

# A novel histogram feature for brain tumor detection

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## Abstract

Substantial and significant extraction and proper selection of features in a machine learning model leads to more accurate result. To detect brain tumors in medical images, features like statistical Gray-Level Co-Occurrence Matrix (GLCM), Histogram of Oriented Gradients (HOG), etc., are used widely. For the same purpose, a local histogram-based new innovative feature extraction method has been proposed here. At first, an image has been divided into four quadrants. Then, every histogram-bin of each quadrant has been divided into two sub-bins. One sub-bin contains the count of each intensity present in the largest connected component while the other contains the count of each intensity present in rest of that quadrant. The extracted new feature has been combined with the classical HOG feature. Principal component analysis (PCA) has been introduced to select 1024 HOG and 128 “Expanded Local Histogram” features from all the integrated features. With these features, classification has been performed through Support vector machines (SVM) and Random Forest. The proposed method has been compared with classical HOG, Histogram, and other two state-of-art methods (M. A. Ansari et al. [2020] and Meenal Thayumanavan et al. [2021]). The experimental result shows that the proposed method has been achieved accuracy up to 99.33%.

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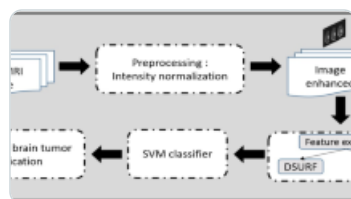
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## Ethics declarations

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### Conflict of interest

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