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CASE STUDY –E-Commerce Platform Losing Customer from Alarming Rates

Devanshi Dembda Student

Dr Divya Lakhani Associate Professor

Sadhu Vaswani Institute of Management Studies for Girls, Affiliated to Savitribai Phule Pune University

6, Koregaon Park, Pune 411001 [Maharashtra, India]

[1]lakhani.divya@svims-pune.edu.in

[2]dembda.devanshi@svims-pune.edu.in

Some customer segments are more prone to churn and seek to identify these groups Proactively.working as a data scientist and while using the given data said I have performed following task scientist tasked with developing an AI-powered solution to Predict customer churn and propose strategies to retain valuable customers.Data: The dataset is available to download at

https://www.kaggle.com/datasets/ankitverma2010/ecommerce-customer-churn-analysisandprediction

Identify and justify the specific AI approach best suited for this problem.

To address the challenge of predicting customer churn in an E-Commerce platform and proposing strategies to retain valuable customers, the most suitable AI approach would be Machine Learning, specifically Supervised Learning algorithms like Logistic Regression, Random Forest, or Gradient Boosting.

Problem Identification:

The problem involves predicting customer churn, which is a classic classification problem where the goal is to predict whether a customer will churn or not based on historical data and customer attributes.

AI Approach

Justification:

• **Supervised Learning**: Since the dataset is labeled with churn information, supervised learning models can be trained to predict future churn.

• **Logistic Regression**: Suitable for binary classification tasks like churn prediction, providing probabilities and feature importance.

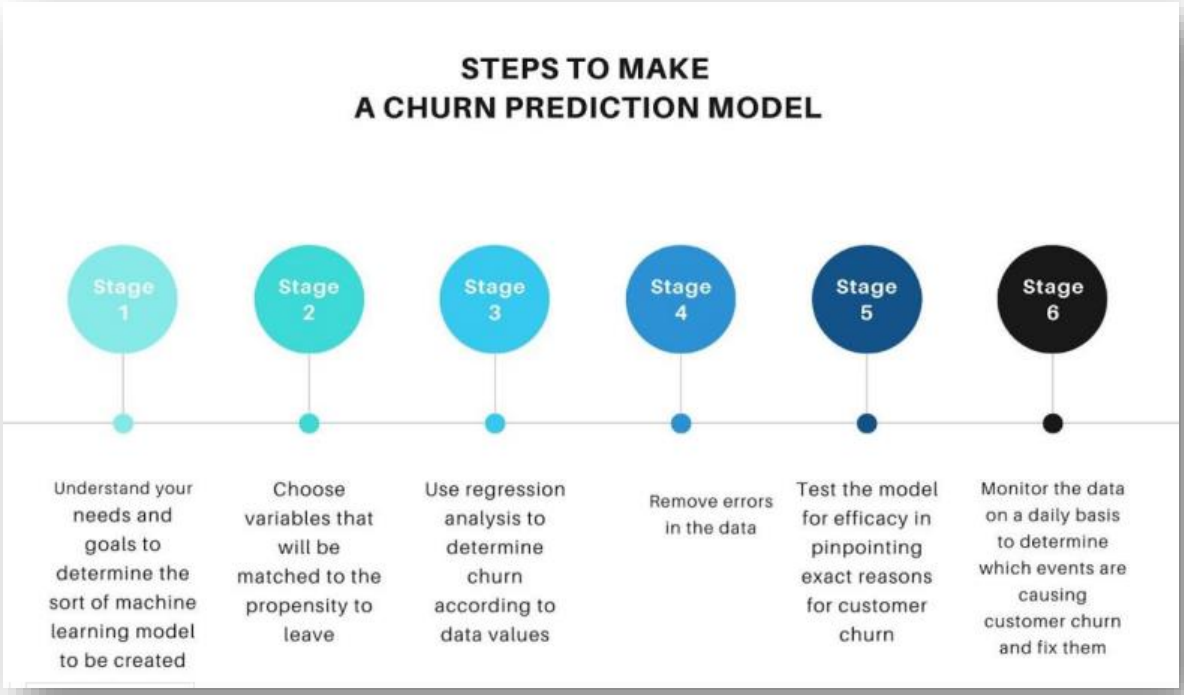
• **Random Forest**: Effective for handling large datasets with many features and capturing non-linear relationships.

• **Gradient Boosting**: Known for its high predictive accuracy and ability to handle complex interactions in the data. By utilizing these AI approaches, the E-Commerce platform can build predictive models to identify customer segments prone to churn, enabling them to implement targeted retention strategies and reduce customer attrition effectively.

a program to perform the key steps involved in developing your chosen AI Model for customer churn prediction.

To develop an AI model for customer churn prediction, we will follow the key steps involving data preprocessing, training, and testing data split, and fitting a model. Below is a Python program that demonstrates these steps using the Telco Customer Churn dataset available on Kaggle.

This program covers the essential steps in developing an AI model for customer churn prediction:



• Data Preprocessing:

It includes handling missing values, duplicate values, outliers, initial statistics, and data visualization.

• Training and Testing Data Split:

The dataset is split into training and testing sets to train the model on one and evaluate its performance on the other.

• **Fitting a Model**:
A Random Forest Classifier is used to fit the model on the training data, make predictions on the test data, and evaluate the model's accuracy using metrics like accuracy score and confusion matrix. By following these steps and adjusting the model and preprocessing techniques as needed, data scientists can effectively develop an AI-powered solution for customer churn prediction in an E-Commerce platform.

