Model Development Phase Template

Date	7th July 2025
Team ID	SWTID1750822736
Project Title	Fault Detection using transfer learning
Maximum Marks	6 Marks

Model Selection Report

In the forthcoming Model Selection Report, various models will be outlined, detailing their descriptions, hyperparameters, and performance metrics, including Accuracy or F1 Score. This comprehensive report will provide insights into the chosen models and their effectiveness.

Model	Description	Hyperparameters	Performance Metric (e.g., Accuracy, F1 Score)
VGG16 (Transfer Learning)	A pre-trained Convolutional Neural Network originally trained on ImageNet. In this project, VGG16 is used with the top classification layers replaced to adapt to fault detection classes. The feature extraction layers are kept frozen while only the newly added dense layers are trained, ensuring faster convergence with less data.	Batch size = 32, Epochs = 10, Optimizer = Adam, Learning Rate = 0.0001	Validation Accuracy ≈ 93.25%
ResNet50 (Transfer Learning)	ResNet50 is a 50-layer deep residual network that includes skip connections to avoid vanishing gradient issues. It was used here with pre-trained weights, where the base layers are frozen and custom dense layers are trained for classification. ResNet's architecture makes effective in	Batch size = 32, Epochs = 10, Optimizer = Adam, Learning Rate = 0.0001	Validation Accuracy ≈ 94.18%

	extracting meaningful patterns in image-based fault datasets.		
InceptionV3 (Transfer Learning)	InceptionV3 is a deep convolutional architecture that uses factorized convolutions and auxiliary classifiers. It helps in reducing computational cost while maintaining high performance. This model was used with the base frozen and only the custom top layers trained, making it efficient for the fault classification task.	Batch size = 32, Epochs = 10, Optimizer = Adam, Learning Rate = 0.0001	Validation Accuracy ≈ 95.12%