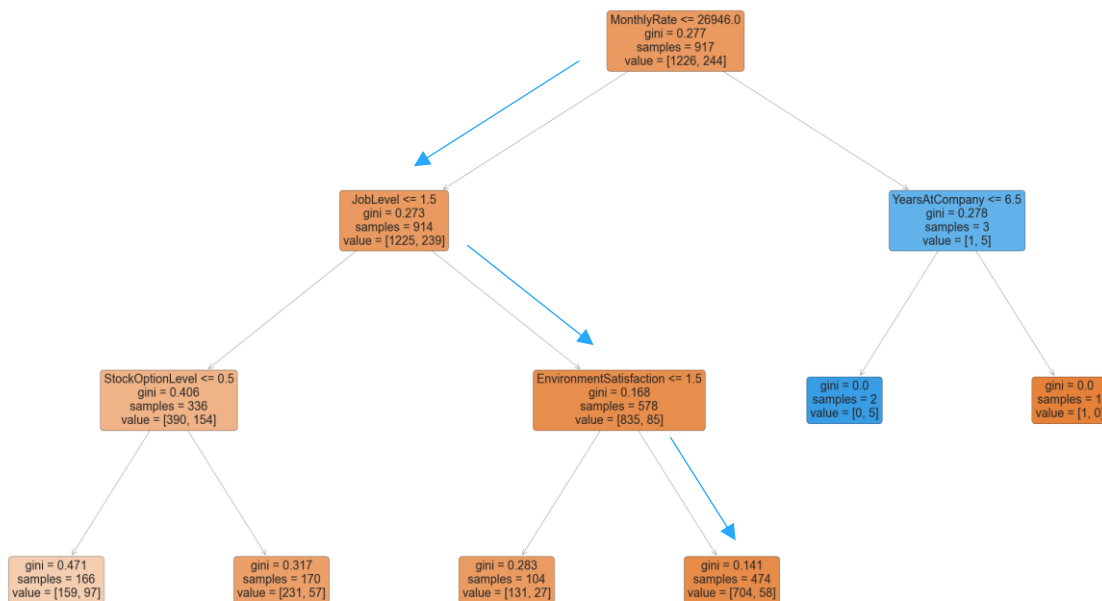
The desired increase in target outcome which is number of employees who did not leave is **10%**. The original number employees who did not leave is **83.87 %** so a **10% increase** should lead to a **92.26%** overall number of employees who did not leave (**83.87*1.1**). Which means **1356** of the employees from **1470** would become number of employees who did not leave rather than current **1233**.

The correlation between SXI and employees who did not leave is **0.95**. This implies that SXI and the number of and employees who did not leave are highly positively correlated to each other. Hence, an increase in SXI will result in an increase in number of employees who did not leave or lower **CHURN**.



Current SXI and Target SXI Decision Trees

a. Current SXI Decision Tree



Interpretation: -

Node 1: Monthly Rate < 26946 (No. of employees who did not leave the company: 1226) (Left split so symbol does not change.)

Left Split: 1225- majority positive class; gini:0.273, **Right split:** 1; gini:0.278
(Total value for the next split: 1225)

Node 2: Job level > 1.5 (Right split so it is False symbol changes from < to >)

