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Analysis and Detection of Facial Expressions in Autism Spectrum Disorder People Using Machine Learning

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Abstract : Autism Spectrum Disorder (ASD) refers to a developmental disorder that impairs an individual's communication and interaction ability. Individuals feel difficult to read facial expressions while communicating or interacting. Facial Expression Recognition (FER) is a unique method of classifying basic human expressions, i.e., happiness, fear, surprise, sadness, disgust, neutral, and anger through static and dynamic sources. This paper conducts a comprehensive comparison and proposed optimal method for a continued research project—a system that can assist people who have Autism Spectrum Disorder (ASD) in recognizing facial expressions. Comparison has been conducted on three supervised learning algorithms EigenFace, FisherFace, and LBPH. The JAFFE, CK+, and TFEID (I&II) datasets have been used to train and test the algorithms. The results were then evaluated based on variance, standard deviation, and accuracy. The experiments showed that FisherFace has the highest accuracy for all datasets and is considered the best algorithm to be implemented in our system.

Keywords : autism spectrum disorder, ASD, EigenFace, facial expression recognition, FisherFace, local binary pattern histogram, LBPH
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