ASSIGNMENT :

"REQUIREMENT LIFE CYCLE FOR CUSTOMER SEGMENTATION MODEL FOR A TELECOMMUNICATIONS COMPANY"

BY: DISHANT BAWEJA

CUSTOMER SEGMENTATION MODEL

A "Customer Segmentation Model" is a framework used to divide a company's customer base into distinct groups that share common characteristics. These segments can be based on demographics, behaviours, psychographics, or other criteria. The aim is to identify patterns in customer behaviour and preferences, enabling more personalized and efficient marketing, sales, and service strategies.

- OBJECTIVES

1) **Personalized Marketing:** Tailor marketing campaigns to the needs and preferences of each customer segment.
2) **Improved Customer Retention:** Understand which customer segments are more likely to churn and create targeted retention strategies.
3) **Product Customization:** Develop products or services based on the specific needs of different customer groups.
4) **Revenue Maximization:** Identify high-value segments that contribute most to revenue and focus on increasing their lifetime value.
5) **Cost Optimization:** Efficient allocation of resources by targeting specific segments, reducing waste in marketing and sales efforts.
6) **Strategic Decision Making:** Enable data-driven decisions that align with the company's goals by better understanding customer needs.

➢ FUNCTIONAL REQUIREMENTS

1) **Data Requirements:**
   - Ability to gather customer data from various sources (e.g., CRM, website, social media).
   - Secure and scalable data storage solutions.
2) **Segmentation Requirements:**
   - Use machine learning algorithms like clustering (K-means, DBSCAN) or decision trees to identify customer segments.
   - Support for custom segmentation logic based on business needs.
3) **Data Preprocessing:**
   - Data cleaning, normalization, and transformation to prepare for analysis.
   - Handling missing data and outliers.
4) **Visualization and Reporting:**
   - Tools for visualizing segmentation results (e.g., dashboards, heatmaps).
   - Reporting features to analyse and present findings.
5) **Predictive Analytics:**
   - Ability to predict customer behaviour or preferences based on segment history.
6) **Integration with Marketing Platforms:**
   - Seamless integration with CRM systems and marketing automation tools for executing personalized campaigns.

➢ NON-FUNCTIONAL REQUIREMENTS

1) **Scalability:** The system should handle increasing volumes of customer data without performance degradation.
2) **Security and Privacy:** Compliance with data protection regulations like GDPR, ensuring the security of customer data.
3) **Performance:** Fast processing of large datasets and quick response to queries and reporting.
4) **Usability:** The system should be user-friendly for business analysts and marketing teams, with minimal technical expertise required.
5) **Accuracy:** The model should provide highly accurate segmentation with reliable insights into customer behaviours.

6) **Maintainability:** The model should be easy to update as the business evolves and new data becomes available.
7) **Flexibility:** Ability to adjust the model parameters based on changes in business objectives.

➢ SEGMENTATION CRITERIA

1) **Demographic Segmentation:** Age, gender, income, education, occupation, marital status.
2) **Geographic Segmentation:** Location (country, region, city), climate, urban/rural distinction.
3) **Behavioural Segmentation:** Purchase history, spending habits, brand loyalty, usage patterns, readiness to buy.
4) **Psychographic Segmentation:** Lifestyle, personality traits, values, interests, and attitudes.
5) **Firmographic Segmentation (for B2B):** Company size, industry, revenue, and decision-making process.
6) **Customer Lifetime Value (CLV):** Segmentation based on predicted lifetime value to the company.

➢ DATA COLLECTION AND DOCUMENTATION

- **Data Sources:**
  - Internal Sources: CRM, transactional data, customer feedback, website behaviour.
  - External Sources: Social media, public databases, market research reports, third-party providers.
- **Documentation:**
  - Document the data collection process, data fields, and criteria for segmentation.
  - Maintain metadata, including data source, frequency of updates, and any data transformations applied.

➢ TOOLS AND ANALYSIS

- **Data Collection Tools:**
  1) CRM Systems: Salesforce, HubSpot.
  2) Survey Tools: SurveyMonkey, Google Forms.
  3) Social Media Listening Tools: Hootsuite, Sprout Social.
  4) Analytics Platforms: Google Analytics, Adobe Analytics.
  5) Data Warehousing: Amazon Redshift, Google BigQuery
- **Data Analysis Tools:**
  1) Statistical Tools: R, Python (NumPy, Pandas, Scikit-learn).
  2) Machine Learning Tools: TensorFlow, Keras, Scikit-learn.
  3) Business Intelligence (BI) Tools: Power BI, Tableau, Looker.
  4) Data Visualization: D3.js, Matplotlib, Seaborn.
  5) Customer Segmentation Algorithms: K-means clustering, hierarchical clustering, DBSCAN, and principal component analysis (PCA).

