Model Development Phase Template

Date	25 June 2025
Team ID	SWTID1750316859
Project Title	ASL- Alphabet image Recognition
Maximum Marks	5 Marks

Model Selection Report

In the ASL Alphabet Image Recognition project, multiple deep learning architectures were considered and evaluated to accurately classify hand gestures corresponding to the ASL alphabet. The selection focused on image-based models such as custom CNNs and transfer learning approaches like VGG16. Key factors such as model accuracy, training efficiency, computational complexity, and generalization performance on unseen gesture data were analyzed to determine the most effective architecture for robust ASL image classification.

Model Selection Report:

Model	Description
VGG16	A deep convolutional neural network pre-trained on ImageNet, used in this project via transfer learning. VGG16 achieved the highest classification accuracy among all evaluated models due to its rich feature extraction capabilities and deep architecture. The final layers were customized for 29 ASL classes while freezing the base layers. Although computationally heavier than lightweight models like MobileNetV2, VGG16 showed superior generalization performance on the ASL alphabet dataset, making it the final choice for production.
CNN (Custom)	A basic custom convolutional neural network with multiple convolution, pooling, and dense layers. Used as a baseline before transfer learning was applied. Lower performance compared to VGG16 and prone to overfitting.

MobileNetV2	Explored for its lightweight and fast architecture in preprocessing. While efficient, it did not outperform VGG16 in classification accuracy. Could be useful for deployment on resource-constrained devices.