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BRAIN TUMOR DIAGONATION USING MACHINE LEARNING

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Abstract

In the medical field, accurate diagnosis is more important for treatment. So we need to implement an efficient diagnosis application for effective treatment. Object detection plays a major role in many areas like medical imaging, aerial surveillance, optimal manipulation and analysis, surgical microscopes, etc. In this work, the LR (Logistic Regression) based Machine Learning (ML) method for classification and global threshold segmentation for pre-processing. In initial stage image acquisition and de-noising will take place and then classification and regression has attained with machine learning techniques.

The SVM algorithm is applied to MRI images for extracting the tumor, and a model is developed to classify the tumor. This paper presents a prototype for Support Vector Machine related object detection, which classifies the images and evaluates whether the image is cancerous or non-cancerous. Determining a brain tumor is usually a very complicated and consumes more time. The MRI images of various patients at various stages can be used for the detection of tumors. Both SVM and Logistic Regression model algorithms helps in detecting the tumor at early stage with high accuracy. Both these models of machine learning helps to detect brain tumor. So far many algorithms have been implemented on how to detect and extract the tumour in medical images, they used techniques such as hybrid approach with Support Vector Machine (SVM), back propagation and dice coefficient. Among these algorithm which used back propagation as base classifier had a highest accuracy of 90%. In this work feature extraction of the medical images of patients' tumors in database is extracted using Histogram of Oriented Gradient, later these images are classified into tumor and non tumor images using SVM.

Introduction

Machine learning techniques are useful for multiple purposes in the field of computers. The techniques mainly focus on predicting, analyzing, detecting, recognition. The most common machine learning tasks are clustering, regression, classification. Healthcare sector is totally different from other industry. It is on high priority sector and people expect the highest level of care and services regardless of cost. After the success of deep learning in other real-world application, it is also providing exciting solutions with good accuracy for medical imaging and is a key method for future applications in health sector. Brain is an organ that controls activities of all the parts of the body. Recognition of automated brain tumor in Magnetic resonance imaging (MRI) is a difficult task due to complexity of size and location variability.

In this research statistical analysis morphological and thresholding techniques are proposed to process the images obtained by MRI for Tumor Detection from Brain MRI Images. Feed-forward backprop neural network will be used to classify the performance of tumors part of the image. The results produced by this approach will increase the accuracy and reduce the number of iterations.

Different types of tissues in the body can be distinguished completely with MRI and contains fine information for treatment Texture of MRI contains information of size, shape, color and brightness that texture properties help to detect texture extraction. Neural Network (NNs) consists of an interconnected component, it contains the mimic properties of biological neurons. In (Feed-Forward backprop) more than one neuron can be simply defined as interconnected components having large inputs activation function and output.

Methods like regression, gradient descent are used for this. The support vector machine mechanism is created as a cardiovascular device for relapse in noisy, complex environments. Not at all common strategies reduce the error of preparing for awareness. It divides or forms pattern using hyperplane in the graph. The Bolster vector machine is going to limit the upper limit of guessing error by enlarging the edge between separating the upper plane and the information. This can be viewed as a limited use of the risk reduction framework. This investigation is a medical picture process Denoising with LR Machine-learning technique. Brain disorders or tumors are major causes of brain malfunction.

Literature Survey

The following shows surveys done on home service systems and service-oriented architecture and also other related platforms.

Support-Vector Networks

This proposed algorithm is a combination of SVM and fuzzy c-means, to predict brain tumor. Here, the image is enhanced using contrast improvement, and mid-range stretch. Then Real data set of 120 patients MRI brain images have been used to detect 'tumor' and 'non-tumor' MRI images. The SVM classifier is trained using 96 brain MRI images, after that the remaining 24 brain MRI images was used for testing the trained SVM. SVM classifier with Linear, Quadratic and Polynomial kernel

function give 91.66%, 83.33% and 87.50% accuracy respectively and 100% specificity.

Face Detection Using Coarse-to-Fine Support Vector Classifiers

This paper, a novel technique which includes Normalization of Histogram and K-means Segmentation. Image is processed to delete the unnecessary signals. To de-noise filters such as Median filter. Adaptive filter and Gaussian filter is used in the MRI images. Atlast, the image is separated using a K-means algorithm to extract the mor from MRI. Efficient classification of the MRIs is done using NB Classifier and SVM Naive Bayes and SVM Classifier give accuracy 87.23% and 91.49% respectively. SVM give better classification accuracy.