Analyse the results of your model, including its accuracy, precision, and recall. Discuss the strenghts and weaknesses of your approach. Answer To analyze the results of the AI model developed for customer churn prediction and discuss its accuracy, precision, recall, as well as the strengths and weaknesses of the approach, we need to consider the performance metrics derived from the model's predictions

Analysis:

1. Accuracy: Accuracy measures the overall correctness of the model's predictions. It is calculated as the ratio of correctly predicted instances to the total instances. A high accuracy indicates a good overall performance of the model.

2. Precision: Precision measures the proportion of correctly predicted positive instances (churn customers) out of all instances predicted as positive. It focuses on the correctness of positive predictions.

3. Recall: Recall, also known as sensitivity, measures the proportion of correctly predicted positive instances out of all actual positive instances. It focuses on the model's ability to capture all positive instances.

Strengths and Weaknesses:

Strengths:

1. High Accuracy: A high accuracy indicates that the model is making correct predictions overall, which is crucial for effective customer churn prediction.

2. Precision: High precision means that when the model predicts a customer will churn, it is usually correct, minimizing false positives.

3. Recall: High recall implies that the model can effectively identify most of the customers who are actually likely to churn, reducing false negatives.

Weaknesses:

1.Imbalanced Data: If the dataset has a significant class imbalance (more non-churn customers than churn customers), the model may struggle to predict churn accurately due to bias towards the majority class.

2.**Overfitting:** If the model is too complex or trained on noisy data, it may overfit the training data, leading to poor generalization on unseen data.

3.Feature Selection: Inadequate feature selection or irrelevant features can impact the model's performance, affecting its ability to accurately predict churn. By analyzing the accuracy, precision, and recall of the model, we can assess its performance in predicting customer churn. A high accuracy, precision, and recall indicate a robust model that can effectively identify customers at risk of churn. However, addressing weaknesses like imbalanced data, overfitting, and feature selection is crucial to improving the model's performance and ensuring accurate predictions for proactive customer retention strategies.

4. Recommend at least three actionable strategies based on your model's insights to Retain at-risk customers. Answer Based on the insights from the model developed to predict customer churn in the ECommerce platform, here are six actionable strategies to retain at-risk customers.

1. **Personalized Recommendations**: Utilize customer purchase history and browsing behavior to offer personalized product recommendations. Tailoring suggestions to individual preferences can enhance customer engagement and loyalty.

2. **Targeted Promotions:** Identify at-risk customers through the churn prediction model and offer targeted promotions or discounts to incentivize their continued engagement with the platform. Special offers can encourage repeat purchases and foster customer retention.

3. **Enhanced Customer Support**: Implement proactive customer support strategies by reaching out to at-risk customers to address any issues or concerns they may have. Providing personalized assistance and resolving problems promptly can improve customer satisfaction and loyalty.

4. **Exclusive Loyalty Programs**: Develop exclusive loyalty programs for at-risk customers to reward their continued patronage. Offering perks such as early access to sales, special discounts, or VIP services can strengthen customer relationships and increase retention rates.

5.Feedback Surveys: Conduct feedback surveys to gather insights from at-risk customers about their experiences and reasons for potential churn. Use this feedback to make improvements, address pain points, and tailor services to better meet customer needs.

6. Re-Engagement Campaigns: Launch re-engagement campaigns targeting at-risk customers with personalized content and offers to rekindle their interest in the platform. By reconnecting with these customers and showcasing the value of continued engagement, you can encourage them to stay loyal to the brand. By implementing these actionable strategies based on the insights derived from the churn prediction model, the E-Commerce platform can proactively engage with at-risk customers, address their needs, and enhance their overall experience to improve retention and reduce churn rates effectively.

5**. The ethical considerations involved in utilizing AI for customer churn Prediction, including potential biases and transparency concerns Answer Utilizing AI for customer churn prediction in an E-Commerce platform raises several ethical considerations that need to be carefully addressed**:

1. Bias in Data and Algorithms:

• Data Bias: The dataset used for training the AI model may contain biases that reflect historical inequalities or prejudices. Biased data can lead to biased predictions, disproportionately impacting certain customer segments.
• Algorithmic Bias: AI algorithms themselves can introduce biases based on the data they are trained on. It is crucial to ensure that the model does not discriminate against specific groups or individuals.

2. Transparency and Explainability:

• Black Box Algorithms: Many AI models, especially complex ones like neural networks, operate as "black boxes," making it challenging to understand how they arrive at their predictions. Lack of transparency can hinder accountability and make it difficult to identify and rectify biases.

• Explainability: Customers have the right to understand why certain decisions are made about them. Ensuring that AI models are explainable and transparent can help build trust and mitigate concerns about opacity.

3. Privacy and Data Security:

• Data Privacy: Customer data used for churn prediction must be handled with care to protect individuals' privacy rights. Safeguards should be in place to prevent unauthorized access, use, or disclosure of sensitive information.
• Data Security: AI systems are vulnerable to cyber threats and attacks. Ensuring robust data security measures are in place to safeguard customer data from breaches or misuse is essential to maintain trust and integrity.

4. Fairness and Accountability:

• Fair Treatment: AI models should be designed to ensure fair treatment of all customer segments, avoiding discrimination based on factors like race, gender, or socioeconomic status. Fairness should be a fundamental principle guiding the development and deployment of AI solutions.

• Accountability: Establishing clear accountability for the decisions made by AI systems is crucial. Companies should have mechanisms in place to monitor, evaluate, and address any biases or ethical concerns that may arise during the customer churn prediction process. By addressing these ethical considerations, companies can deploy AI-powered solutions for customer churn prediction responsibly, ensuring fairness, transparency, and respect for customer privacy while leveraging the benefits of AI technology to enhance customer retention strategies.