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RESEARCH ARTICLE

A Study on Different Object Identification Approach

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Abstract: Data Object Identification is one of the most important Data processing operations to categorize the Dataset and to recognize the input Data. This Object Identification process includes the feature set based analysis to generate effective Object Identification model. This paper includes the study on different Object Identification approaches such as Clustered and Bayes Network. Paper also discussed the contribution of earlier authors in the area of Data Object Identification.

Keywords: Supervised Learning, Clustered, Decision Tree, Featured set

I. INTRODUCTION

Data Processing is one of the most required forms of data processing to extract the information effectively and to conclude some valuable information from it. Some of the information is integrated in Data in different forms. To extract this kind of information from Data, the feature extraction is applied over the Data. There are different methods to retrieve the information from Data under different aspects, applications and Data types. Some of such information representation or extraction approaches includes the segmentation, Object Identification etc. The information retrieval process from Data is shown in figure 1.

Data Object Identification is one of the most required tasks to extract information from Data. It is used in different contexts to perform the object or pattern recognition as well as to perform the categorization of the objects based on information analysis. It is actually defined in a hybrid scenario that itself covers the concept of object categorization, object recognition as well as enable the object search. Object Identification is about to characterize the Data under the visual part analysis with view analysis. There are number of application areas where the Object Identification plays an important role. These application areas include the disease Object Identification in medical Data, , object Object Identification in real time Data etc.

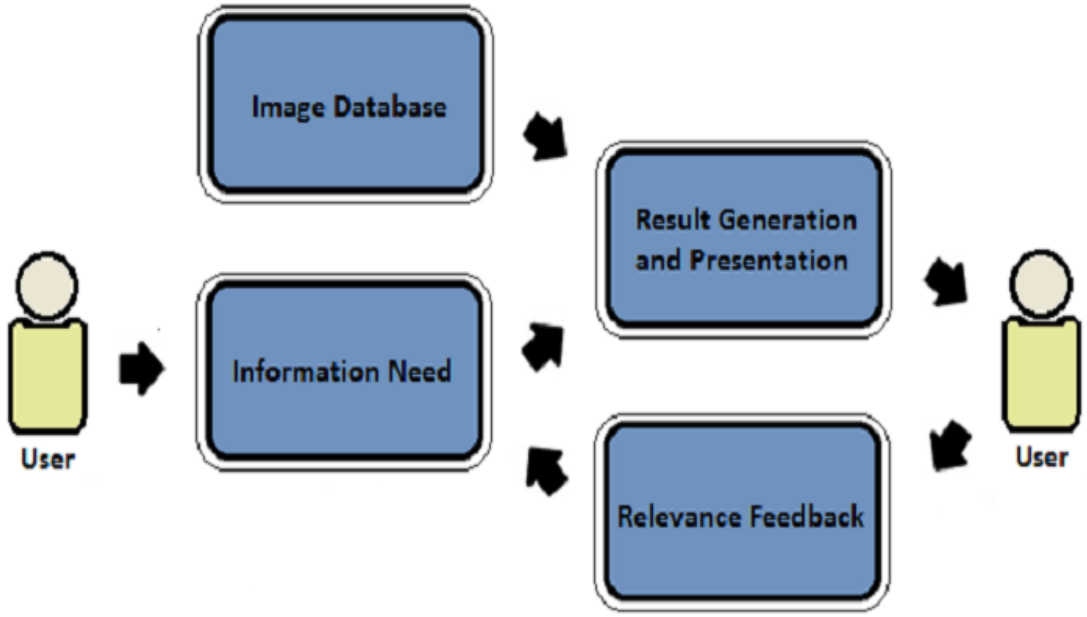

Figure 1 : Information Retrieval Process

Data Object Identification is actually to define a tag or the annotation to the Data based on the feature based analysis. The Object Identification process is applied on a set of arbitrary Data collected from any primary or secondary source. These Data belong to specific domain such as medical Data, geographic Data, handwritten characters, biometric Data etc. The Object Identification procedure is divided in two broader approaches called supervised Object Identification and unsupervised Object Identification.

