

# BRAIN TUMOR CLASSIFICATION

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# INTRODUCTION

A tumor is an uncontrolled growth of tissues in any part of the body. Tumors are of different types and hence they have different treatments. Detection of tumor in the earlier stages makes treatment possible.

Magnetic resonance imaging is a medical imaging technique used in radiology to form pictures of the anatomy and the physiological processes of the body. MRI scanners use strong magnetic fields, magnetic field gradients, and radio waves to generate images of the organs in the body.

Stages in detection :

1. Preprocessing
2. Segmentation
3. Feature Extraction
4. Classification/Prediction

# PREPROCESSING

Preprocessing is critical for accurate detection of tumor. It involves noise and artifacts reductions and sharpening of edges. Stages Involved :

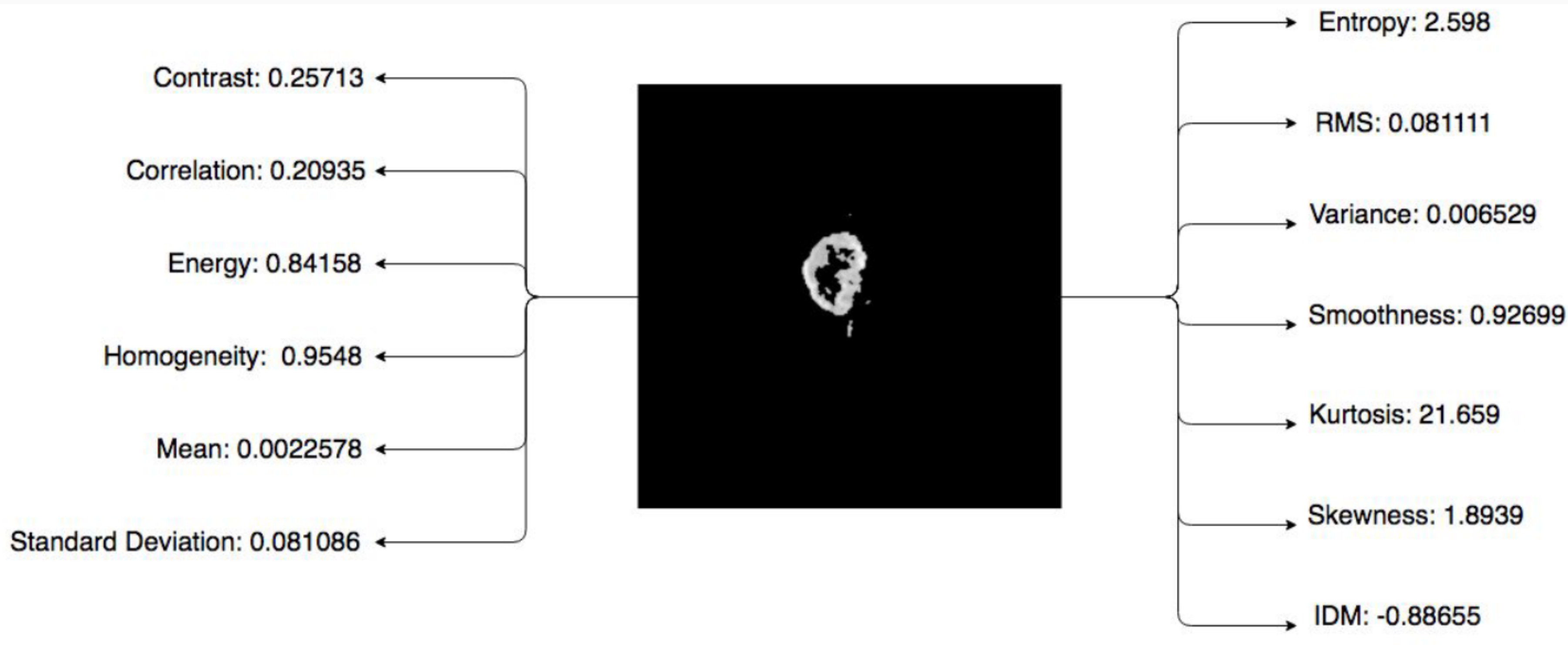
1. Median Filter – Replace pixel value with median value of neighbors.
2. Threshold
3. Edge Detection – canny edge detector

# FEATURE EXTRACTION

Grey Level Co-occurrence Matrix

1. Contrast
2. Correlation
3. Homogeneity
4. Energy
5. Mean
6. Skewness
7. Kurtosis
8. Standard Deviation
9. Entropy
10. Root Mean Square
11. Variance
12. Smoothness
13. Inverse Difference Moments

Discrete Wavelet Transform (DWT) is used in combination with Principal Component Analysis (PCA) to extract image features from the segmented MRI scans.



