

EMPLOYEE TURNOVER ANALYSIS

Idris Mahamat

2025MIS637-WZ



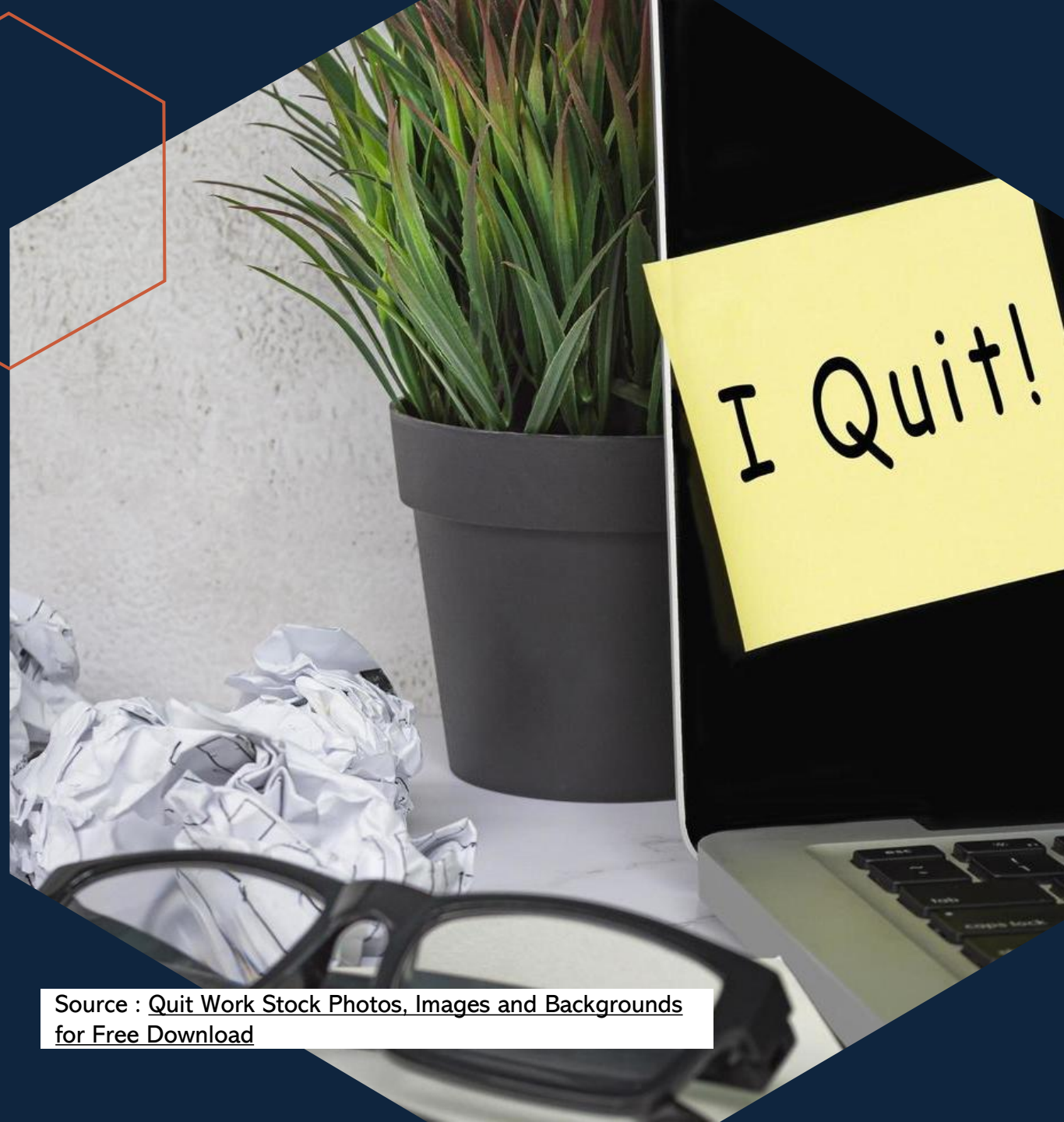
Agenda

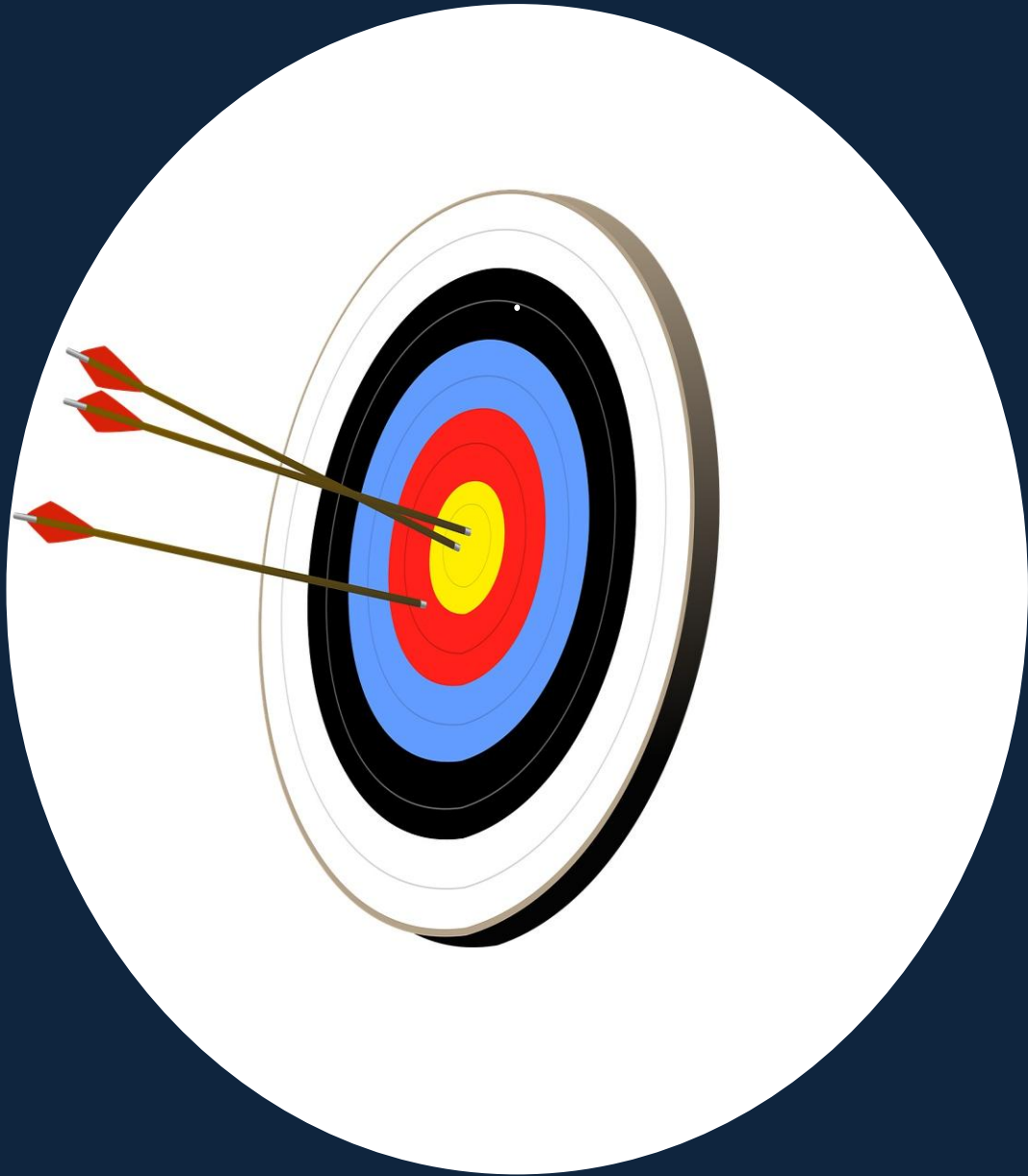
- ✓ Introduction
- ✓ Exploratory Data Analysis
 - ✓ Dataset description
 - ✓ Bar chart
 - ✓ Histogram
- ✓ Modeling
- ✓ Model performance
- ✓ Implementation
- ✓ Summary

Introduction

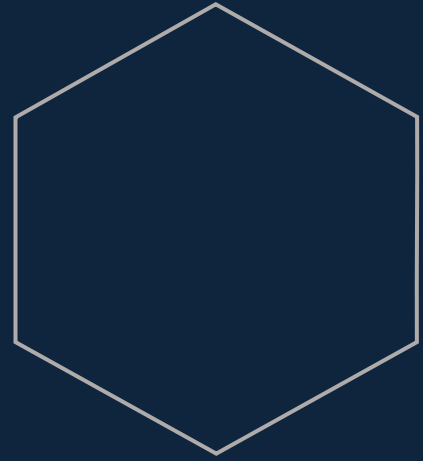
Employee turnover analysis is an HR analysis that involves collecting data, analyzing and reporting HR data to help understand the company's turnover rate. In our use case, we will study the dataset name “**data_generated**” which was randomly generated from mackaroo.com.

The implementation of this use case will be as follow : first we are going to conduct a basic data exploratory analysis, then build different machine learning models, compare each model's performance and finally choose the model with the highest accuracy.





- Find out the reason that employee is resigning from the company.
- Determine the key factor that led to the turnover.



