A Novel Approach Fuzzy Approach to Pattern Recognition for Large Database through MATLAB

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Abstract: ***The purpose of this paper is to discuss the latest techniques for identifying fuzzy set methods and algorithms in the field of models. In identifying and classifying reality, the work is confronted with the ambiguity associated with all aspects of human cognitive activities. The origin of the fuzzy source is related to the label represented in the characteristic space and the category label considered in the classification process. By the theory of probability and theory of fuzzy sets, the obvious difference between the information processing method and the method of interpreting the results is explained in detail. The fuzzy set is the oldest and most reported soft computation paradigm. They are ideal to simulate the various forms of uncertainty and ambiguity often encountered in real life. Integrating fuzzy sets with other computing tools can lead to more powerful, smarter, and more efficient systems.***

Keyword: Fuzzification, Neural Network, Pattern Recognition, MATLAB

Introduction: One of the most important abilities of mankind is to learn through our experience, our efforts and our mistakes. When we reach the age of five, most of us recognize numbers, characters, regardless of size, capital letters or small letters, rotation and tilt. Even if the character is on a piece of paper, partially covered, or even on a background, it can be recognized. Throughout the history of human tracing of knowledge, it is clear that nature recognizes patterns, understands patterns, and tries to relate patterns to a set of rules. But the question is how to use this experience to do learning in the car. The most important challenge is how to summarize these experiences. This is one of the fundamental principles of developing a wide range of theories and concepts based on the natural world.

1.1 Pattern Recognition: Model identification can be defined as classifying input data into identifiable classes by extracting important data characteristics or attributes from unrelated details. Duda and Hart define it as an area of concern for the significant laws of machine recognition in noisy or complex environments. A simpler definition is the structure in search data. According to Jain et al. Model identification is a generic term describing a wide range of issues, such as identifying, describing, classifying and grouping patterns. Identification of patterns refers to the unknown nature of predicting or predicting observations, such as black or white, one or zero, morbid or healthy, real or false discrete quantities. Watanabe defines the pattern as "the opposite of chaos, it is a fuzzy defined entity that can give its name." For example, a pattern may be a fingerprint image, a handwriting word, a face, or a voice signal. Model recognition issues are important in a variety of engineering and science disciplines, such as biology, psychology, medicine, marketing, artificial intelligence, computer vision and remote sensing.

1.2 Pattern recognition for large data: The rapid development of data collection and storage technologies has enabled organizations to accumulate large amounts of data. However, extracting useful information has proven to be extremely challenging. Often, traditional data analysis tools and techniques are not available due to the size of the data set. Sometimes, non-traditional data features mean that traditional methods cannot be applied even if the data set is relatively small. In other cases, the questions that need to be answered cannot be resolved using existing data analysis techniques, so new methods need to be developed.

2. Literature Survey

Ferdous Hossain and others have proposed an adaptive algorithm at the edge n. The adaptive canny algorithm is used to improve the accuracy of the output object. In conventional Canny, you must manually set the two thresholds, so there are some flaws in different images, but provided the adaptive threshold here based on the average value and the average value. Approved canalized channel detection method can successfully detect the edge and is divided into several stages. **Ranita Biswas and Jaya Sil** proposed edge detection algorithm is a classic and robust method for edge detection in grayscale images. Two important feature of the method is to introduce NMS (non-maximal inhibition) and gradient threshold. **Dhiraj Kumar Patel, Professor Sagar** raised the edge is the boundary between the object and the background, to identify the boundary between object objects overlapping and not overlapping. This means that if an edge can be accurately identified with animation, it can locate all objects, and measure basic properties such as area, perimeter, and shape. **Jayaram K. Udupa, Supar Samarasekera** proposed to extract information from the objects in the image should try to use this fact do not remain vaguely possible. In previous image segmentation studies, the concept of "hanging" the image elements specified by their fuzzy connections was absent. Dr. S. Lakshmi and **V. Shankara Narayanan** suggested that about basic features of the image. Image margins include a wealth of information that is important for image recognition by object recognition. Border detection refers to the process of identifying and locating powerful discontinuities in life. **Salem Saleh Al-amri** and others have proposed a method of segmenting the boundaries of satellite imagery. They have used seven types of technology in this category, comparing with Sobel technology, Prewitt technology, Kiresh technology, Laplace technology, cutting-edge technology and maximizing Cany technology (EMT) to select the best technology benefits in the field of image detection. **U. Rajendra Acharya** presented a representative electrocardiogram signal containing information about the condition of the heart. The shape and size of the P-QRS-T-wave, the time interval between the different peaks may contain other useful information about the nature of the heart. Implementation of Fuzzy approach to Pattern Recognition. The concept of fuzzy logic is similar to the feelings and processes of human reasoning. Unlike classic control strategies (point-to-point control), fuzzy logic control is control from one interval to another or from one interval to another. The output of the fuzzy controller comes from blurring inputs and outputs using associated membership functions. The explicit entry is converted to the individual

members of the associate membership function based on its value. From this point of view, the output of the fuzzy logic controller is based on its membership in various membership functions, which can be seen as a series of entries. To implement fuzzy logic technology in practical applications, the following three steps are required:

