Project Initialization and Planning Phase

Date	7th July 2025
Team ID	SWTID1750822736
Project Title	Fault Detection using transfer learning
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) report

The proposal aims to automate and optimize fault detection in manufacturing using transfer learning, enhancing accuracy and reducing dependency on manual inspection. It addresses inefficiencies in traditional quality control systems, promising fewer defects, reduced costs, and improved product reliability. Key features include the use of pre-trained convolutional neural networks (CNNs) adapted to identify product faults from images.

Project Overview	
Objective	The primary objective is to modernize the fault detection process in manufacturing by applying transfer learning with deep learning models, enabling faster and more accurate identification of product defects.
Scope	The project focuses on automating product quality assessment by leveraging CNN architectures such as VGG16, ResNet50, and InceptionV3. It aims to improve inspection efficiency while minimizing human error in detecting subtle faults.
Problem Statement	
Description	Automating the inspection process using AI can enhance accuracy, reduce operational bottlenecks, and ensure consistent quality control. This contributes to reduced product recalls, improved brand reputation, and greater customer trust.
Impact	Solving these issues will result in improved operational efficiency, reduced risks, and an overall enhancement in the lending process, contributing to customer satisfaction and organizational success.
Proposed Solution	
Approach	The project employs transfer learning with pre-trained deep learning models to classify product images into fault and non-fault categories. By freezing base layers and fine-tuning custom classifiers, it achieves high accuracy with limited data.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	T4 GPU
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	1 TB SSD
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	scikit-learn, pandas, numpy, matplotlib, seaborn
Development Environment	IDE	Jupyter Notebook, pycharm
Data		
Data	Source, size, format	Kaggle dataset, 614, csv UCI dataset, 690, csv