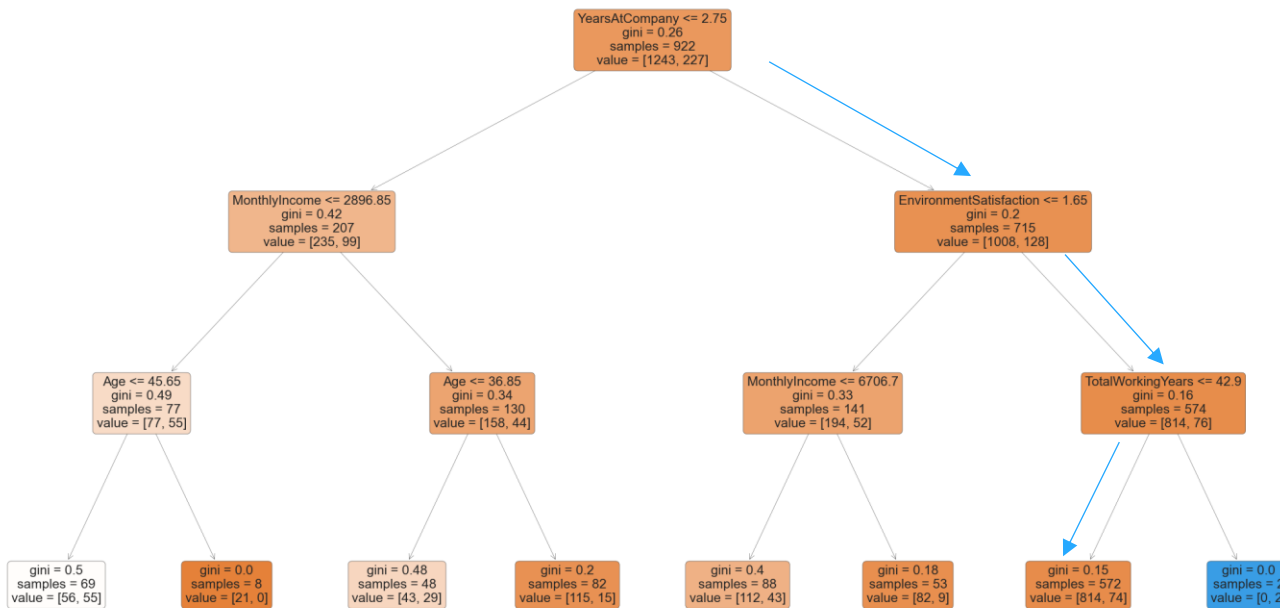
Left split: 390; gini:0.406, **Right Split:** 835- majority positive class; gini:0.168
(Total value for the next split: 835)

Node 3: Environmental satisfaction >= 1.5 (Right split so it is False symbol changes from < to >)

Left Split: 131; gini:0.283, **Right split:** 704- majority positive class; gini:0.141 – Final Leaf Node

- ✓ Success Ratio is: **57.4%** (704/1225) *100 – (Total value of the positive class in the final leaf node/Total value of the positive class after first split) *100
- ✓ Employee who did not leave/employees who left: **8.10**

b. Target SXI Decision Tree



Target SXI from correlation curve for 10% increase in target outcome of employee who did not leave rate is **2.28**.

Interpretation: -

Node 1: Year at the company > 3 (No. of Employees who did not leave: 1243)

Left Split: 235; gini:0.26, **Right split:** 1008- majority positive class; gini:0.20
(Total value for the next split: 1008)

Node 2: Environmental satisfaction > = 1.65

Left Split: 194; gini:0.33, **Right split:** 814 - majority positive class; gini:0.16
(Total value for the next split: 814)

Node 3: Total working years < 42

Left split: 814- majority positive class; gini:0.15, **Right Split:** 0; gini:0.0 – Final Leaf Node.

- ✓ Success Ratio is: **80.75%** $(814/1008) * 100$ – (Total value of the positive class in the final leaf node/Total value of the positive class after first split) *100
- ✓ Employees who did not leave/ employees who left: **11**

Conclusion

Data Analytics Outcome

1. SXI Prediction accuracy is **1.26x** Auto AI prediction accuracy and hence is **26% superior improvement in accuracy over Auto-AI**
2. Target **10%** number of employees who did not leave is achievable by increasing target SXI to **2.28** from current **2.1** levels. This would result in **1356** employees who did not leave up from current 1233 levels.

<u>Initial Increase from current levels:</u> 10% or 123	SXI Impact <i>Potential</i>
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3. Based on the inference from the correlation graph w.r.t to SXI there is a **potential 19.23% compounded increase** if all recommendations in target SXI are completely implemented.

<u>Compounding Increase from current levels:</u> 35.8% or 441	SXI Impact <i>Potential</i>
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Business Case Outcome

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|--------------------------------------|---------------------------------|
| 1. Employee Churn Rate (%): | 16.13 (237 employees attrition) |
| 2. Desired Churn / Precision-AI (%): | 7.76 (114 employees attrition) |
| 3. Churn Rate Reduction (%): | 8.37 (48% Improvement) |
| 4. Churn headcount Impact: | 123 employees extra stayed |

Financial Outcome

Churn Savings Example:

Churn Savings = (Churn Rate Before Improvement – Churn Rate After Improvement) * (Total Employees) * (Average Cost per Employee)

Churn Savings = (16.13% – 7.76%) * 1470 * \$80,000

Churn Savings = \$9,843,120