- **Fuzzification** – Convert classical data or crisp data into fuzzy data or Membership Functions (MFs).
- **Fuzzy Inference Process**–Combine membership functions with the control rules to derive the fuzzy output.
- **Defuzzification** – In order to enable machines to handle vague language input such as 'Somehow Satisfied', the crisp input and output must be converted to linguistic variables with fuzzy components.

4. Research Investigation

This thesis investigate the following investigation on the basis of various modules related to pattern recognition techniques.

- Colour Detection
- Geometrical Shape Detection
- 3d Modelling
- Fuzzy Motion Detection
- Motion Detection in Video

4.1 Mathematical Constructs

Gaussian filter to reduce noise and unwanted details

$$g(m,n) = G_\sigma(m,n) * f(m,n)$$

Where,

$$G_\sigma = \frac{1}{\sqrt{2\pi\sigma^2}} exp\left(-\frac{m^2+n^2}{2\sigma^2}\right)$$

Compute gradient of g (m, n) using any of the gradient operators (Roberts, Sobel, Prewitt, etc.) to get:

$$M(n,n) = \sqrt{g_m^2(m,n) + g_n^2(m,n)}$$

And

$$\theta(m,n) = tan^{-1}[g_n(m,n)/g_m(m,n)]$$

Threshold M:

$$M_T(m,n) = \begin{cases} M(m,n) & \text{if } M(m,n) > T \\ 0 & \text{otherwise} \end{cases}$$

Where, T is so chosen that all edge elements are kept while most of the noise is suppressed.

5. Simulation:

The proposed methodology based on fuzzy approach on the MATLAB plate form is been executed and the result has been come out as follows in form of GUI (Graphical User Interface).

Fig: 4.1 Basic Layout of Simulation of Fuzzy Pattern Approach for Large Database

Fig: 4.2 RGB Colour Detection GUI

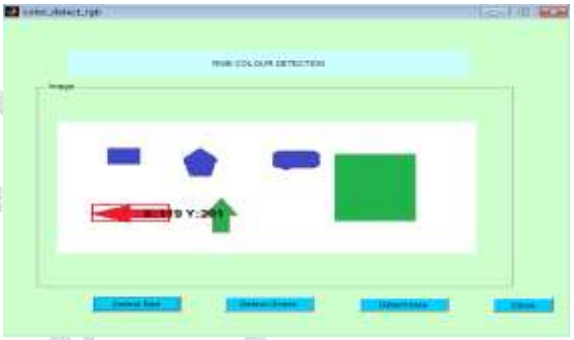

Fig: 4.3 Red Colour Detection in Image

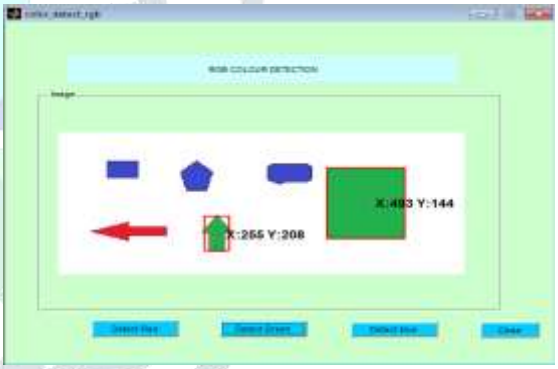

Fig: 4.4 Green Colour Detection in Image

Fig: 4.5 Blue Colour Detection in Image

Fig: 4.6 Geometrical Shape Detection GUI

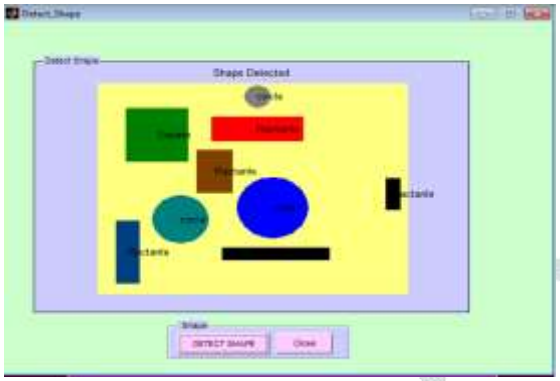

Fig: 4.7 Shape Detected (Circle, Rectangle, Square)

