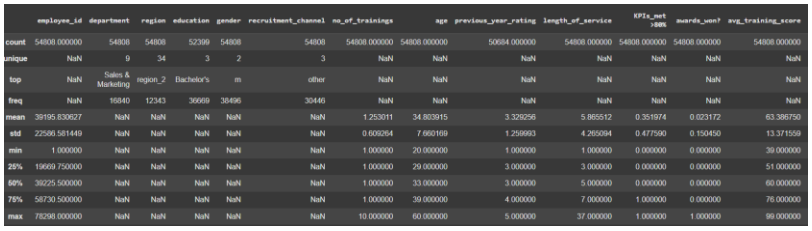
Data Collection and Preprocessing Phase

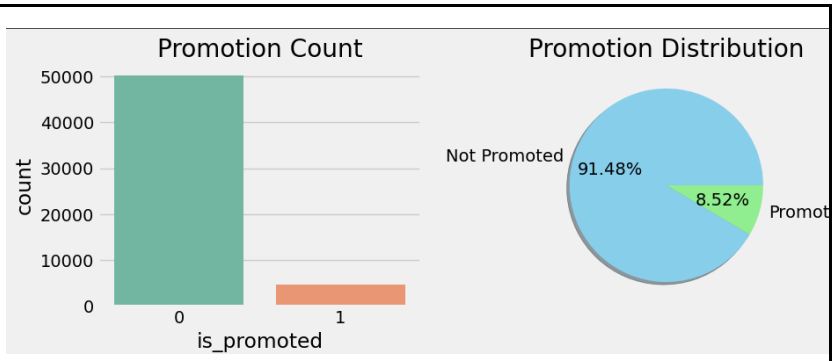
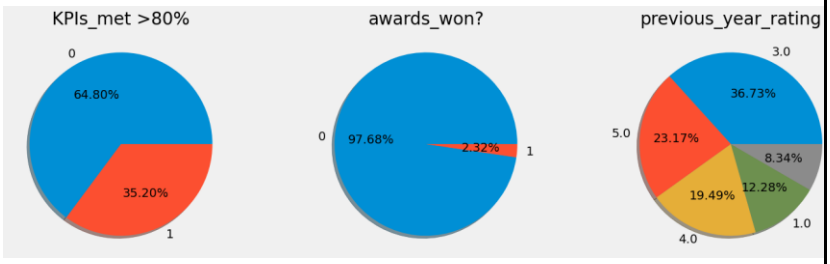
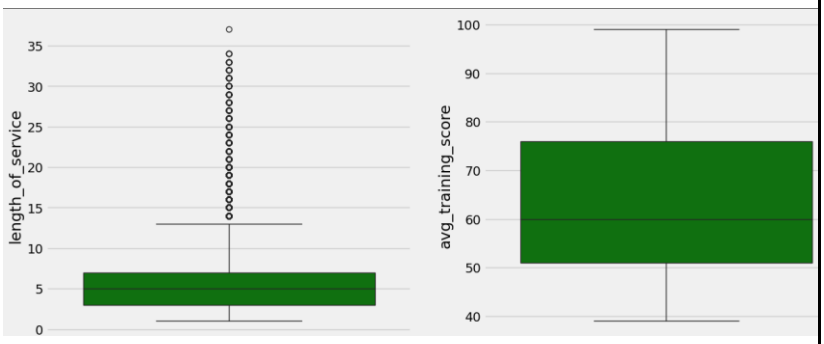
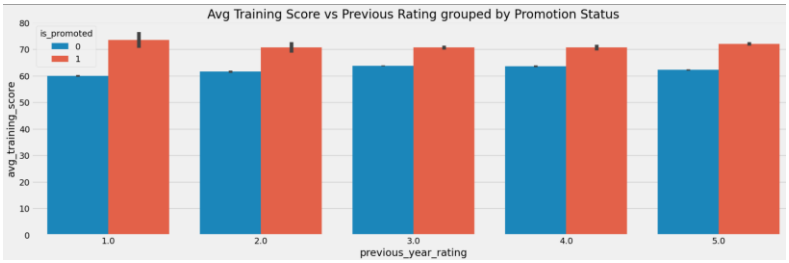
Date	25 June 2025
Team ID	SWTID1750155746
Project Title	Human Resource Management: Predicting Employee Promotions using Machine Learning
Maximum Marks	6 Marks

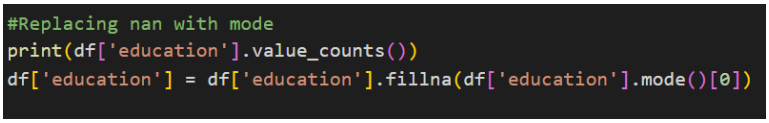
Data Exploration and Preprocessing Report