➢ PRIORITIZATION AND IMPACT ANALYSIS

- **Prioritization:**
  1) Revenue Potential: Focus on segments with the highest potential for generating revenue.
  2) Customer Lifetime Value (CLV): Prioritize segments with higher lifetime value.
  3) Cost of Acquisition: Evaluate the cost-effectiveness of targeting each segment.
  4) Ease of Access: Focus on segments that are easier to reach through marketing channels.
  5) Business Goals Alignment: Ensure that the segment aligns with the company's strategic goals and capabilities.
  6) Feasibility: Consider the ease of reaching or influencing a segment, including costs and resources.
- **Impact Analysis:**
  1) Market Penetration: Estimate the potential increase in market share after targeting specific segments.

2) Profitability: Assess the impact on profit margins based on customer behaviour and spending patterns in each segment.
3) Customer Satisfaction: Measure changes in customer satisfaction and loyalty post-segmentation.
4) Operational Efficiency: Evaluate how targeting specific segments can improve internal processes and resource allocation.
5) Long-Term Growth: Analyse how segmentation efforts contribute to long-termcustomer base growth and business scalability.

By implementing a robust customer segmentation model, companies can optimize their marketing strategies, improve customer satisfaction, and drive sustainable business growth.

THE REQUIREMENT LIFE CYCLE

The “Requirement Life Cycle for a Customer Segmentation Model” for a telecommunicationscompany can be structured using the following steps,

1. Elicitation
2. Analysis and Documentation
3. Validation and Verification
4. Prioritization and Negotiation
5. Change Management
6. Communication and Collaboration
7. Traceability and Impact Analysis
8. Implementation and Testing
9. Validation and Acceptance
10. Deployment and Maintenance
11. Retirement and Archival

➢ ELICITATION

Objective: Gather requirements and understand the business context of customer segmentation.

1) **Stakeholder Interviews:** Conduct interviews with marketing, customer support, data science teams, and leadership to understand their expectations from the model.
2) **Focus Groups and Workshops:** Host sessions with key stakeholders to collect insights on customer behaviour, needs for segmentation (e.g., churn reduction, campaign targeting), and potential impacts on business operations.
3) **Data Exploration:** Identify available data (customer demographics, usage patterns, service interactions) to confirm its alignment with business needs.
4) **Data Collection:** Use interviews, surveys, and workshops to collect information about current customer segmentation methods, desired outcomes, and pain points.

➢ ANALYSIS AND DOCUMENTATION

Objective: Analyse the gathered requirements and document them clearly.

- **Requirement Analysis:** Analyse elicited information to identify functional and non-functional requirements of the segmentation model.
  - Functional: The model should segment customers based on their usage patterns, billing behaviour, etc.
  - Non-functional: The model should process data within a certain time frame, be scalable for large datasets, and ensure data privacy.
- **Documentation:** Create a requirements specification document detailing:
  - Business objectives.
  - Key performance indicators (KPIs).
  - Data sources.
  - Desired segmentation types (demographic, behavioural, etc.).
  - Constraints (data privacy, processing power).
  - Assumptions and Dependencies: Capture any assumptions regarding data availability or stakeholder input and dependencies on other systems (e.g., CRM integration).

➢ VALIDATION AND VERIFICATION

Objective: Ensure that the requirements are complete, accurate, and aligned with business goals.

1) **Verification with Stakeholders:** Validate the documented requirements with stakeholders to ensure that they align with business goals. For example, verify that the model segments will help drive personalized marketing or reduce churn.
2) **Data Validation:** Ensure that the available data is clean, accurate, and sufficient for model development. Identify any gaps or missing data.
3) **Model Validation Metrics:** Define model performance metrics (e.g., silhouette score for clustering) that will later validate the model's effectiveness in segmenting customers.

➢ PRIORITIZATION AND NEGOTIATION

Objective: Prioritize requirements based on their importance and negotiate trade-offs if necessary.

1) **Requirement Prioritization:**
   - Prioritize the requirements based on their business impact (e.g., customer churn reduction may be more critical than marketing personalization).
   - Focus on high-priority segments like high-value customers or those likely to churn.
2) **Negotiation with Stakeholders:** Negotiate on scope, timelines, and resource allocation based on the importance of different segments and the feasibility of implementation.
3) **Budget and Timeline Adjustments:** Collaborate with teams to adjust expectations on timelines and resources, especially if advanced data processing or machine learning tools are needed.