Exploratory Data Analysis



Dataset description

Satisfaction_Score	Realised_Project	Performance_Score	Work_accident	Promotion_History	Department
Numerical (0-10)	Numerical (1-10)	Numerical (0-10)	Numerical (1-0) True= 1 False = 0	Numerical (1-0) True= 1 False = 0	Categorical
Montly_Hours	Tenure	Employment_status	Job_level	Bonus	Salary
Numerical (96-320)	Numerical (0-10)	Numerical (0-1) True= 1 False = 0	Categorical	Numerical (0-1) True= 1 False = 0	Categorical

Need some mock data to test your app? Mockaroo lets you generate up to 1,000 rows of realistic test data in CSV, JSON, SQL, and Excel formats.

Need more data? Plans start at just \$60/year. Mockaroo is also available as a [docker image](#) that you can deploy in your own private cloud.

Field Name	Type	Options
Satisfaction_Score	Number	min: 0 max: 10 decimals: 0 blank: 0 % Σ ×
Performance_Score	Number	min: 0 max: 10 decimals: 0 blank: 0 % Σ ×
Realised_Project	Number	min: 1 max: 10 decimals: 0 blank: 0 % Σ ×
Montly_Hours	Number	min: 96 max: 320 decimals: 0 blank: 0 % Σ ×
Tenure	Number	min: 0 max: 10 decimals: 0 blank: 0 % Σ ×
Work_accident	Number	min: 0 max: 1 decimals: 0 blank: 0 % Σ ×
Employment_status	Number	min: 0 max: 1 decimals: 0 blank: 0 % Σ ×
Promotion_History	Number	min: 0 max: 1 decimals: 0 blank: 0 % Σ ×
Department	Custom List	Supply_Chain, Legal_Compliance, Quality_Assurance, Logistic weighted blank: 0 % Σ ×
Salary	Custom List	low, medium, high weighted blank: 0 % Σ ×
Bonus	Number	min: 1 max: 1 decimals: 0 blank: 0 % Σ ×
Job_level	Custom List	Entry_Level, Mid_Level, Senior_Level, Executive weighted

+ ADD ANOTHER FIELD

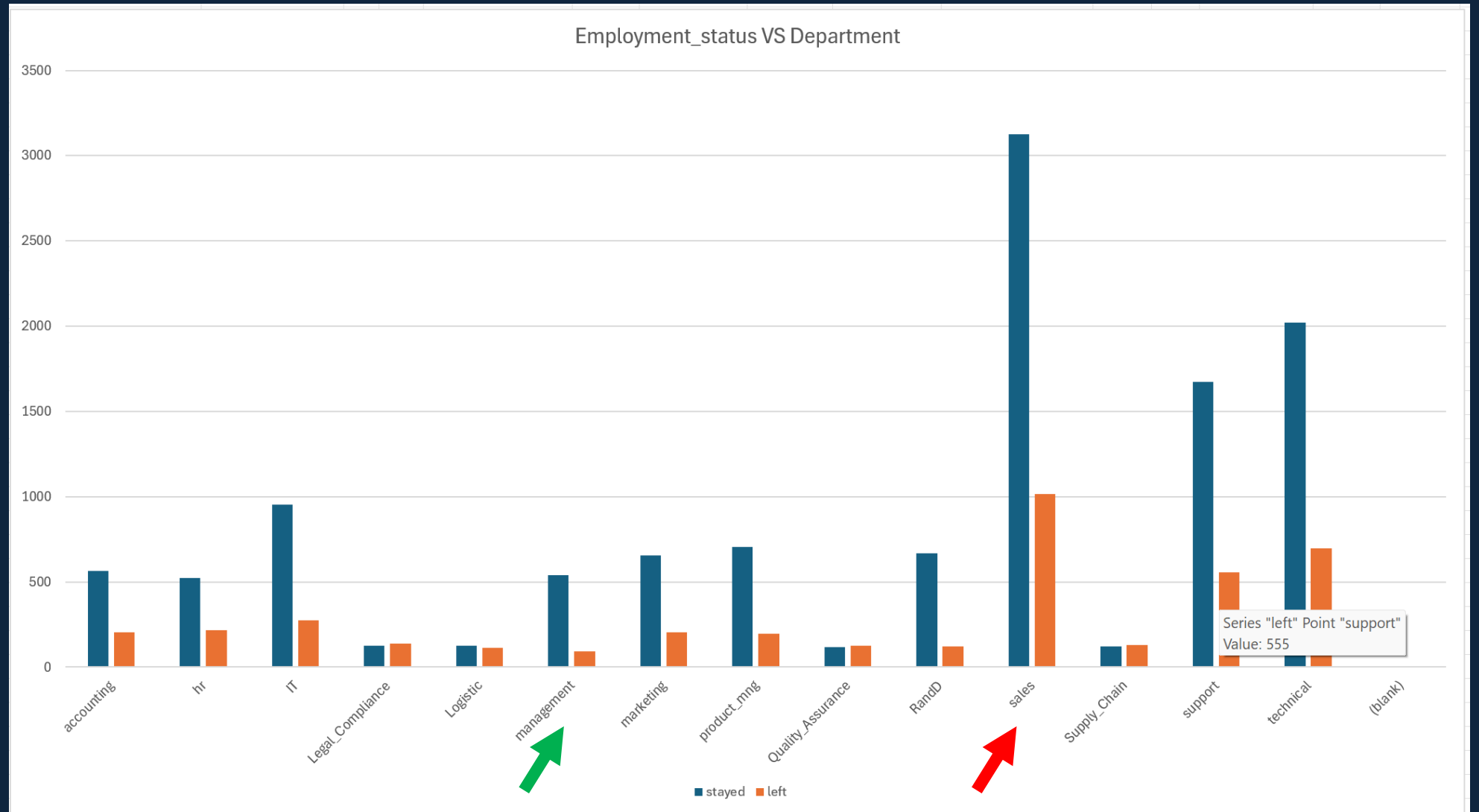
GENERATE FIELDS USING AI...

