



**INFORMATICS  
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INFORMATICS INSTITUTE OF TECHNOLOGY

In Collaboration with

UNIVERSITY OF WESTMINSTER

**Early Detection of Autism in Children  
with Computer**

A dissertation by

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Supervised by

Mr. Pumudu Fernando

Submitted in partial fulfilment of the requirements for the BEng (Hons.) Software Engineering  
degree at the University of Westminster.

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## **DECLARATION**

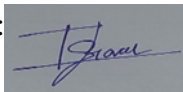
I, Ishara Vidusanka, a BEng (Hons) in Software Engineering undergraduate candidate, hereby confirm that this research project and all accompanying materials are the results of my own efforts and have never been submitted or presented to any other academic institution or university.

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## **ABSTRACT**

A considerable percentage of the population globally is afflicted by autism spectrum disorder (ASD), which is a neurodevelopmental disorder. The outcomes for kids with ASD can be dramatically improved with early screening and intervention. This research investigates the application of deep learning methods to identify children with autism by examining face features from Images or frames. For this objective, a convolutional neural network architecture known as EfficientB3 and MTCNN were employed, for feature extraction and face detections respectively. The suggested method entails training the model on a dataset of face images of autistic and non-autistic children before utilizing the learned model to forecast whether a new image belongs to the autistic or non-autistic class. In order to be usable by parents and other caretakers, the system is incorporated with a user-friendly interface.

This research discusses the difficulties and restrictions that come with implementing the suggested system. These include choosing and preparing the dataset, fine-tuning the model's hyperparameters, and assessing the effectiveness of the system. Custom callback function has

also been applied in the implemented approach to enhance the pre-trained EfficientB3 model on a dataset made up of facial images of kids with and without ASD. The detection of faces is performed using the MTCNN algorithm, which has a high degree of accuracy even in difficult situations. The system's effectiveness in identifying various facial traits, such as race and gender, is evaluated based on the precision, recall, f1 score and validation loss of the model. On a dataset of 200 child faces, the suggested method is tested, and its accuracy for detecting ASD is 86.63%, with an F1 score of 86.57%. The findings indicate that the suggested method may be a useful and non-intrusive technique for the early identification and diagnosis of ASD in children

**Keywords:** Autism, Computer vision, Image Processing, Deep Learning, Face Detection, EfficientNetB3, CNN

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