➢ CHANGE MANAGEMENT

Objective: Manage changes to requirements throughout the project lifecycle.

1) **Change Request Process:** Define a process for managing changes to requirements (e.g., introducing new customer data points or modifying segmentation criteria).
2) **Impact Analysis:** Evaluate how proposed changes will impact the project scope, budget, and timeline. This could involve recalculating data processing time or modifying the clustering algorithm.
3) **Approval Mechanism:** Set up a formal process for approving changes in scope, with input from both business and technical stakeholders.

➢ COMMUNICATION AND COLLABORATION

Objective: Ensure effective communication and collaboration among all team members and stakeholders.

1) **Communication Plan:** Develop a plan for regular updates and feedback loops.
2) **Cross-Team Collaboration:** Establish regular meetings between data scientists, business analysts, marketing, and IT teams to ensure continuous alignment.
3) **Collaboration Tools**: Use tools like project management software and collaboration platforms to facilitate teamwork and information sharing.
4) **Transparency:** Maintain transparency in progress, challenges, and updates through collaboration tools (e.g., Jira, Confluence).
5) **Stakeholder Updates**: Provide stakeholders with progress reports, ensuring they understand model development timelines and expected outcomes.

➢ TRACEABILITY AND IMPACT ANALYSIS

Objective: Ensure that requirements are traceable throughout the project and analyse the impact of any changes.

1) **Requirement Traceability Matrix (RTM):** Establish a traceability matrix linking each requirement to its business objective, model component, and stakeholder.

2) **Impact Analysis for Changes:** Use the RTM to assess the impact of any new requirements or changes in customer data. For instance, if the company introduces a new service, analyse how this affects customer segmentation.
3) **Dependency Mapping:** Identify dependencies between different requirements, such as the need for updated CRM data before segmenting customers.

IMPLEMENTATION AND TESTING

Objective: Implement the customer segmentation model based on the requirements and test its functionality.

1) **Model Development:** Implement the customer segmentation model, typically using clustering algorithms (e.g., K-Means, hierarchical clustering).
2) **Unit Testing:** Test the model components individually (data preprocessing, clustering algorithms, feature engineering).
3) **Model Validation Testing:** Evaluate model performance against defined metrics (e.g., silhouette score, Davies-Bouldin index). Ensure that segments make business sense and align with expectations.
4) **A/B Testing:** Run A/B tests with a sample of customers to validate the effectiveness of the segments in improving business outcomes (e.g., higher campaign response rates).

➢ VALIDATION AND ACCEPTANCE

Objective: Validate the model to ensure it meets all requirements and gain stakeholder acceptance.

1) **Internal Validation:** Validate that the model meets both functional and non- functional requirements. Verify that customer segments are distinct, actionable, and provide meaningful insights.
2) **User Acceptance Testing (UAT):** Conduct UAT with business stakeholders, such as marketing and customer service, to ensure that segments are useful and actionable for campaigns or customer retention strategies.

3) **Business Approval:** Obtain final approval from key stakeholders (e.g., marketing or sales executives) before deployment.

➢ DEPLOYMENT AND MAINTENANCE

Objective: Deploy the model into a production environment and ensure its ongoing maintenance.

1) **Model Deployment:** Deploy the segmentation model into production, ensuring it integrates with existing systems (e.g., CRM, customer data warehouses).
2) **Performance Monitoring:** Set up systems for continuous monitoring of the model's performance (e.g., tracking how well it segments new customers over time).
3) **Data Refresh:** Implement a schedule for data refreshes and model retraining, based on new customer data.
4) **Error Handling and Alerts:** Establish protocols for handling issues such as data drift or system errors.

➢ RETIREMENT AND ARCHIVAL

Objective: Retire the model when it is no longer needed and archive relevant documentation.

1) **Retirement Planning:** Plan for model retirement when it becomes outdated or no longer aligns with business needs (e.g., due to changes in customer behaviour or company strategy).
2) **Knowledge Transfer:** Archive the model's code, documentation, and segmentation results to ensure future teams can reference past decisions or outcomes.
3) **Data Archival:** Securely archive historical customer data used for segmentation,ensuring compliance with data protection regulations.

This approach ensures a structured, comprehensive development of the customer segmentation model, meeting business objectives and technical standards while maintaining flexibility for future changes.