

## Documents

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**Efficient Deep Learning-Based Data-Centric Approach for Autism Spectrum Disorder Diagnosis from Facial Images Using Explainable AI**

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**Abstract**

The research describes an effective deep learning-based, data-centric approach for diagnosing autism spectrum disorder from facial images. To classify ASD and non-ASD subjects, this method requires training a convolutional neural network using the facial image dataset. As a part of the data-centric approach, this research applies pre-processing and synthesizing of the training dataset. The trained model is subsequently evaluated on an independent test set in order to assess the performance matrices of various data-centric approaches. The results reveal that the proposed method that simultaneously applies the pre-processing and augmentation approach on the training dataset outperforms the recent works, achieving excellent 98.9% prediction accuracy, sensitivity, and specificity while having 99.9% AUC. This work enhances the clarity and comprehensibility of the algorithm by integrating explainable AI techniques, providing clinicians with valuable and interpretable insights into the decision-making process of the ASD diagnosis model. © 2023 by the authors.

**Author Keywords**

ASD diagnosis; augmentation; convolutional neural network; deep learning; facial image

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