HP Command Center

Screen Time

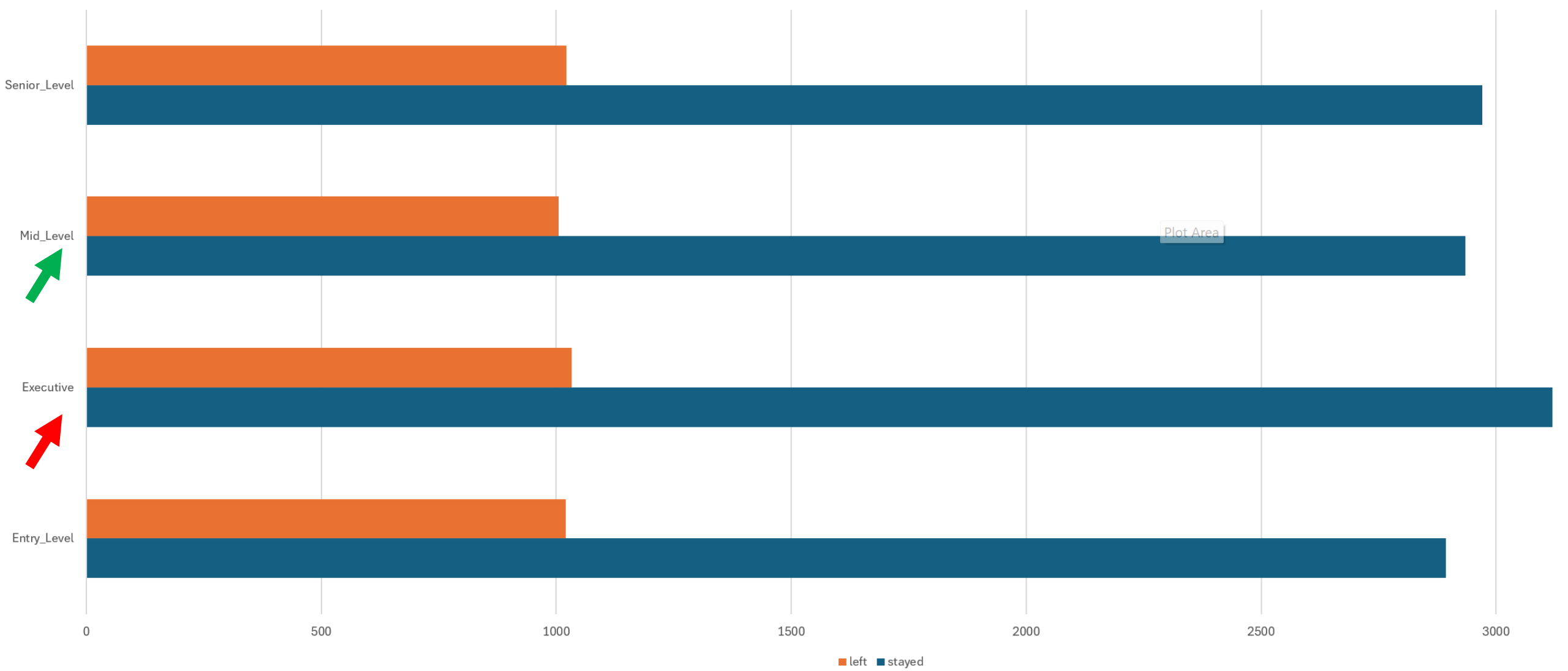
Consider taking a break

Bar chart



Employee turnover analysis

