# Individual Project Report - Customer Satisfaction Analysis using Machine Learning

# Project Title: Customer Satisfaction Analysis using Machine Learning

# Role and Responsibilities:

In the "Customer Satisfaction Analysis using Machine Learning" project, my primary responsibilities were focused on implementing the Support Vector Classifier (SVC) with the polynomial kernel and analyzing the graphical visualizations, including heatmap, to gain insights into the dataset.

# SVC Poly Model Implementation:

My role involved building and fine-tuning the SVC model with the polynomial kernel (SVC Poly). The SVC Poly model is well-suited for handling non-linearly separable data, and I utilized hyperparameter optimization techniques to find the optimal configuration. This involved researching and understanding the impact of different hyperparameters on the model's performance, such as the degree of the polynomial kernel and the regularization parameter (C). After experimenting with various combinations, I successfully trained the SVC Poly model, which contributed to the comparison of different classification models in the project.

# Graphical Analysis and Heatmap Visualization:

Additionally, I was also involved in conducting an in-depth analysis of the correlation matrix using heatmap visualizations. The heatmap provided a powerful visual representation of the correlation between different variables in the dataset, allowing me to identify key associations between customer attributes and their satisfaction levels. Through the heatmap, I observed substantial positive correlations between "Profession" and "Family Size" with the target variable "Segmentation." This implied that specific professions and larger family sizes positively influenced customer satisfaction and played significant roles in customer segmentation.

Moreover, the heatmap revealed a high inverse correlation between "Age" and the target variable "Segmentation." This indicated that younger customers were more likely to be categorized into specific classes of customer satisfaction segmentation.

Additionally, I discovered a moderate positive correlation between "Spending Score" and "Ever Married, “suggesting that married individuals tend to have higher spending scores. Furthermore, the heatmap visualizations helped uncover weak correlations between "Gender," "Graduated," "Work Experience," and "Spending Score" with the target variable "Segmentation." These variables appeared to have less influence on customer satisfaction segmentation. The graphical analysis of the heatmap complemented the model-based approach, providing a holistic understanding of the data. It allowed me to gain deeper insights into the dataset, facilitating the fine-tuning of machine learning models and refining our understanding of customer satisfaction drivers.

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# Conclusion:

Working on the SVC Poly model and conducting graphical analysis, including the heatmap visualization, in this project has been an enriching experience. The heatmap served as a valuable tool to uncover meaningful patterns and relationships between customer attributes and their satisfaction levels. By leveraging this visualization, I gained additional insights into the dataset, reinforcing the importance of customer satisfaction for business success. The combination of machine learning models, such as the SVC Poly, and graphical analysis using the heatmap, significantly contributed to the success of the "Customer Satisfaction Analysis using Machine Learning" project. The insights gained from these analyses can be instrumental in making informed business decisions, optimizing customer-centric strategies, and enhancing overall customer satisfaction. Throughout the project, I have gained valuable hands-on experience in applying machine learning techniques to real-world datasets, improving my knowledge of model evaluation, hyperparameter optimization, and feature importance.

This project has further solidified my understanding of machine learning concepts and their practical applications. In conclusion, the project has been a rewarding and enlightening experience, equipping me with essential skills in the field of machine learning.