Big Data Analytics

Assignment One

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**Section 1: Application of Decision Trees in Business (Theoretical Analysis)**

**Why are Decision Trees Useful in Customer Churn Prediction?**

Decision Trees are powerful and intuitive machine learning algorithm which is well-suited for a customer Churn prediction due to the following:

1. **Intepretability**: Decision trees provide a clear and visual representation of the decision-making process. The tree structure allows stakeholders to easily understand how different customer attributes (e.g., age, subscription length, watch time) contribute to the likelihood of churn. This transparency is crucial for business decisions, as it helps explain why a customer might churn.
2. **Handling Mixed Data Types**: Decision trees can handle both numerical (e.g., age, watch time) and categorical (e.g., membership type, payment method) data without requiring extensive preprocessing. This flexibility makes them suitable for datasets like the one provided by StreamFlex, which contains a mix of demographic, behavioral, and subscription-related features.
3. **Feature Importance**: Decision trees can rank the importance of different features in predicting churn. For example, the model might reveal that "number of complaints" or "payment issues" are the most significant predictors of churn. This insight helps businesses focus on the most impactful factors.
4. **Non-Linear Relationships**: Decision trees can capture non-linear relationships between features and the target variable (churn). For instance, the relationship between watch time and churn might not be linear; decision trees can model such complexities effectively.
5. **Scalability**: Decision trees are computationally efficient and can handle large datasets, making them suitable for businesses like StreamFlex with a large customer base.

**What Business Actions Can Be Taken Based on the Predictions of a Decision Tree Model?**

The predictions from the decision tree model can help guide several strategic business actions to reduce churn and improve customer retention:

1. **Targeted Retention Campaign**: By identifying customers who are at high risk of churning, StreamFlex can design personalized retention campaigns. For example, customers with a high likelihood of churn could be offered discounts, free months of service, or exclusive content to encourage them to stay.
2. **Improving Customer Support**: If the model highlights that customers with unresolved complaints or long resolution times are more likely to churn, StreamFlex can prioritize improving its customer support system. This could involve reducing resolution times, increasing support staff, or implementing better complaint-handling processes.
3. **Subscription Plan Adjustments**: The model might reveal that customers on certain membership types (e.g., Basic) are more likely to churn. StreamFlex could consider revising its subscription plans, offering more value to these customers, or providing incentives to upgrade to higher-tier plans.
4. **Personalized Recommendations**: If usage behavior (e.g., watch time, preferred content type) is a significant predictor of churn, StreamFlex can use this information to provide personalized content recommendations. For example, customers who watch less content could be recommended popular shows or movies to re-engage them.
5. **Payment Issue Resolution**: If payment issues are a key driver of churn, StreamFlex can implement measures to simplify the payment process, offer multiple payment options, or provide reminders to avoid missed payments.