Chart Title





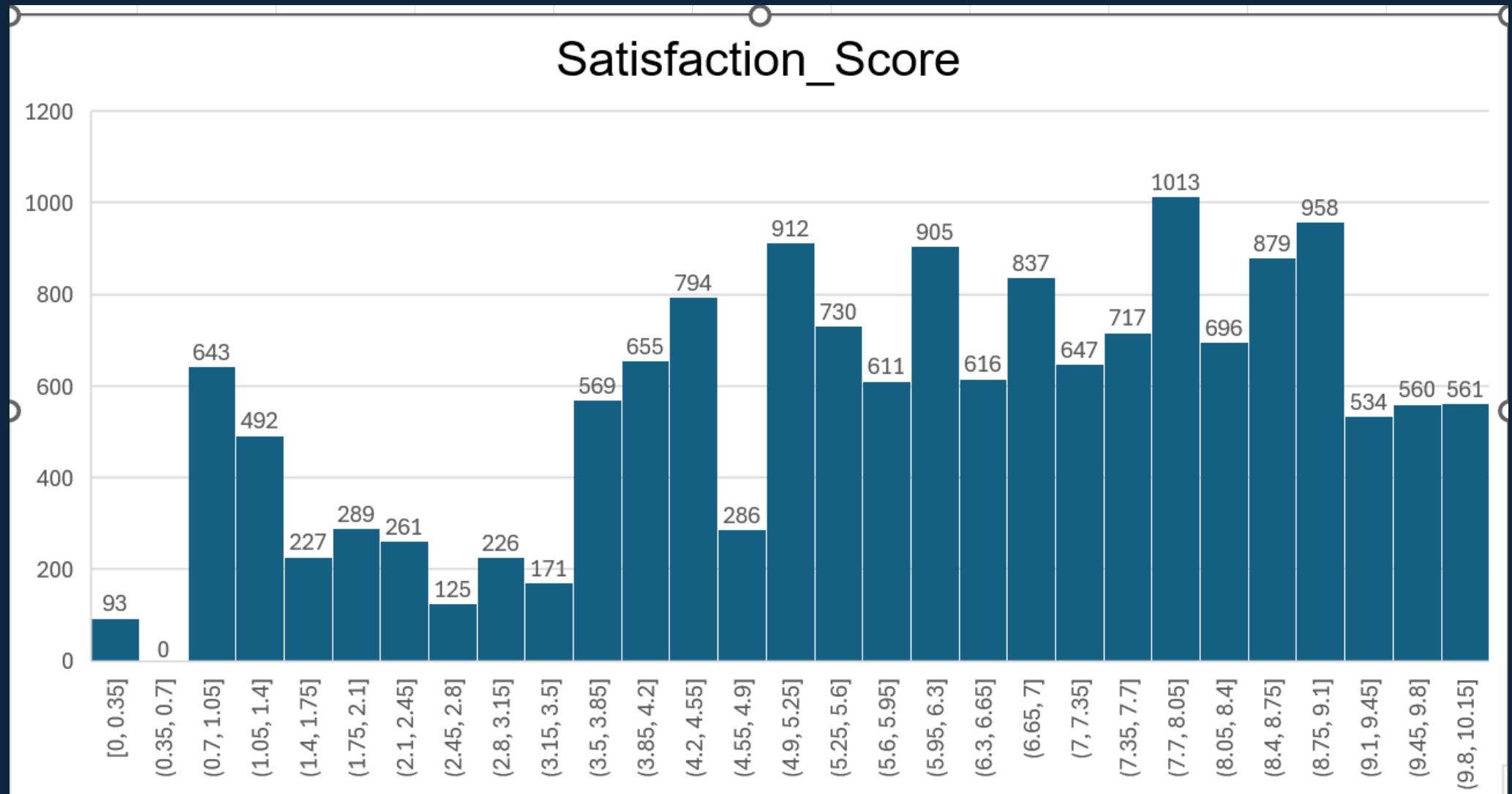
Employee turnover analysis

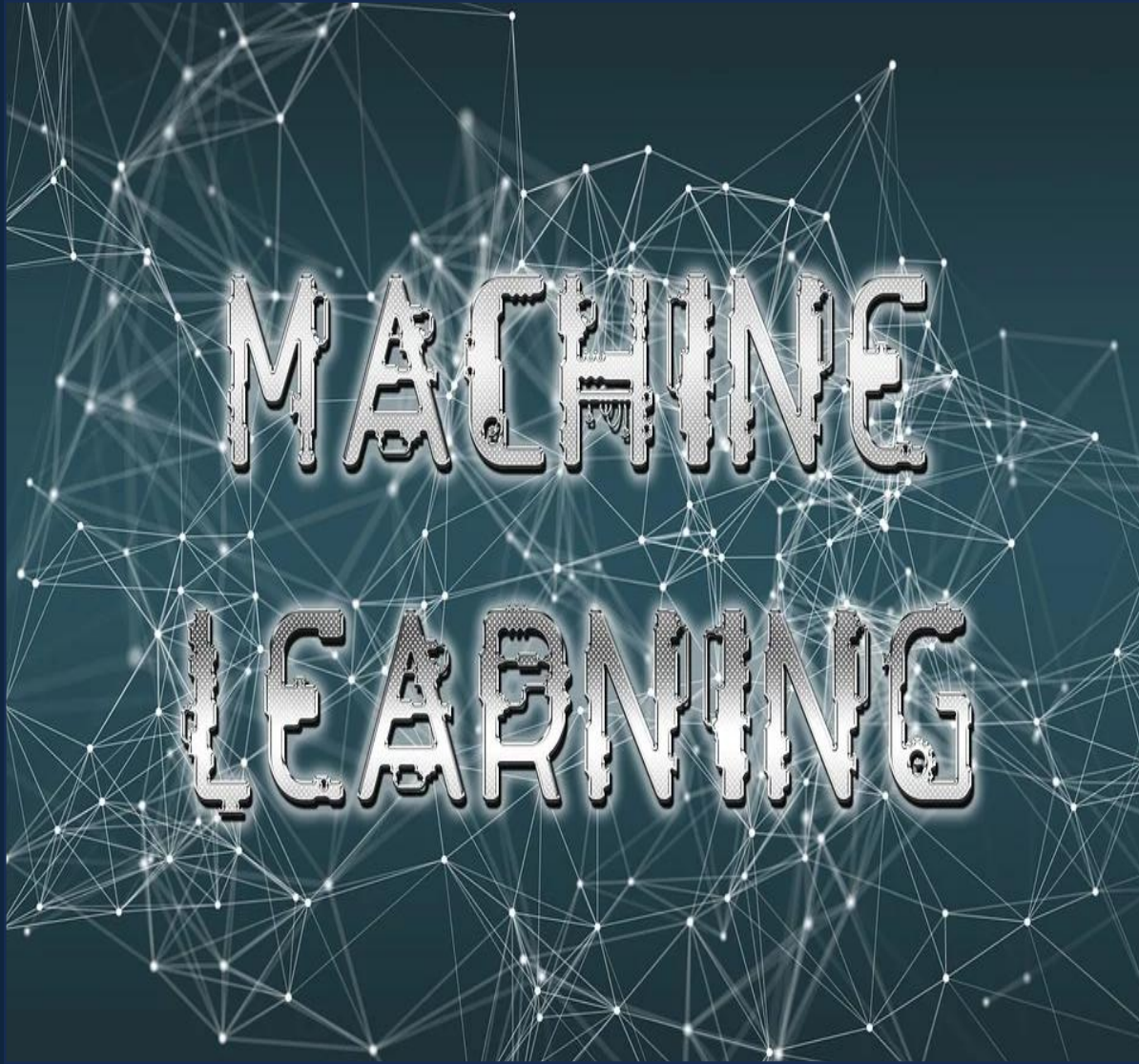
Histogram



Employee turnover analysis

Histogram





Modeling

Source : https://cdn.pixabay.com/photo/2019/04/15/12/09/machine-learning-4129175_960_720.jpg

