

## **ABSTRACT**

*The diagnosis of brain tumors in magnetic resonance imaging (MRI) images with the aid of machine learning (ML) algorithms is often involves the use of image filters and binary classification. To differentiate between various types of brain tumors, an algorithm capable of performing multi-class classification is required. This study aims to develop an ML model that can classify different types of brain tumors with optimum accuracy (>80%) and analyze the impact of image filtering on model's accuracy. The classification method used is support vector machine (SVM). The dataset consists of four image classes: Glioma, Meningioma, Pituitary, and Normal. A total of 6,725 images were used, with 5460 for training and 1265 for testing. The features of these images were extracted using the gray-level co-occurrence matrix (GLCM) algorithm and used as inputs for classification. Three models were developed: a model without filter, a model with an anisotropic diffusion filter (ADF), and a model with Median filter. The result is, the models could not achieve optimum accuracy with best performance was achieved by the model without filter, with an average accuracy of 77.77% during training and 78.75% during testing. The use of filters in multi-class classification models resulted in a decline in performance, particularly in terms of accuracy, of the ML models.*

*Keywords: brain tumor, multi-class classification, filters, SVM.*