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ADVANCED DECISION TREE BASED HYBRID MEDICAL IMAGE CLASSIFICATION WITH REGION USING CORRELATION METHOD

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ABSTRACT

The paper entitled as "Advanced Decision Tree Based Hybrid Medical Image Classification with Region Using Correlation Method" is an improved method for region identification using correlation method. This hybrid approach classifies the CT scan brain images into three categories namely normal, benign and malignant. The developed system can assist the physicians for efficient classification with multiple keywords per image to improve accuracy.

Keywords: *CT scan brain images*

INTRODUCTION

Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging. Image Processing is a technique to enhance raw images received from cameras/sensors placed on satellites, space probes and aircrafts or pictures taken in normal day-to-day life for various applications. Nowadays, in many hospitals images are compared and checked manually. To make it easy, the system called CAD (Computer Aided Diagnosis) are used to make work easy for radiologist. The CT scan image is given as input. By using the proposed system the brain tumor is normal or benign or malignant are identified.

SYSTEM DESCRIPTION

In electrical engineering and computer science, image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it.

A correlation function is a statistical correlation between random variables at two different points in space or time, usually as a function of the spatial or temporal distance between the points. If one considers the correlation function between random variables representing the same quantity measured at two different points then this is often referred to as an autocorrelation function being made up of autocorrelations.

Types of Correlation are: positive, negative, no, perfect, strong and weak correlation. Positive correlation occurs when an increase in one variable increases the value in another. Negative correlation occurs when an increase in one variable decreases the value of another. No correlation occurs when there is no linear dependency between the variables. Perfect correlation occurs when there is a functional dependency between the variables. A correlation is stronger the closer the points are located to one another on the line. A correlation is weaker the farther apart the points are located to one another on the line.

In proposed method, the work of correlation method follows:

1. When the process is initiated the input correlation method is called to get a unique ID for the process.
2. The run-time system creates a new process instance with the ID.
3. The run-time system initializes the process data. It also stores the unique ID of the process within this data, so that it can be retrieved in the future.
4. The process is executed, one activity at a time.

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5. When the event activity is executed, the process is halted. The process remains halted until one of the operations associated with the event is invoked.
6. When an event operation is invoked, the run-time environment evaluates the event data to determine which correlation method to invoke. It invokes the method, yielding a correlation ID.
7. The run-time environment takes this ID and looks it up in the system to find the process instance associated with the caller.
8. It then moves the blocked event forward and steps through the process again.

The proposed methods, image mining concepts have been used. It deals with the implicit knowledge extraction, image data relationship and other patterns which are not explicitly stored in the images. This technique is an extension of data mining to image domain. It is an inter disciplinary field that combines techniques like computer vision, image processing, data mining, machine learning, data base and artificial intelligence. The objective of the mining is to generate all significant patterns without prior knowledge of the patterns. Rule mining has been applied to large image data bases. Mining has been done based on the combined collections of images and it is associated data. The essential component in image mining is the identification of similar objects in different images.

The main focus of image mining in this work is concerned with the classification of brain tumor in the CT scan brain images into three types: Normal, benign, and malignant. The normal images depict the cells of healthy patients, benign cells are like cancerous cells but not originally cancerous and third type is malignant cells that depict the original steps for classifying the CT-Scan brain images into the cancerous cells. Various algorithms have been used to undergo various stages such as: preprocessing, feature extraction, rule generation, classification and diagnosis. The pre-processing step has been done using the 2D median filtering method along with the morphological opening process. The edge features from the image have been extracted using canny edge detection technique.

REGION IDENTIFICATION PROCESS BY CORRELATION OR CRITERIA MATCHING

In the proposed system, the enhancement of the region based identification for detected images is implemented. The detection image is given as input to the system. It will detect the region on that particular image based on region identification process.

- Region Identification provides an automated way to identify regions within an image by correlation or criteria matching.
- Correlation involves comparing collections of points on two images for similarities; a correlation of 1 would be a complete match. Setting up such automated systems often requires a significant training set of data so that thresholds and compensation values can be set.
- Classification is often used in combination with region identification to classify detected region identified within an image. The detected region is not a clear view.
- Correlation method is used to find the correct position of affected area in brain. It locates the brain tumor area in brain.

Correlation methods are used in conjunction with event activities in a run-time system where multiple instances of the same process are running simultaneously. The correlation methods are used to ensure that any event which is received by the system is directed to the right process. If a process contains an event activity, a correlation method is defined for the input activity and for each operation of the event activity. The input correlation method returns a unique ID for the process, which is derived from the input data. Each event correlation method should return the same ID, in this case being derived from the event data. This identifies the target process for the event.

RESULTS AND DISCUSSIONS

When the process is initiated the input correlation method is called to get a unique ID for the system. The run-time system creates a new process instance with the ID. The run-time system initializes the process data. It also stores the unique ID of the process within this data, so that it can be retrieved in the future. The process is executed, one activity at a time. The suggested hybrid approach of correlation method classifies the brain tumors cells in an efficient way. This approaches mainly deals with identification of region using correlation method. The developed brain tumor classification system is expected to provide valuable diagnosis techniques for the physicians.

Fig. 1 CT scan brain image

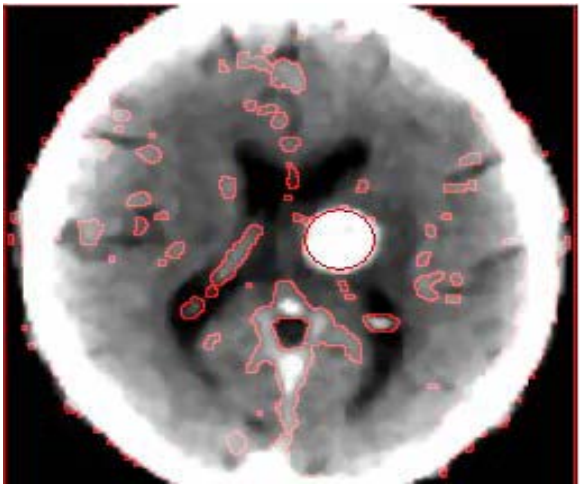

Fig. 2 Segmented image with less object

The main goal of segmentation is to partition an image into regions. Some segmentation methods such as "Thresholding" achieve this goal by looking for the boundaries between regions based on discontinuities in gray levels or color properties. Region-based segmentation is a technique for determining the region directly.

The proposal deals with the identification of brain tumor in correct location of brain that is left or right etc. This technique is an extension of data mining to image domain. The main focus of image mining in the proposed method is concerned with the classification of brain tumor in the CT scan brain images. The proposed hybrid approach of association rule mining, region identification and decision tree algorithm classifies the brain tumors cells in an efficient way.

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