Give me summary of this paper in terms of Algorithm used, Hyperpameter tuning, performance metrics with numerical values in a para of 4 lines and also give the author name, paper title and journal of the paper in IEEE format.

Give me the summary algorithm hyperparameter tuning performance metrics numerical values in a para of 4 lines and also give me the title authors name journal in IEEE format.

Give me details of Authors in et.al format, Participants, Data, Features, Feature Selection, Machine learning method, and Accuracy in a table format.

Could you interpret the above table and suggest me a consolidated summary of 250 words highlighting the advantages and limitations? suggesting the future work to be carried out

**Consolidated Summary**

**Advantages**

The surveyed studies demonstrate significant progress in autism spectrum disorder (ASD) classification using various data sources, including EEG signals, facial images, behavioral questionnaires, and genetic data. Machine learning (ML) and deep learning (DL) methods have yielded remarkable classification accuracies, often exceeding 90%, with some models achieving near-perfect results (100%). Feature selection techniques like Principal Component Analysis (PCA), Robust Feature Selection, and MST-based dimensionality reduction have improved model efficiency. Deep learning architectures, including CNNs, LSTMs, and hybrid models, have effectively analyzed EEG and image datasets. Transfer learning with pre-trained models (e.g., VGG16, ResNet50) has enhanced performance for facial recognition tasks. Studies have also explored novel techniques, such as AutoML and contrastive learning, demonstrating the adaptability of AI in ASD detection.

**Limitations**

Despite high classification accuracies, several challenges persist. Many studies suffer from small sample sizes, limiting generalizability. EEG-based studies often require extensive preprocessing, and feature selection remains inconsistent across research. Behavioral datasets rely on self-reported questionnaires, introducing bias. The lack of standardized feature sets complicates comparisons. Data augmentation techniques, while improving model performance, may introduce artificial patterns not present in real-world cases. Additionally, high computational costs of deep learning architectures restrict their deployment in clinical settings.

**Future Work**

Future research should focus on multi-modal data fusion to improve classification robustness. Standardizing datasets and feature extraction methods will enhance reproducibility. Expanding sample sizes and leveraging federated learning can mitigate privacy concerns while improving model generalizability. Real-time and low-resource ASD detection tools should be developed for broader accessibility. Lastly, integrating explainable AI methods can help clinicians trust and interpret ML-driven diagnoses effectively.

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