

Title: Ensemble of hybrid model based technique for early detecting of depression based on SVM and neural networks

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Abstract: The prevalence of depression has increased dramatically over the last several decades: it is frequently overlooked and can have a significant impact on both physical and mental health. Therefore, it is crucial to develop an automated detection system that can instantly identify whether a person is depressed. Currently, machine learning (ML) and artificial neural networks (ANNs) are among the most promising approaches for developing automated computer-based systems to predict several mental health issues, such as depression. This study propose an ensemble of hybrid model-based techniques that aims to build a strong detection model that considers many psychological and sociodemographic characteristics of an individual to detect whether a person is depressed. Support vector machines (SVM) and multilayer perceptrons (MLP) are the two fundamental methods used to construct the suggested ensemble approach. The hybrid DeprMVM served as a meta-learner. In this study, the hybrid DeprMVM is a level-1 learner, whereas the SVM and MLP networks are level-0 learners. After the classifiers are trained and tested at level 0, their outputs are based on both the independent and dependent variables in the new data set that was used to train the meta-classifier. The training data class imbalance was reduced by applying the synthetic minority oversampling technique (SMOTE) and cluster sampling together, which improved the accuracy for detecting depression. Additionally, it can effectively reduce the risk of over-fitting from simply duplicating data points. To further confirm the effectiveness of the proposed method, various performance evaluation metrics were calculated and compared with previous studies conducted on this specific dataset. In conclusion, among all the techniques for identifying depression, the suggested ensemble approach had the best accuracy, at 99.39%, and an F1-score of 99.51%.

Key words: Depression detection Machine learning Artificial neural networks Ensemble model Support vector machine (SVM)

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