

## ABSTRACT

The Indonesian Sign Language System (SIBI) is an essential communication tool for the deaf, yet the development of automatic recognition systems still faces challenges related to visual variations and model generalization capabilities. This study employs transfer learning with EfficientNetB0, fine-tuning the last 40 layers, and Global Average Pooling for classifying SIBI alphabet gestures A-Z (except J and Z). Four dataset scenarios were tested, namely single landmark overlay (Dataset A), landmarks on a black canvas (Dataset B), original images (Dataset C), and heterogeneous overlays including images with failed landmarks detection (Dataset D). The results show that Dataset A achieved high performance (~0.98) with most minority classes detected, while Dataset B was slightly lower (~0.96-0.97) because some visual information from the original images was not fully available. Dataset C provided the best performance (~0.99-1.00), confirming that original images offer the most complete gesture feature representation. Dataset D showed good performance (~0.97-0.98) and is useful under non-ideal image conditions. These findings confirm that original images remain the key to the highest accuracy, while landmarks support model stability under special conditions.

**Keywords:** Indonesian Sign Language System (SIBI), image classification, transfer learning, EfficientNetB0, hand landmarks, deep learning.