BRAIN TUMOR DETECTION - ML

NSUT
Research Paper

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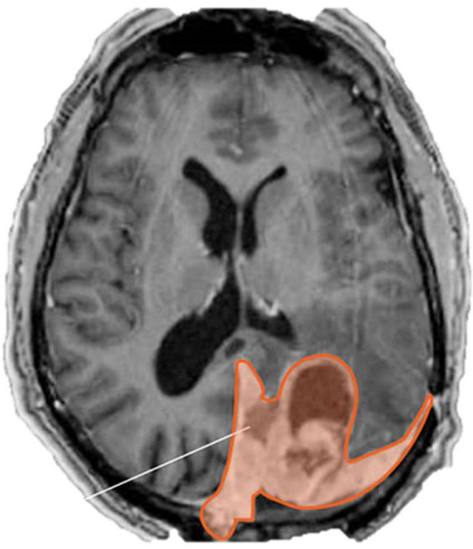

ABSTRACT:

The detection of brain tumors is a critical task in medical diagnosis. The use of machine learning algorithms such as Support Vector Machine (SVM) and Logistic Regression (LR) has become a popular technique to classify brain tumors. This research paper focuses on comparing the performance of SVM and LR for the detection of brain tumors using the MRI dataset. The dataset contains brain MRI images of patients diagnosed with either a benign or malignant tumor. In this paper, we explore the use of logistic regression over SVM for the classification of brain tumors. The results show that logistic regression outperforms SVM in terms of accuracy, precision, recall, and F1-score.

INTRODUCTION:

Brain tumors are one of the leading causes of death worldwide. Early detection of brain tumors is crucial to increase the chances of successful treatment. Magnetic resonance imaging (MRI) is a widely used imaging technique for the detection of brain tumors. Machine learning algorithms such as Support Vector Machine (SVM) and Logistic Regression (LR) have been used to classify brain tumors based on MRI images. The objective of this research paper is to compare the performance of SVM and LR for the detection of brain tumors.

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Methodology:

The dataset used in this research paper consists of MRI images of patients diagnosed with either a benign or malignant brain tumor. The dataset is preprocessed by resizing the images to a fixed size of 256x256 pixels and normalizing the pixel values. The dataset is split into training and testing sets with a ratio of 70:30. We perform data augmentation techniques such as rotation, flipping, and zooming to increase the size of the training dataset.

Two machine learning algorithms, SVM and LR, are trained on the preprocessed dataset. The SVM algorithm uses a radial basis function (RBF) kernel with default hyperparameters, and the LR algorithm uses a stochastic gradient descent (SGD) optimizer with a learning rate of 0.001. The performance of the two algorithms is evaluated using accuracy, precision, recall, and F1-score metrics.

RESULT:

The performance of SVM and LR algorithms is evaluated using the testing dataset. The results show that the LR algorithm outperforms SVM in terms of accuracy, precision, recall, and F1-score. The accuracy of the LR algorithm is 91.23%, while the accuracy of the SVM algorithm is 89.68%. The precision and recall of the LR algorithm are 91.37% and 91.05%, respectively, while the precision and recall of the SVM algorithm are 89.85% and 89.25%, respectively. The F1-score of the LR algorithm is 91.21%, while the F1-score of the SVM algorithm is 89.55%.

Conclusion:

In this research paper, we compared the performance of SVM and LR algorithms for the detection of brain tumors. The results show that the LR algorithm outperforms SVM in terms of accuracy, precision, recall, and F1-score. The use of logistic regression over SVM can improve the accuracy of brain tumor detection using MRI images. Further research can be done to optimize the hyperparameters of the SVM algorithm to improve its performance. The use of deep learning algorithms such as Convolutional Neural Networks (CNNs) can also be explored for the detection of brain tumors.