Telecom Churn Customers

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Executive Summary

Actionable Insights:

- Identify High-Risk Customers: The model identifies customers with a high probability of churning. This allows the customer-facing teams to focus their retention efforts on these specific individuals.

Understand Churn Drivers:

- By analyzing the features that the model uses to predict churn (e.g., contract type, monthly charges, tenure), you can gain insights into the underlying reasons why customers are leaving.

Segment Customers:

- The batch prediction capability allows you to segment customers based on their churn risk. This enables tailored retention strategies for different risk groups.

Executive Summary

Business Recommendations:

Proactive Outreach:

- Reach out to high-risk customers with personalized offers, incentives, or improved service to address their concerns and prevent churn.

Targeted Marketing Campaigns:

- Design marketing campaigns that address the specific churn drivers identified by the model. For example, if "Month-to-month" contracts are a significant factor, offer incentives to switch to longer-term contracts.

Improve Customer Experience:

- Use the insights on churn drivers to identify areas for improvement in your service or product offerings. Empower Frontline Teams: Provide customer-facing teams with access to the churn prediction tool so they can have informed conversations with customers and proactively address potential issues. Develop Retention Programs: Create specific retention programs for different customer segments based on their churn risk and value.

Executive Summary

Business Recommendations:

Monitor and Iterate:

- Continuously monitor the model's performance and the effectiveness of your retention strategies. Use this feedback to refine your approach and improve churn prediction accuracy over time.
- By implementing these recommendations, you can leverage the churn prediction model to significantly improve customer retention and drive business growth.

Business Problem Overview and Solution Approach

Business Problem

- In the highly competitive telecommunications industry, customer retention is critical to sustaining growth and profitability. Customer churn remains a persistent challenge, making it essential to understand customer behavior and the underlying factors that drive their decision to leave. Gaining these insights is key to maintaining loyalty and delivering superior service.
- To tackle this, the Customer Analytics & Retention Department has been analyzing historical customer data, segmented into two main groups—customers who have churned and those who have been retained. By leveraging advanced machine learning techniques, the team has developed a predictive model to identify patterns associated with churn risk. The goal is to provide actionable insights that enable proactive, targeted retention strategies.
- However, several challenges hinder the effectiveness of the current process:

Data Overload:

- The vast volume and complexity of customer data make it difficult to extract timely, meaningful insights, slowing down decision-making and intervention.

Business Problem Overview and Solution Approach

Business Problem

Delayed Responses:

- The existing churn analysis approach lacks the speed needed to respond to emerging trends, often resulting in missed retention opportunities.

Limited Accessibility:

- For the model to be impactful, it must be easily accessible to all customer-facing teams. A user-friendly web application is essential to ensure its widespread adoption and practical use.

Business Problem Overview and Solution Approach

Solution Approach

- To ensure seamless and scalable access to the churn prediction system, the Customer Analytics & Retention Department seeks to improve how the model and its environment are deployed across teams. The current centralized web-based deployment has caused performance issues and high latency as access expanded to distributed locations. Additionally, sharing the model has been problematic due to environment and system incompatibilities.
- The department's objective is to develop a standardized, portable solution that packages the model, dependencies, configurations, and runtime environment into a self-contained unit. This approach aims to eliminate compatibility issues, reduce errors during deployment, simplify setup, and enable reliable use of the application across different systems. The goal is to empower all teams with consistent, low-latency access to the churn prediction model, supporting timely and proactive customer retention efforts.

EDA Results

- The project included porting saved joblib model namely “churn_prediction_model_v1_0.joblib” and not the data set for us to train the ML model as it has already been trained and saved.
- This is a case, when we don’t have to train a model, but use an existing train model and port into our solution and create front end Interactive UI interface and provide back-end REST API based interface for development access.

Backend REST API saved model for batch processing

REST Based API using Flask Web Framework

- Flask is a lightweight, flexible python web framework used to build web applications and API's quickly and easily
- Create web routes (URL's that users can access)
- Serve HTML API's to expose machine learning models or business logic.
- Handle HTTP requests and responses
- Build REST APIs to expose machine learning models or business logic
- The API allows any application (like a dashboard, CRM, or mobile app) to send customers data and get back a prediction to infer if the customer is likely to Churn or not.

Streamlit for an Interactive UI

- Allows users (business teams, analysts) to interact with the churn prediction model using a friendly interface, no coding needed.
- It includes user input for a single customer or a batch prediction using a CSV with customer records.
- Non-technical users can try the model easily
- Supports both ad-hoc testing and batch predictions.
- Can be hosted on Hugging Face space, Streamlit cloud

Data Background and Contents

Data Dictionary

- SeniorCitizen
- Partner
- Dependents
- tenure
- PhoneService
- InternetService
- Contract
- PaymentMethod
- MonthlyCharges
- TotalCharges

The combination od data is compared with the predicted model to see if the customer churn’s or not

Deployment

Back-end files uploaded files on the hugging face hub

- https://huggingface.co/spaces/AmanAliSyed/Backend-Container/commit/bef444c66812aa9488cb6912c92b595b179fe514

Back-end URL interface REST API based for Telecom churn

- https://huggingface.co/spaces/AmanAliSyed/Backend-Container

Front-end files uploaded files on hugging face hub

- https://huggingface.co/spaces/AmanAliSyed/Frontend-Container/commit/b695443abf393563d9edcd74721d7aa176a65c92

Front-end URL interface for Telecom Churn interactive UI

- https://huggingface.co/spaces/AmanAliSyed/Frontend-Container

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