Empowering Telecom Sales: AI-Driven Plan Recommendations and Dynamic Rewards System

Abstract:

The telecom industry faces significant challenges in customer retention, profitability, and customer engagement. This project delivers an AI-driven Phone Plan Sales System that provides personalized recommendations, profit-optimized discounts, and dynamic rewards allocation. By combining software development and data science principles, the system aligns customer satisfaction with organizational goals. Leveraging content-based filtering for plan recommendations and decision tree models for rewards, the system ensures scalability, efficiency, and value-driven outcomes. An earlier approach using Random Forest models on synthetic data provided key learnings, further refining our current solution.

Problem Statement:

Choosing the right phone plan can be overwhelming for customers due to the variety of options available. Companies often struggle to balance profitability with providing discounts, as poorly targeted offers erode revenue without attracting or retaining customers effectively. Moreover, bundling opportunities are underutilized, leaving revenue potential untapped. Finally, a lack of personalized rewards or loyalty strategies increases customer churn, impacting long-term engagement.

Technical Implementation:

Weighted Content-Based Filtering:

The system is designed with a focus on personalization and user-centric recommendations. It starts with a **weighted content-based filtering approach**, which matches customer preferences—like budget and data needs—with available plan features. By using a scoring formula, the system ensures that the best plans for each customer are recommended, simplifying the decision-making process and improving satisfaction.

Decision Tree for Rewards Allocation:

To handle reward allocation, the system uses a **decision tree model** that predicts rewards such as loyalty points, cashback, or even free phones. The tree works by evaluating specific customer attributes, including whether they are a new or existing customer, the type of plan they have selected (basic or premium), and how long they've been with the company. With **Gini Index optimization**, the model ensures these predictions are accurate and fair, making sure rewards feel personalized and valuable.

Tailored Discounts:

Tailored discounts are another key feature of the system. These discounts are designed to provide additional value to specific customer groups. For example, **students** enjoy a 20% discount, **senior citizens** receive a flat $10 discount, and **veterans** or **first responders** are offered 30% off on premium plans. This targeted approach not only adds value for customers but also helps build stronger relationships with these important segments.

Dynamic Bundling (Future work):

Although not yet implemented, dynamic bundling offers an exciting opportunity to combine plans, phones, and accessories into customized packages that better suit customer needs. This could involve using simple rules for predefined bundles or leveraging data-driven methods like collaborative filtering to recommend popular combinations. By doing so, the system can provide more value to customers while boosting Average Revenue Per User (ARPU).

Previous Approach: Initially used a Random Forest - based model trained on synthetic data. While it performed well on training data, it faced limitations:

- **Overfitting:** High accuracy on training data but poor generalization.
- **Synthetic Data Limitations:** The lack of real-world variability reduced reliability.
- **Imbalanced Target Classes:** Uneven representation of plans skewed predictions.

Value Proposition

Simplified Choices: Personalized recommendations make it easier for customers to choose the right plan.
Enhanced Value: Tailored discounts and dynamic bundles improve perceived value.
Transparent Pricing: Fair discounts build trust and loyalty.

Value Delivered

For Customers:

- Easier decisions with tailored recommendations.
- Greater value through targeted rewards and discounts.
- Improved trust via transparent pricing strategies.

For the Business:

- **Revenue Growth:** Effective bundling and upselling increase revenue.
- **Retention:** Personalized offers improve loyalty and reduce churn

Conclusion:

This Phone Plan Sales System bridges software engineering and data science to tackle key challenges in telecom sales. By offering personalized recommendations, tailored discounts, and dynamic rewards, it directly enhances customer satisfaction while driving revenue growth. Though currently a prototype, the system showcases significant potential to evolve into a scalable, real-world solution that delivers measurable value to both customers and the organization.