

ABSTRAK

PENERAPAN *CONVOLUTIONAL NEURAL NETWORK* UNTUK DETEKSI KECEMASAN ANAK *AUTISM SPECTRUM DISORDER* DENGAN TERAPI MUSIK MELALUI *SOCIALLY ASSISTIVE ROBOT*

(2025: vii + 67 Halaman + 33 Gambar + 10 Tabel + Daftar Pustaka + Lampiran)

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Anak autis seringkali mengalami kesulitan dalam mengekspresikan emosi, sehingga diperlukan pendekatan asistif untuk mengenali dan merespons kondisi emosional mereka. Penelitian ini bertujuan untuk mengembangkan sistem deteksi ekspresi wajah anak autis menggunakan metode *Convolutional Neural Network* (CNN) dengan arsitektur ResNet-50, yang diintegrasikan pada perangkat Raspberry Pi. Sistem ini dikembangkan untuk mendeteksi tiga ekspresi utama, yaitu *happy*, *fear*, dan *neutral*, serta memberikan respons berupa pemutaran musik sebagai media terapi ketika anak menunjukkan ekspresi *fear*. Dataset yang digunakan merupakan kumpulan citra wajah anak autis, yang telah melalui tahap augmentasi dan pelatihan model sebanyak 50 epoch. Hasil evaluasi menunjukkan bahwa sistem mampu mencapai akurasi pelatihan yang cukup baik, dan dalam pengujian nyata terhadap lima anak autis, diperoleh akurasi rata-rata sebesar 80%. Implementasi sistem pada Raspberry Pi menunjukkan kinerja yang efektif dan responsif secara real-time. Sistem ini diharapkan dapat menjadi salah satu solusi pendukung dalam terapi interaktif bagi anak autis dengan pendekatan yang lebih adaptif dan ramah anak.

Kata Kunci : Anak autis, ekspresi wajah, *Convolutional Neural Network* (CNN), ResNet-50

ABSTRACT

APPLICATION OF CONVOLUTIONAL NEURAL NETWORK FOR ANXIETY DETECTION IN CHILDREN WITH AUTISM SPECTRUM DISORDER WITH MUSIC THERAPY THROUGH SOCIALLY ASSISTIVE ROBOT

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Autistic children often have difficulty in expressing emotions, so an assistive approach is needed to recognize and respond to their emotional state. This research aims to develop a facial expression detection system for autistic children using the Convolutional Neural Network (CNN) method with ResNet-50 architecture, which is integrated on a Raspberry Pi device. This system is developed to detect three main expressions, namely happy, fear, and neutral, and provide a response in the form of music playback as a medium of therapy when the child shows fear expression. The dataset used is a collection of facial images of autistic children, which have gone through the augmentation and model training stages for 50 epochs. The evaluation results show that the system is able to achieve fairly good training accuracy, and in real testing of five autistic children, an average accuracy of 80% is obtained. The implementation of the system on Raspberry Pi shows effective and responsive performance in real-time. This system is expected to be one of the supporting solutions in interactive therapy for autistic children with a more adaptive and child-friendly approach.

Keywords: *Autistic child, facial expression, Convolutional Neural Network (CNN), ResNet-50*