### CUSTOMER CHURN PREDICTION USING MACHINE LEARNING

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# Phase-2 Document Submission

**Project:** *Customer Churn Prediction*



### OBJECTIVE:

The objective of customer churn prediction is to identify customers who are at high risk of leaving your company or canceling a subscription to a service, based on their behavior with your product. This information can then be used to intervene and prevent churn, which can save businesses a significant amount of money

**Phase 2*: Innovation:***

**Introduction :**

Customer churn prediction is the process of identifying customers who are at high risk of leaving your company or canceling a subscription to a service. This is done by analyzing customer behavior and other data points to identify patterns that are associated with churn.

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**Step 1:** Data Collection and Preprocessing

**G**ather historical customer data, including demographic information, transaction history, customer support interactions, and any other relevant features.

* Preprocess the data by handling missing values, encoding categorical variables, and scaling numerical features.
* Split the data into training and testing set**s.**

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**Step 2:** Model Selection and Development

* Choose an appropriate machine learning algorithm for your churn prediction problem. Common choices include logistic regression, decision trees, random forests, support vector machines, or gradient boosting methods like XGBoost or LightGBM.
* You can also explore more advanced techniques like neural networks if you have a large dataset

**Step 3:** Data Spilting

* Split the data into training, validation, and test sets. This allows you to train the model, tune hyperparameters, and evaluate its performance on unseen data.

**Step 4:** Model Training

Train the selected machine learning model on the training data. Optimize hyperparameters using techniques like grid search or random search.

* Consider techniques for handling class imbalance, as churned customers are often a minority class.

**Step 5:** Model Evaluation

* Evaluate the model's performance using appropriate metrics, such as accuracy, precision, recall, F1-score, and ROC AUC.
* Choose the metric that aligns with your business objectives. In churn prediction, minimizing false negatives (customers wrongly classified as not churning when they actually do) is often crucial.

**Step 6:** Model Deployment

* Once satisfied with the model's performance, deploy it to your production environment.
* Implement a mechanism to regularly retrain the model as new data becomes available to ensure it remains accurate.

**Step 7:** Monitoring and Action

Continuously monitor the model's predictions and act on them. When a customer is predicted to churn, take appropriate retention actions, such as targeted marketing campaigns, discounts, or personalized offers.

**Step 8:** Documentation and Training

* Describe the business problem and the goal of the churn prediction model.
* Explain the data sources and features used in the model.
* Document the machine learning algorithm and its parameters.
* Describe the model evaluation metrics and results.
* Prepare the data by cleaning, preprocessing, and engineering features.
* Train the machine learning model using the prepared data.
* Evaluate the trained model on a holdout test set.
* Deploy the trained model to production to predict churn risk for new customers.

**Step 10:** Continuous Improvement

**Feedback Loop:**

* Collect feedback on the effectiveness of your retention strategies and use this information to improve your churn prediction model and business processes continually.

**Research and Development:**

* Invest in ongoing research to explore new anomaly detection techniques and technologies

**Conclusion:**

customer churn prediction is not just a one-time analysis but an ongoing process that empowers businesses to retain valuable customers, reduce churn-related costs, and ultimately achieve sustainable growth. When executed effectively, it can be a valuable asset for any organization seeking to thrive in a competitive market.