Machine Learning in Python

This proposed Methodology includes methods such as Histogram, Re-sampling provides a specified number of pixels distributed in a particular image. Resized the image to 629X 839 to get the right geometric representation. Separation and identification of brain tumor using k-NN training based on k training. In this work the Manhattan metric used and calculated the distance range. The algorithm was tested in 48 images. Identification score for all images is almost 95%.

System Design

The document provides an architecture overview of the system using number ofdifferent architectural view to depict different aspect of the system. It is intended to capture and convey the significant architectural decisions, which have been made on the system

System Architecture

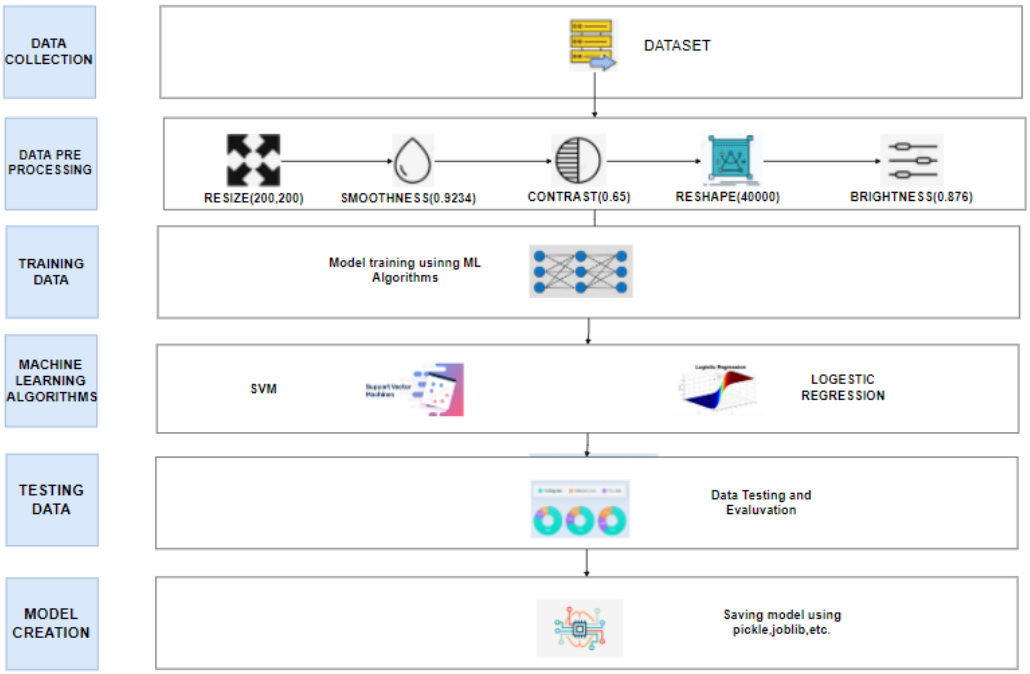

Fig 1: system architecture

List of Modules

The system has been implemented as different modules. The features of this system is divided into various modules.Those modules are explained below:

MODULES

- Download Dataset
- Data Visualization
- Image preprocessing
- Featurization
- Data splitting
- Modeling Evaluation
- Model Testing

System Implementation: The implementation of the system is done using the following features and libraries.

Integrated Development Environment

It's a coding tool which allows us to write, test, and debug your code in an easier way, as they typically offer code completion or code insight by highlighting, resource management, and debugging tools. IDE's provide so many features because of all the features they are extremely useful for development.

1. IDE enables us to design to write and manipulate source code.
2. Maintains a smooth Development Cycle
3. Increases efficiency and satisfaction
4. Automatically checks for errors to ensure top quality code.
5. Code completion capabilities improve programming workflow.