A) Supervised Learning

Supervised learning perform the analysis on the pre-classified Dataset and represent it as the training Dataset. The descriptors are applied on these Dataset Data to represent different classes. These annotations are applied on each training Data manually without performing any analysis. When Object Identification process is applied, at the earlier stage, the training Dataset analysis is performed. This analysis is performed to identify the descriptive features for each class. Now when some Data is accepted from the user and the feature analysis is performed on it. Now these extracted features will be compared with the training set features. The Data with the maximum feature match will be elected as the matched Data and the class of that matched Data will be considered as the class of input Data. There are number of local algorithms comes under the supervised learning process such as neural network, SVM (State Vector Machines), Bayesian Network, Decision Tree etc. The standard Object Identification model is shown in figure 2.

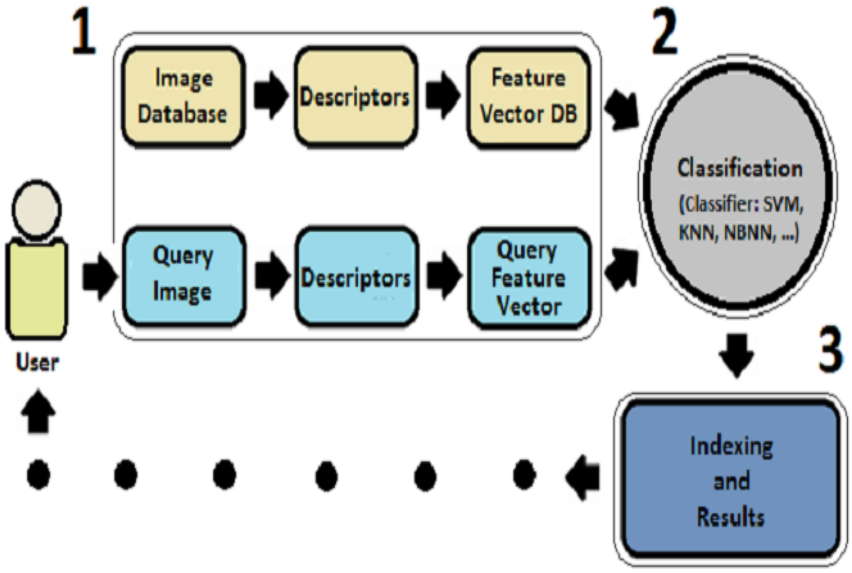

Figure 1 : Data Object Identification

B) Unsupervised Learning

This kind of Object Identification approach does not require any training set. These methods rely on the clustering process that performs the distance based analysis between the input Data and the available Dataset Data. This distance measure can be performed on complete Data or the featured Data extracted from the Data itself. Based on this distance based analysis, the Data with minimum distance match will be elected as the matched Data and its class annotation is placed on input Data.

In this paper, the exploration to the Object Identification process is been defined. This paper includes the study of different Object Identification approaches. In this section, the exploration of the Data Object Identification model is defined along with the major categorization of Object Identification process. In section II, the work done in the area of Data Object Identification is defined. In section III, different Data Object Identification approaches are discussed. In section IV, the conclusion obtained from the work is presented.

II. EXISTING WORK

In this section, the work done by the earlier researchers in the area of Data Object Identification is discussed and presented. In Year 1997, K. S. Chen[1] has defined the filtering effect based analysis on Data Object Identification. This paper exams its effects on the Data Object Identification by a supervised fuzzy dynamic learning neural network trained by a Kalman filter technique. Based on the available ground truth, the Object Identification performances were evaluated using the original and filtered Data. In Year 1998, A.T. Shuen[2] has improve the Object Identification approach using region fusion on spotted Data. This paper investigates various digital filtering techniques to remove speckles for Data Object Identification using fused SAR and SPOT XS Data. The fused Data Object Identification is then compared with the classified SPOT XS Data. In Year 2003, N. Abbadeni[3] presented work on texture and the content based approach for the similarity analysis on Data. This paper addresses the fundamental issues of visual content representation and similarity matching in content-based Data retrieval and Data databases in general. In this paper, a new similarity model is introduced based on the Gower coefficient of similarity.

