

INTISARI

PENERAPAN *FINE-TUNING* RESNET50 DAN *SUPPORT VECTOR MACHINE* (SVM) UNTUK KLASIFIKASI *AUTISM SPECTRUM DISORDER* (ASD) BERBASIS CITRA WAJAH

Oleh

Kadek Ninda Nandita Putri

21/475288/PA/20562

Autism Spectrum Disorder (ASD) merupakan gangguan perkembangan saraf yang memengaruhi kemampuan komunikasi dan interaksi sosial. Penelitian ini bertujuan mengembangkan metode identifikasi ASD berbasis citra wajah menggunakan pendekatan *deep learning* dengan *fine-tuning* pada ResNet50 sebagai *feature extractor*, dikombinasikan dengan *Support Vector Machine* (SVM) sebagai klasifikator. Untuk meningkatkan kualitas citra input, diterapkan pra-pemrosesan berupa Gaussian filter dan image cropping.

Eksperimen dilakukan dengan empat konfigurasi model untuk mengevaluasi pengaruh *fine-tuning* dan pra-pemrosesan terhadap performa klasifikasi. Model terbaik yang menggabungkan *fine-tuning* dan pra-pemrosesan mencapai akurasi 81.6% pada data uji dan rata-rata 84.8% pada k-fold cross validation. Dibandingkan tiga model lain yang diuji, terjadi peningkatan akurasi sebesar 28.23%, 8.16%, dan 20.75%. Selain itu, model ini juga menunjukkan keunggulan dibandingkan metode dari penelitian sebelumnya seperti *federated logistic regression*, *decision tree*, dan menjadikannya alternatif yang efektif dan efisien dalam klasifikasi ASD berbasis citra wajah.

Kata Kunci: *Autism Spectrum Disorder (ASD)*, *Citra Wajah*, *ResNet50*, *Support Vector Machine (SVM)*, *Fine-tuning*, Pra-pemrosesan.

ABSTRACT

IMPLEMENTATION OF *FINE-TUNING* RESNET50 AND SUPPORT VECTOR MACHINE (SVM) FOR CLASSIFICATION OF AUTISM SPECTRUM DISORDER (ASD) BASED ON FACIAL IMAGE

by

Kadek Ninda Nandita Putri

21/475288/PA/20562

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that affects communication and social interaction abilities. This study aims to develop a facial image-based ASD detection method using a deep learning approach by applying *fine-tuning* on the ResNet50 model as a feature extractor, combined with Support Vector Machine (SVM) as the classifier. To improve the quality of input images, preprocessing techniques such as Gaussian filtering and image cropping were applied.

Experiments were conducted using four model configurations to evaluate the effects of *fine-tuning* and preprocessing on classification performance. The best-performing model, which combined *fine-tuning* and preprocessing, achieved an accuracy of 81.6% on the test data and an average accuracy of 84.8% based on k-fold cross-validation. Compared to the three other tested models, accuracy improvements of 28.23%, 8.16%, and 20.75% were observed. Furthermore, this model also outperformed previous approaches such as federated logistic regression and decision tree methods, making it an effective and efficient alternative for ASD classification based on facial image.

Keywords: Autism Spectrum Disorder (ASD), Facial Image, ResNet50, Support Vector Machine (SVM), Fine-tuning, Preprocessing.