Methods for Enhancing Ensemble Learning or Improving Classifiers of This Technique in the Analysis and Classification of Brain Signals

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Abstract : This scientific article explores enhancement methods for ensemble learning with the aim of improving the performance of classifiers in the analysis and classification of brain signals. The research approach in this field consists of two main parts, each with its own strengths and weaknesses. The choice of approach depends on the specific research question and available resources. By combining these approaches and leveraging their respective strengths, researchers can enhance the accuracy and reliability of classification results, consequently advancing our understanding of the brain and its functions. The first approach focuses on utilizing machine learning methods to identify the best features among the vast array of features present in brain signals. The selection of features varies depending on the research objective, and different techniques have been employed for this purpose. For instance, the genetic algorithm has been used in some studies to identify the best features, while optimization methods have been utilized in others to identify the most influential features. Additionally, machine learning techniques have been applied to determine the influential electrodes in classification. Ensemble learning plays a crucial role in identifying the best features that contribute to learning, thereby improving the overall results. The second approach concentrates on designing and implementing methods for selecting the best classifier or utilizing meta-classifiers to enhance the final results in ensemble learning. In a different section of the research, a single classifier is used instead of multiple classifiers, employing different sets of features to improve the results. The article provides an in-depth examination of each technique, highlighting their advantages and limitations. By integrating these techniques, researchers can enhance the performance of classifiers in the analysis and classification of brain signals. This advancement in ensemble learning methodologies contributes to a better understanding of the brain and its functions, ultimately leading to improved accuracy and reliability in brain signal analysis and classification.