**Project Initialization and Planning Phase**

|  |  |
| --- | --- |
| Date | 20 June 2024 |
| Team ID | 740019 |
| Project Title | 3D Printer Material Prediction Using Machine Learning |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution) template**

Utilize machine learning to predict optimal 3D printing materials. Research, collect data, preprocess, develop models, and validate predictions to streamline material selection, enhancing printing efficiency and product quality.

|  |  |
| --- | --- |
| **Project Overview** | |
| Objective | Develop a system to enhance material selection for 3D printing. |
| Scope | Research, data collection, model development, validation, and implementation. |
| **Problem Statement** | |
| Description | Utilize machine learning to automate material selection based on printing requirements. |
| Impact | Improve printing efficiency and product quality by optimizing material choices. |
| **Proposed Solution** | |
| Approach | Research, data preprocessing, model development, training, validation, and system integration. |
| Key Features | Automated material selection, accuracy in predictions, user interface design. |

**Resource Requirements**

|  |  |  |
| --- | --- | --- |
| **Resource Type** | **Description** | **Specification/Allocation** |
| **Hardware** | | |
| Computing Resources | |  | | --- | | High-performance CPU/GPU for model training and inference. |  |  | | --- | |  | | 2 GPUs (NVIDIA RTX 3090) |
| Memory | Sufficient RAM for handling large datasets and model operations. | 64 GB RAM |
| Storage | |  | | --- | | High-capacity storage for storing datasets and model checkpoints. |  |  | | --- | |  | | 1 TB SSD |
| **Software** | | |
| Frameworks | TensorFlow or PyTorch for machine learning model development. | TensorFlow 2.0, Scikit-learn |
| Libraries | Scikit-learn, Pandas, NumPy for data preprocessing and analysis. | Pandas, NumPy, Matplotlib |
| Development Environment | Python IDE (e.g., Jupyter Notebook) and version control (e.g., Git). | Jupyter Notebook, Git |
| **Data** | | |
| Data | Diverse dataset of 3D printing materials, including properties and costs. | 10,000 samples of 3D printing material data |