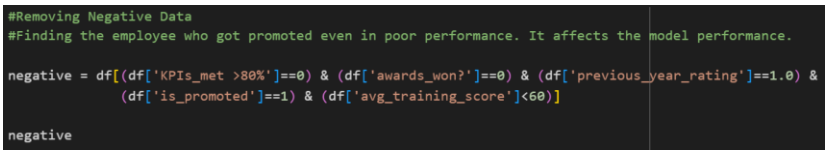
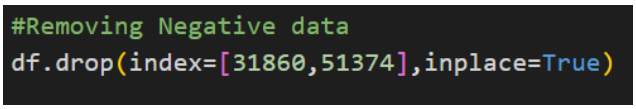
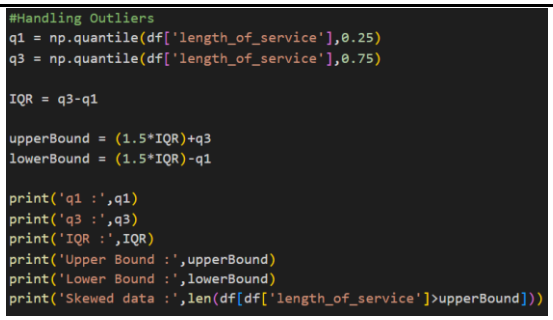
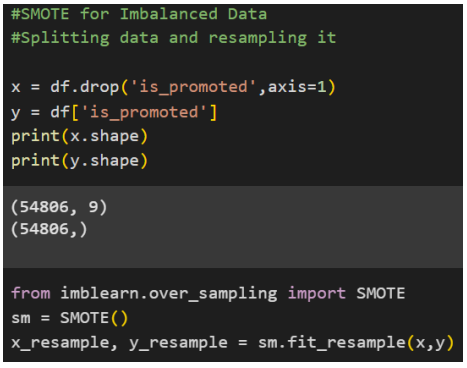
Dataset variables will be statistically analyzed to identify patterns and outliers, with Python employed for preprocessing tasks like normalization and feature engineering. Data cleaning will address missing values and outliers, ensuring quality for subsequent analysis and modeling, and forming a strong foundation for insights and predictions.

Section	Description
Data Overview	<u>Dimension:</u> 54808 rows × 14 columns <u>Descriptive statistics:</u> 
Univariate Analysis	

	employee_id	department	region	education	gender	recruitment_channel	no_of_trainings	age	previous_year_rating	length_of_service	KPIs_met >80%	awards_won?	avg_training_score
count	54808.000000	54808	54808	52399	54808	54808	54808.000000	54808.000000	50684.000000	54808.000000	54808.000000	54808.000000	54808.000000
unique	NaN	9	34	3	2	3	NaN	NaN	NaN	NaN	NaN	NaN	NaN
top	NaN	Sales & Marketing	region_2	Bachelor's	m	other	NaN	NaN	NaN	NaN	NaN	NaN	NaN
freq	NaN	16840	12343	36669	38496	30446	NaN	NaN	NaN	NaN	NaN	NaN	NaN
mean	39195.830627	NaN	NaN	NaN	NaN	NaN	1.253011	34.803915	3.329256	5.865512	0.351974	0.023172	63.386750
std	22586.581449	NaN	NaN	NaN	NaN	NaN	0.609264	7.660169	1.259993	4.265094	0.477590	0.150450	13.371559
min	1.000000	NaN	NaN	NaN	NaN	NaN	1.000000	20.000000	1.000000	1.000000	0.000000	0.000000	39.000000
25%	19669.750000	NaN	NaN	NaN	NaN	NaN	1.000000	29.000000	3.000000	3.000000	0.000000	0.000000	51.000000
50%	39225.500000	NaN	NaN	NaN	NaN	NaN	1.000000	33.000000	3.000000	5.000000	0.000000	0.000000	60.000000
75%	58730.500000	NaN	NaN	NaN	NaN	NaN	1.000000	39.000000	4.000000	7.000000	1.000000	0.000000	76.000000
max	78298.000000	NaN	NaN	NaN	NaN	NaN	10.000000	60.000000	5.000000	37.000000	1.000000	1.000000	99.000000

	
	 
Multivariate Analysis	

Outliers and Anomalies	-
Data Preprocessing Code Screenshots	
Loading Data	
Removing Unwanted Features	
Handling Missing Data	 

Removing Negative Data	 
Handling Outliers	
Handling Imbalanced Data	

Data Transformation	
Feature Engineering	Attached the codes in final submission.
Save Processed Data	-