This similarity model is exible and can be declined in several versions: non-weighted, weighted and hierarchical versions. This model was applied to a sample of homogeneous textured Data considering two representation models: the

autoregressive model, a purely statistical model, and an empirical perceptual model based on perceptual features such as coarseness and directionality.

In Year 2003, Kentaro Toyama[4] defined the Geographic tag placement in digital Data. Author describe an end-to-end system that capitalizes on geographic location tags for digital photographs. This paper brings all of these issues together, explores different options, and offers novel solutions where necessary. Topics include acquisition of location tags for Data media, data structures for location tags on photos, database optimization for location-tagged Data media, and an intuitive UI for browsing a massive location-tagged Data database. In Year 2006, L. Yuan[5] performed a work on the Object Identification of Data using MAP based algorithm. Presented main work is to select a Gaussian mixture model and then use it in a MAP Object Identification algorithm. The model is assumed that the whole distribution could be separated into finite parametric density distributions, and then the maximum likelihood parameters of each proportional distribution can be estimated by EM iterative computation.

In Year 2006, Lan Gao[6] performed a fuzzy based analysis for SAR Data Object Identification. This paper is to investigate a new unsupervised approach for extracted the objects based on Data using improving fuzzy clustering method. The traditional Fuzzy c-means clustering (FCM) is very sensitive to the initial value and the number of clusters. This paper employs the textural feature in Data to extract the transition and propose a new fuzzy unsupervised Object Identification method for SAR Data using the transition region to define the initial value and the number of cluster adaptively. In Year 2006, R. Lorenzo[7] defined supervised learning approach for recognition using spiking neurons. In this paper Author propose a three-layered neural network for binary pattern recognition and memorization. Unlike the classic approach to pattern recognition, Presented net works organizing itself in an unsupervised way, to distinguish between different patterns or to recognize similar ones. In Year 2006, Q. Wu[8] perform the knowledge representation on the spiking neuron based analysis. Knowledge representation is very important in intelligent systems - e.g. for knowledge discovery, data mining, and machine learning. The human brain, a significant intelligent system, works with a huge number of spiking neurons. Based on spiking neuron models a new generation of spiking neural networks (SNNs) has been developed for artificial intelligence systems. SNNs are computationally more powerful than conventional artificial neural networks. In this paper, the spiking neuron model is applied to represent logic rules and fuzzy rules. Based on the STDP (Spike Timing Dependent Plasticity) principle, a new SNN model is proposed for pattern recognition. In Year 2007, M.R. Peterson[9] defined work on the evolution of satellite Data. A Satellite Data Set for the Evolution of Data Transforms for Defense Applications". Author present a set of fifty satellite Data used to evolve Data transforms appropriate for satellite and unmanned aerial vehicle (UAV) reconnaissance applications. Author identify the best training and test Data. In Year 2007, F. Chen[10] defined a work on Object Identification on SAR Data using cased based reasoning. In this paper, Author investigate a case-based reasoning (CBR) method for the Object Identification of multi-temporal SAR Data with the aid of ancillary information. Author propose a similarity assessment and use it for the case-based matching. After that, Author investigate an object-oriented post-Object Identification method which takes the shape of land use region into account, as a result, it leads to a more meaningful Object Identification, and the regenerate land use Data or map can be easier compared and combined with usual GIS data.

III. OBJECT IDENTIFICATION TECHNIQUES

In this section, Data Object Identification process is defined with the exploration of Data Object Identification model. There are parametric and non-parametric Object Identification approaches to divide the available Data set in various categories based on feature analysis. The Object Identification process is actually the mapping between the input object to featureed set and then to label class. These basic models of Object Identification process are shown in figure 3. This model is defined respective to the supervised Object Identification process. This Object Identification process is applied with two Datasets called training set and the testing set.