Fig: 4.8 GIS of Image GUI

Fig: 4.9 Load Satellite Image in GUI

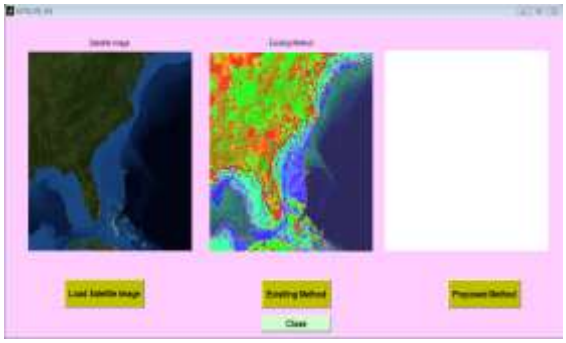

Fig: 4.10 Apply Existing Method

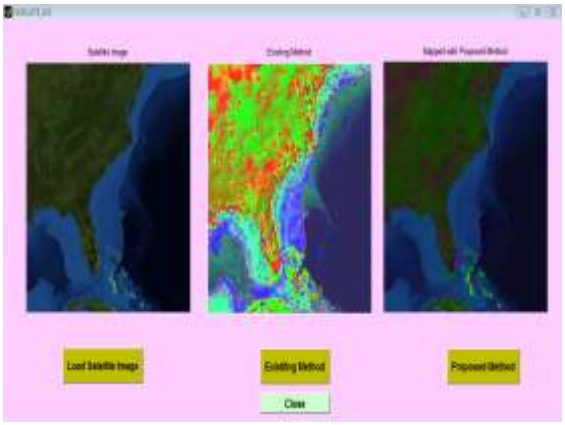

Fig: 4.11 Apply Proposed Method

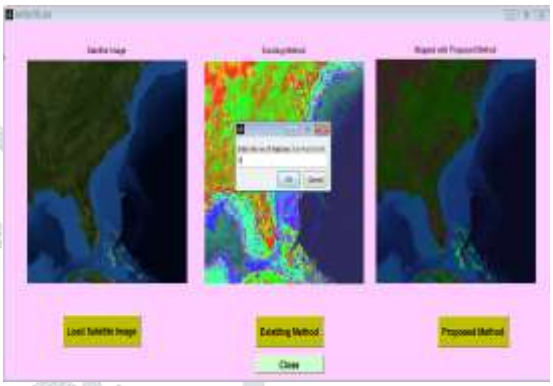

Fig: 4.12 Apply 6 Number of Features

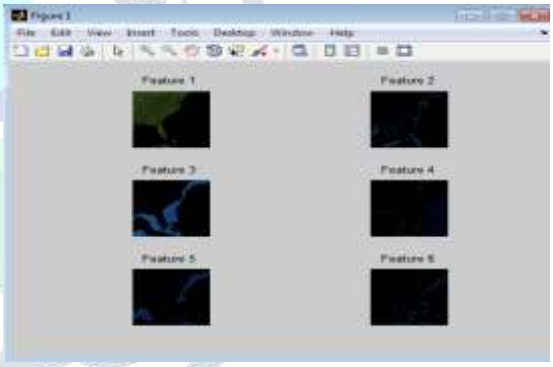

Fig: 4.13 6 Features of Images Calculated

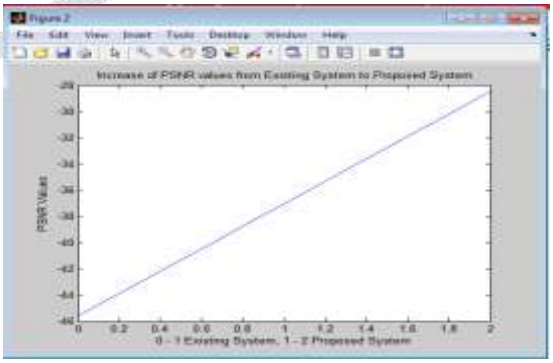

Fig: 4.14 Graph between Existing System and Proposed Method

5. Conclusion

In summary, a comprehensive survey highlights the different techniques used for pattern detection based on fuzzy pattern recognition. With a larger mode detection algorithm, various detection systems can be efficiently performed. Extensive research has been done in creating many different methods and algorithms for pattern detection, but it is still difficult to evaluate whether the different types of implementations used to implement

pattern detection are applicable to GUIs built in MATLAB. This is the basic work of my research. In the future, we will continue to study the validity of pattern or shape detection by using fuzzy methods to classify large data sets.

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