Employee turnover analysis

Model

Supervised

KNN

K-Nearest Neighbor

CART

Classification And
Regression Tree

Random
Forest

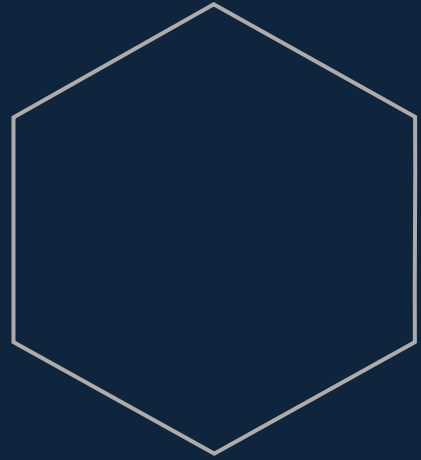
Multiple tree

clustering

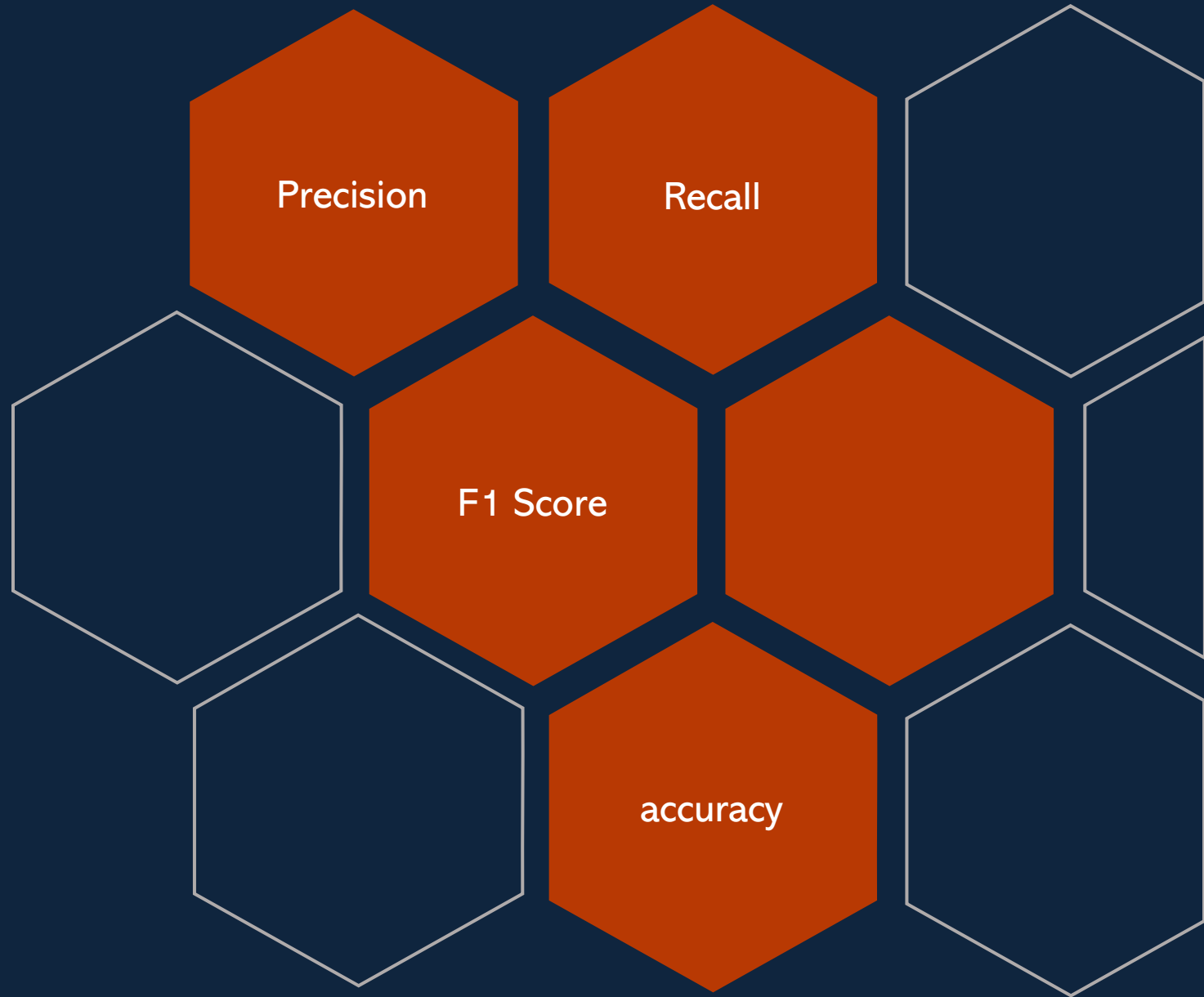
K-means

Vice-Président du
marketing

Unsupervised



Model Performance



Implementation



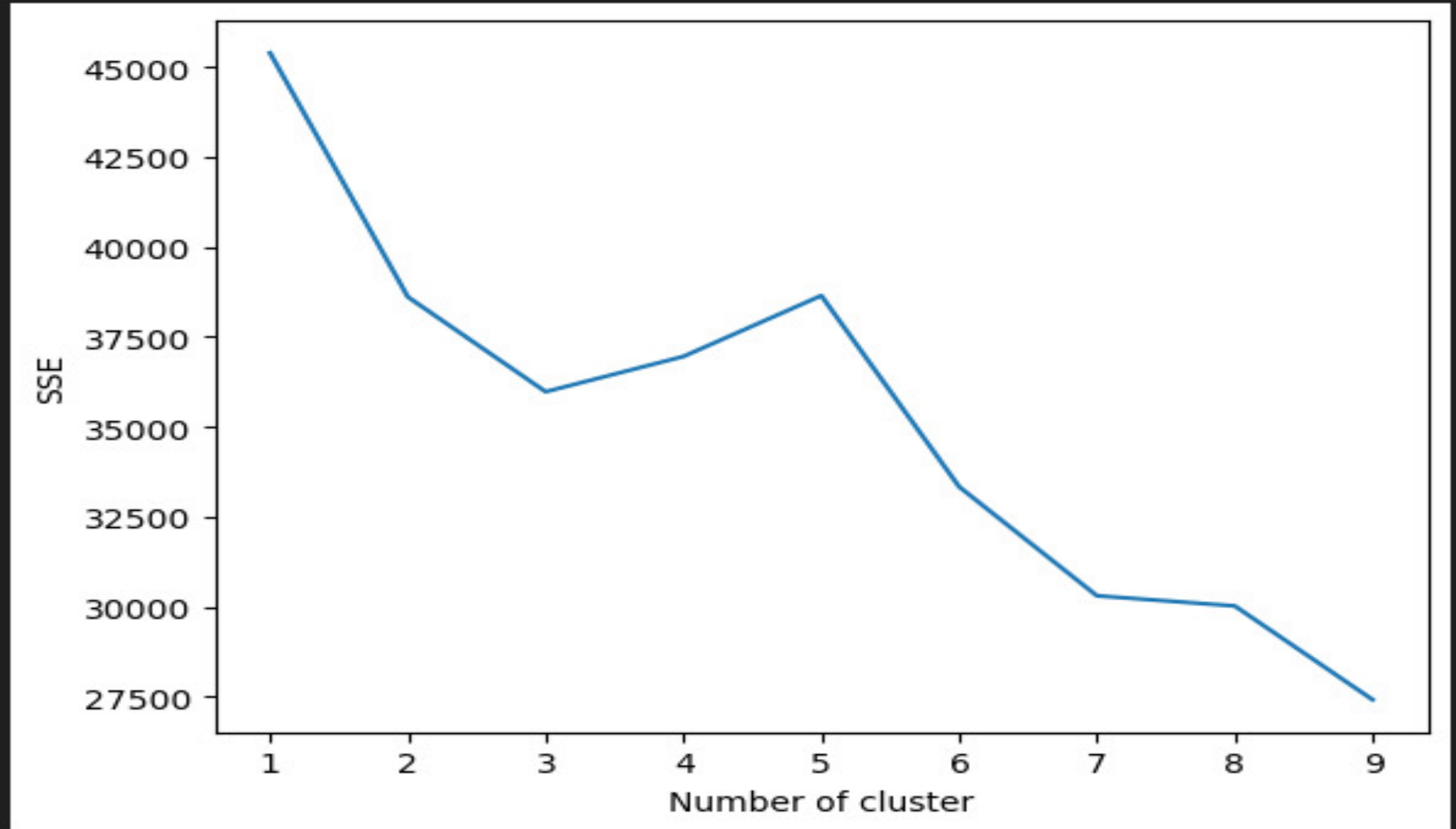
Model measurement - test = 30%

model	Precision [0 – 1]	Recall [0 – 1]	F1-score [0 – 1]	accuracy	Support [0 – 1]
KNN (K = 2)	0.95 – 0.85	0.95 – 0.84	0.95 – 0.84	0.92	3593 - 1207
CART	0.96 – 0.88	0.96 – 0.90	0.96 – 0.89	0.94	3593 - 1207
RANDOM FOREST	0.95 – 0.94	0.98 – 0.86	0.97 – 0.90	0.95	3593 - 1207
					4800
K_MEAN					

Out of all model we tested so far, random forest has the highest accuracy score about 95% and F1 score which is better than KNN, CART. So, we will choose random forest for our project.



Cluster	0	1
Actual		
0	4678	7241
1	1529	2551



Summary

According to the model, the key feature which determine an employee turnover in our use case is **SATISFACTION**. From that we understand that the chance of an employee to leave is unlikely if he his satisfied with his job.



references

- ✓ [Mockaroo - Random Data Generator and API Mocking Tool | JSON / CSV / SQL / Excel](#)
- ✓ [Quit Work Stock Photos, Images and Backgrounds for Free Download](#)
- ✓ [Employee Turnover Data Analysis: 8 Tips for Success – AIHR](#)
- ✓ [DeepSeek - Into the Unknown](#)
- ✓ [<https://cdn.computerhoy.com/sites/navi.axelspringer.es/public/media/image/2023/04/raspberry-lanza-editor-codigo-aprender-python-lenguaje-ia-3008158.jpg>](#)
- ✓ [<https://d3srxiunz7lgh6.cloudfront.net/nhrdh8t9d2rox4ezsizzhyvm1y5l>](#)



MACHINE
LEARNING

Merci

Idris Mahamat