Libraries Project involves set of python. The libraries used here are as follows:

1. NumPy

2. Pandas Matplotlib Sci-Kit learn

Performance Analysis

The efficiency of the existing system are shown in the below graph

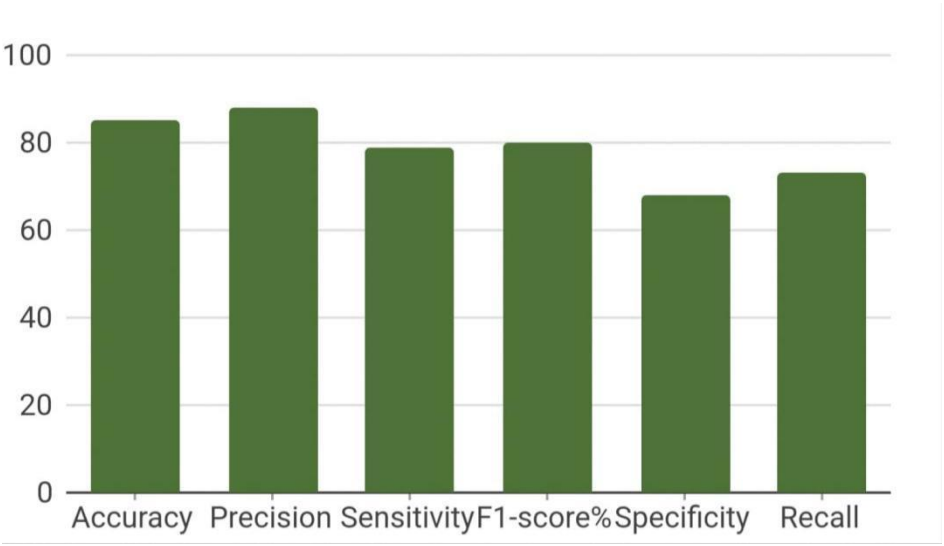

Fig 2: performance analysis

The efficiency of the proposed system are shown in the below graph

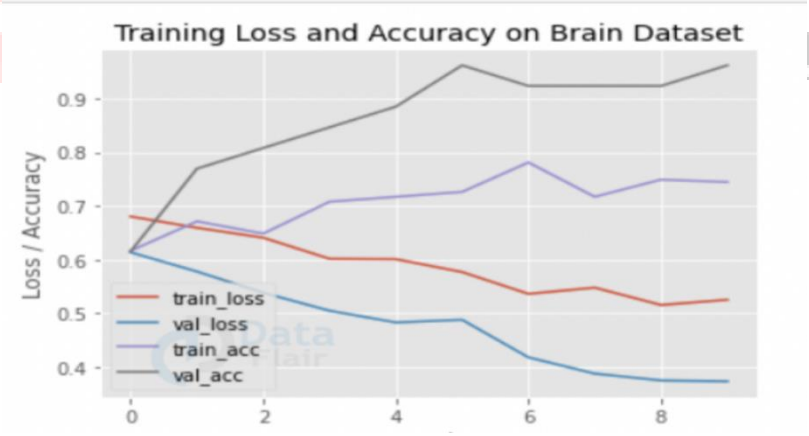

Fig 3: efficiency analysis

The comparison of the existing and proposed system are shown in the below graph

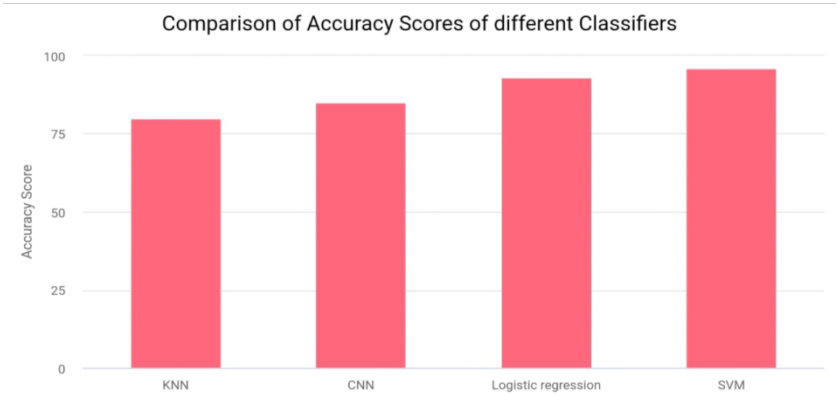

Fig 4: comparison process

Conclusion

In brain tumor detection we have studied about detecting brain tumor. In feature based we have study about image processing techniques likes image pre-processing, image segmentation, features extraction, classification. And also study about deep learning techniques SVM and Logistic regression. In this system we have detect the tumor is present or not if the tumour is present then model return's yes otherwise it return no and we have compared SVM with the LR Model. The result of comparison, one model's accuracy will be higher than the other . However, not every task is said to be perfect in this development field even more improvement may be possible in this application. I have learned so many things and gained a lot of knowledge about development field.

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