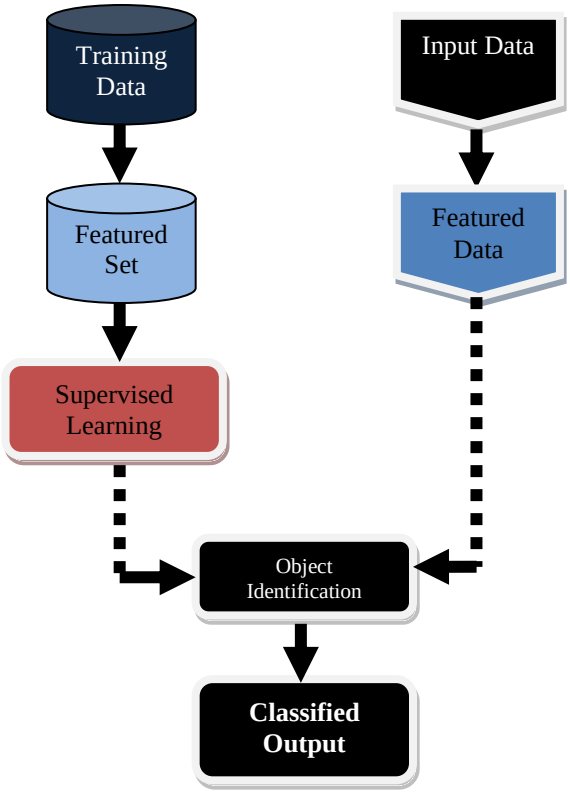

Figure 3 : Object Identification Model

As shown in the figure, the supervised Object Identification process is divided on two separate stages that works separately upto some extent with same procedure. In this parallel process, the preprocessing is implied over the training set Data as well as on testing Data. The preprocessing stage basically performs the analysis on the Data and extracts the Data features. These obtained features collectively form a featured Dataset. Now this, featured set and the input featured Data is processed under the Object Identification approach and the result Data is identified. Some of these Object Identification approaches are discussed in this section. These approaches includes Probabilistic, K-Nearest Neighbor(Clustered) approach, Decision Approach etc.

A) Probabilistic Classifier

Probabilistic Object Identification is basically the estimation approach that includes the density based analysis. This approach categorized the pattern under the prior knowledge analysis respective to particular class. This approach is effectual to handle the N number of independent variables and establish the relationship between them to identify the feature class based on feature analysis. These variables construct a probabilistic rule to map the input feature vector to the relative feature class. The base equation of Class (C) formation from Feature (X) is given as

$$P(C_j|X_1,X_2..X_n) = \frac{P(C_j)\ P(X_1,X_2..X_n|C_j)}{P\ (X_1,X_2..X_n)}$$

Here P(Cj) is the prior probability of class Cj, $P(X_1,X_2..X_n|C_j)$ represents the conditional probability of feature vector respective to the class.

The process of Probabilistic Object Identification combines the model with some decision rule. The decision rule here defines the hypothesis to obtain the most probabilistic value. Based on which, the maximum a posterior mapping based decision rule can be formed. This Object Identification process can be performed to obtain the most effective matched Data.

B) Clustered Analysis

This is one of the simplest Object Identification techniques that based on the computation process to achieve the accurate result. In most of the Object Identification implementation, it gives more accurate results. This method is processed on the feature vector and performs the distance based analysis between the input object and the training objects. Here k represents the number of classes in the training set. Now when the distance analysis is performed, based on the best-fit analysis the nearest neighbor is identified. The featured classes are differentiated based on the analytical distance based decision vector.

IV. CONCLUSION

In this paper, a study based representation of different Object Identification approaches is defined. The paper includes the study of the Object Identification process along with model exploration. The work also includes the exploration of different supervised learning approaches that are effective to perform the Data Object Identification.

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