Detailed Analysis of Customer Churn Machine Learning Project Threat Concerns

1. **Question:** Does the model need to be explainable to the users or affected persons?
    a. **Severity Rating:** **High**
    b. **Explanation:** Explainability is critical for customer churn prediction. Business teams need to understand why customers are predicted to churn in order to take appropriate retention actions. Without explainability, teams can't address the root causes of churn or create targeted interventions.
    c. **Possible Mitigations:** Implement SHAP values for feature importance, create natural language explanations for predictions.
2. **Question:** Are we preventing Concept and Data Drift?
    a. **Severity Rating:** **High**
    b. **Explanation:** Customer behavior and market conditions change over time, making drift a major concern for churn prediction models. If not addressed, the model will gradually become less accurate as customer behavior patterns evolve.
    c. **Possible Mitigations:** Regular monitoring of input data distributions, automated drift detection, scheduled retraining cycles, and drift-triggered retraining.
3. **Question:** Once our model is running, can we keep feeding it data?
    a. **Severity Rating:** **High**
    b. **Explanation:** For churn prediction, the model needs continuous updates with fresh customer data to remain relevant. Customer behavior changes over time, and the model must adapt to these changes to maintain accuracy.
    c. **Possible Mitigations:** Set up automated data pipelines, implement a feature store for consistent feature computation, and establish clear data refresh protocols.
4. **Question:** Is human intervention necessary to oversee the automatic decision-making (ADM) process of the AI system?
    a. **Severity Rating:** **Medium**
    b. **Explanation:** While the system provides predictions, human judgment is valuable in determining appropriate customer retention strategies based on those predictions. Full automation could miss important context or lead to inappropriate interventions.
    c. **Possible Mitigations:** Create "human in the loop" review processes, implement confidence thresholds for automatic actions, and provide clear escalation paths for uncertain predictions.
5. **Question:** Could the learning curve of the product be an issue?
    a. **Severity Rating:** **Low**
    b. **Explanation:** Sales, marketing, and customer success teams may have varying levels of data literacy, making it challenging for some users to interpret and act effectively on model outputs.

    c. **Possible Mitigations:** Simplified UX; tool-tips; guided tour; quick-start videos; use familiar business language instead of technical terms.
6. **Question:** Can we collect all the data that we need for the purpose of the algorithm?
    a. **Severity Rating: Medium**
    b. **Explanation:** Comprehensive data about customer behavior, interactions, and sentiment is crucial for accurate churn prediction. Missing data sources could lead to blind spots in the model.
    c. **Possible Mitigations:** Data source mapping, gap analysis, external data procurement plans, incremental feature importance testing.
7. **Question:** Could the user perceive the message from the AI system in a different way than intended?
    a. **Severity Rating: Medium**
    b. **Explanation:** Business users might misinterpret churn probabilities or feature importance, leading to inappropriate interventions or strategies that don't address actual customer concerns.
    c. **Possible Mitigations:** Clear confidence intervals on predictions, contextual explanations, practical interpretation guides, and visualization.
8. **Question:** Could our AI system have an impact on human work?
    a. **Severity Rating: Medium**
    b. **Explanation:** The churn prediction system will change how customer-facing teams work by influencing their priorities and potentially automating some decision-making, which could affect job roles and required skills.
    c. **Possible Mitigations:** Change management planning, skills training programs, gradual automation rollout, and feedback channels for affected employees.
9. **Question:** Could we be processing sensitive data?
    a. Severity Rating: High
    b. Explanation: Customer data used for churn prediction might include sensitive personal information like financial history or communication preferences that require special handling and protection.
    c. Possible Mitigations: Data anonymization, access controls, consent management, regular privacy impact assessments.
10. **Question:** Can we comply with all the applicable GDPR data subjects' rights?
    a. Severity Rating: High
    b. Explanation: The system processes personal data and must respect rights like access, erasure, and objection. Non-compliance could lead to regulatory penalties and reputation damage.
    c. Possible Mitigations: Data deletion workflows, model retraining protocols for deleted data, data lineage tracking, and consent management systems.
11. **Question:** Will our AI system make automatic decisions without human intervention?
    a. Severity Rating: Medium

   b. **Explanation:** If the system automatically triggers retention offers or service changes based on churn prediction without human oversight, it could lead to inappropriate interventions or missed context.
   c. **Possible Mitigations:** Decision confidence thresholds, human approval workflows for high-impact actions, A/B testing of automated interventions, and clear audit trails for automated decisions.
12. **Question:** Could our AI system automatically label or categorize people?
    a. **Severity Rating: Medium**
    b. **Explanation:** The system explicitly segments customers into groups like "high churn risk" or "high value," which could lead to differential treatment that might not always be warranted.
    c. **Possible Mitigations:** Regular bias audits, dynamic segmentation rather than fixed labels, confidence levels for categorizations, periodic reassessment of customer segments.
13. **Question:** Is data minimisation possible?
    a. **Severity Rating: Medium**
    b. **Explanation:** While the model needs comprehensive data for accuracy, collecting excessive data increases privacy risks and compliance burden without necessarily improving model performance.
    c. **Possible Mitigations:** Feature importance analysis to eliminate unnecessary data collection, privacy-preserving feature engineering, and regular data necessity reviews.
14. **Question:** Have we considered the need to start with a data protection impact assessment (DPIA)?
    a. Severity Rating: High
    b. **Explanation:** A churn prediction system processing personal data at scale likely requires a DPIA under GDPR, especially when used for systematic customer evaluation that influences business decisions about those customers.
    c. **Possible Mitigations:** Conduct formal DPIA before deployment, document risk assessment and mitigations, and regular DPIA updates as the system evolves.
15. **Question:** Bias & Discrimination: Could there be groups who might be disproportionately affected by the outcomes of the AI system?
    a. Severity Rating: High
    b. Explanation: The model might incorrectly predict higher churn rates for certain demographics due to historical patterns in the training data, resulting in these groups receiving different retention offers or support levels without valid business justification.
    c. Possible Mitigations: Regular fairness audits across demographic groups, balanced training datasets, diverse representation in testing scenarios, periodic manual review of predictions across segments.