# FEATURE REDUCTION

Feature reduction, is the process of reducing the number of features in a resource heavy computation without losing important information.

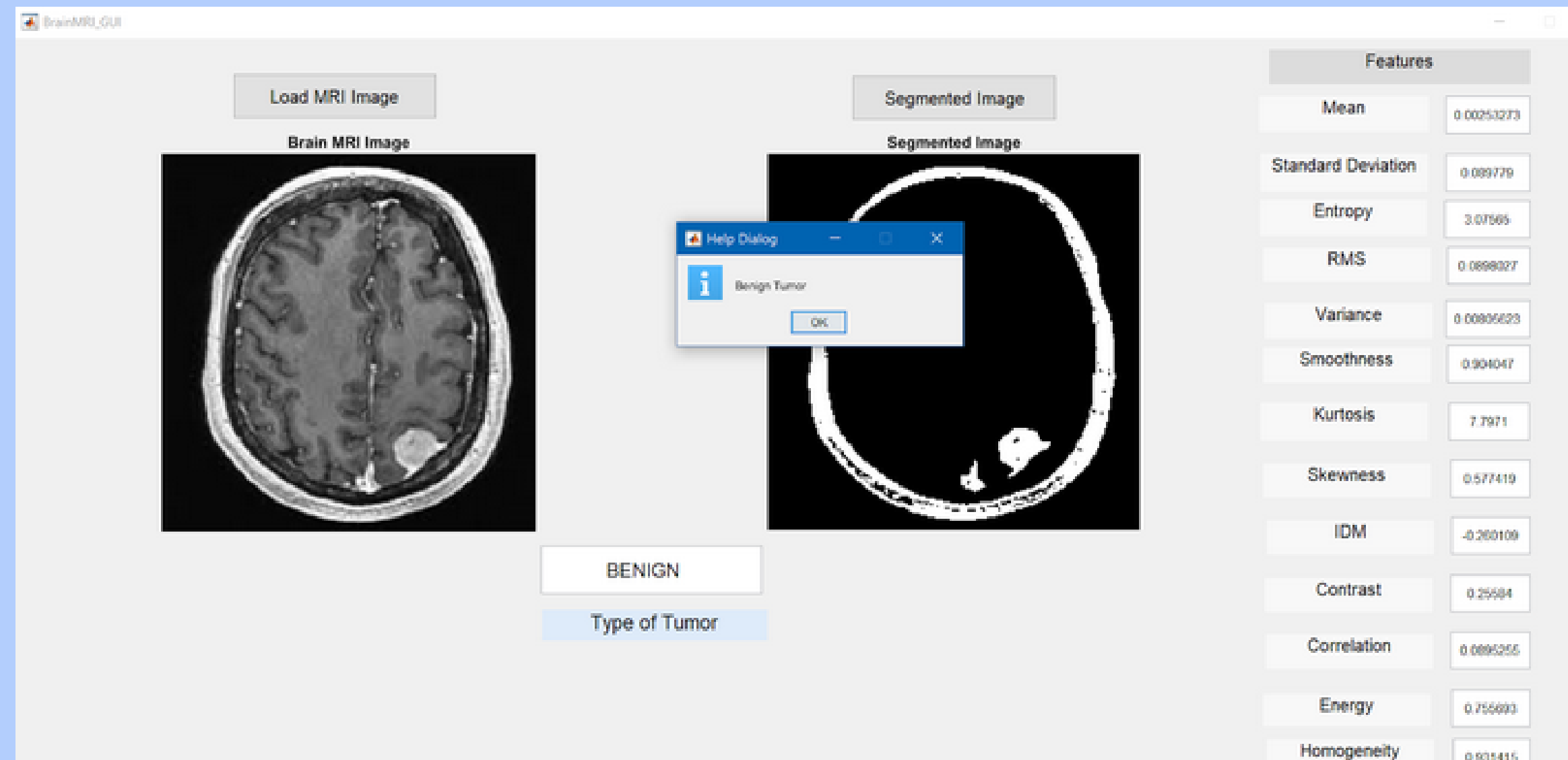
1. Principal Component Analysis PCA is used to reduce the large dimensionality of the data.
2. PCA computes the Eigen vectors of the covariance matrix and approximates it by a linear combination of the leading eigenvectors

# CLASSIFICATION

The Query image undergoes all the above steps and features are extracted. Support Vector Machine is used to classify if the tumor is benign or malignant.

The data points are plotted on a graph and an N Dimensional hyper plane is generated to classify the data points as benign or malignant

# RESULTS



	Bening (predicted)	Malignant (predicted)
Bening (actual)	4	2
Malignant (actual)	1	3