Project Initialization and Planning Phase

Date	20 June 2024
Team ID	739900
Project Name	Predicting Permanent Magnet Resistance Of Electronic Motor Using Machine Learning
Maximum Marks	3 Marks

Define Problem Statements (Customer Problem Statement Template):

1. **Background:** Our company manufactures electronic motors that utilize permanent magnets. Understanding and predicting the resistance of these magnets is crucial for optimizing motor performance and efficiency.

2. **Problem Description:** Currently, predicting the resistance of permanent magnets in our electronic motors relies heavily on manual measurements and theoretical calculations. This process is time-consuming, prone to human error, and lacks precision, leading to potential inefficiencies in motor design and operation.

3. **Customer Pain Points:**

   - **Inaccuracy:** Existing methods for predicting magnet resistance often result in deviations from actual values due to manual errors or simplified assumptions.
   - **Time-Consuming:** The current process requires significant time and effort, delaying motor development and production cycles.
   - **Costly Iterations:** Inefficient predictions can lead to costly design iterations and potential rework, impacting time-to-market and overall profitability.
   - **Lack of Scalability:** As our product lines expand, the manual prediction method becomes increasingly impractical and unsustainable.

4. **Desired Outcome:** We aim to develop a machine learning model capable of accurately predicting the resistance of permanent magnets in electronic motors. This model should:

   - Improve prediction accuracy compared to current methods.
   - Reduce the time required for resistance prediction.
   - Enable faster iterations in motor design and development.

- Provide scalability to handle increased production demands.

5. **SolutionRequirements:**

- **Accuracy:** The model should achieve a high level of accuracy in predicting magnet resistance, minimizing deviations from actual measurements.
- **Efficiency:** Automation of this prediction process should significantly reduce the time and effort currently required.
- **Scalability:** The solution should be scalable to accommodate different motor designs and production scales.
- **Integration:** Ideally, the model should integrate seamlessly into our existing motor design and testing processes.

6. **Success Metrics:**

- **Prediction Accuracy:** Reduce prediction errors by X% compared to current methods.
- **Time Efficiency:** Decrease the time required for resistance prediction from hours to minutes.
- **Cost Savings:** Achieve cost savings of $Y per motor through reduced design iterations and improved efficiency.

7. **Constraints:**

- The model should be developed using data that respects confidentiality and privacy agreements.
- Compliance with industry standards and regulatory requirements must be ensured throughout the development and deployment phases.

8. **Stakeholders:**

- Engineering and R&D teams responsible for motor design.
- Production and quality control teams involved in manufacturing and testing.
- Senior management for strategic alignment and resource allocation.

9. **Implementation Plan:**

- Phase 1: Data collection and preprocessing.
- Phase 2: Model development and training.
- Phase 3: Model validation and testing.
- Phase 4: Integration into existing processes and tools.
- Phase 5: Monitoring and continuous improvement.

10. **Timeline:**

- Start Date: [Insert Start Date]
- Completion Date: [Insert Completion Date]
- Milestones and checkpoints should be defined to ensure timely progress and alignment with business objectives.