# Autism Disease Detection Using Transfer Learning Techniques: Performance Comparison between Central Processing Unit vs. Graphics Processing Unit Functions for Neural Networks

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**Abstract :** Neural network approaches are machine learning methods used in many domains, such as healthcare and cyber security. Neural networks are mostly known for dealing with image datasets. While training with the images, several fundamental mathematical operations are carried out in the Neural Network. The operation includes a number of algebraic and mathematical functions, including derivative, convolution, and matrix inversion and transposition. Such operations require higher processing power than is typically needed for computer usage. Central Processing Unit (CPU) is not appropriate for a large image size of the dataset as it is built with serial processing. While Graphics Processing Unit (GPU) has parallel processing capabilities and, therefore, has higher speed. This paper uses advanced Neural Network techniques such as VGG16, Resnet50, Densenet, Inceptionv3, Xception, Mobilenet, XGBOOST-VGG16, and our proposed models to compare CPU and GPU resources. A system for classifying autism disease using face images of an autistic and non-autistic child was used to compare performance during testing. We used evaluation matrices such as Accuracy, F1 score, Precision, Recall, and Execution time. It has been observed that GPU runs faster than the CPU in all tests performed. Moreover, the performance of the Neural Network models in terms of accuracy increases on GPU compared to CPU.

**Keywords :** autism disease, neural network, CPU, GPU, transfer learning
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