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# A Review On Hybrid Feature Based Object Mining And Tagging

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***Abstract*—** Tag mining is important as far as image search engines/databases are concerned viz. Flicker, Picasa, Facebook...etc. Tag Mining is a difficult and highly relevant machine task. In this paper, we present a new approach to hybrid features based object mining and tagging that identifies the objects with higher accuracy from an occluded image. In existing system tag Mining with algorithms based on 'Nearest neighbor classification' have achieved considerable attention implementation point of view but at the cost of increasing computational complexity both during training and testing. It is very difficult to identify the object which is occluded in image. The objective of object tagging of image is to search over user contributed photo online which have accumulated rich human knowledge and billions of photos, then associate surrounding tags from those visually similar photos for the unlabeled image. For an unlabeled image, photos in the social media are extracted by the Feature based object tagging of image, the annotations associated with the images are expanded, and then each object group is classify. In this paper different features and classifier are compare with advantages and disadvantages.

***Keywords*—** Image processing, Object recognition, object mining, object tagging, feature extraction, classification, SVM

## I. INTRODUCTION

Object mining is the process of identifying objects from an image. In this process, an image is first divided into segments and subsequently, the objects are identified and labeled from segments. An image with labeled objects is called tagged image [1].Image is a visual representation of objects that are difficult to translate by our eyes, especially grayscale images. To simplify our visual presences for images, it needs a coloring[7].while image coloration is the addition of color to the image which is usually in the form of grayscale or black and white images in order to provide more information to the viewers[7].Detecting and identifying objects is a crucial methodology for analyzing objects under various situations. Automatic object detection and recognition systems are extensively used in large number of real life applications. several algorithms, Among them is the AdaBoost algorithm that has been successfully applied in various sports entertainment and security applications[5].In future, the FOMTA can be evaluated for higher resolution images and for highly occluded images[1].

These systems try to retrieve images similar to a user-defined specification or pattern (e.g. shape sketch and image example).Generally, the algorithms used in these systems are commonly divided into three tasks: extraction, selection, and classification [3]. Feature extraction is the process of generating features to be used in selection and classification tasks. Feature selection reduces the number of features provided to the classification task. Those features, which are likely to assist in discrimination, are selected and used in the classification task [3]. To localize objects in Web images using an invariant descriptor is crucial. The HOG (histogram of oriented gradients) descriptor is used to increase the accuracy of localization. This well-known descriptor does not cover rotation variations of an object in images. In this introduces a rotation invariant feature descriptor based on HOG [3].

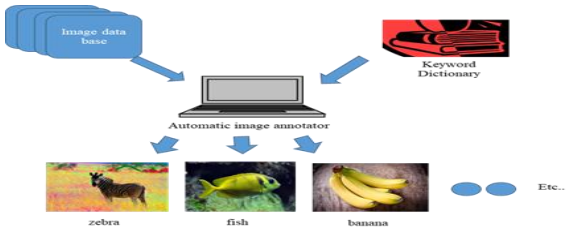


Figure 1. Automatic image annotator

The end-to-end generalized framework for object handling. It is deals with the recognition, detection, segmentation and grasping of objects. It starts with the recognition and detection of classes of objects in the RGB domain using a CNN [2]. A supervised learning technique (ANN) for object detection based on interest point features with different hidden layer settings and different Thresholds [4].

Section I contains the introduction of basic approach for weather forecasting. II contain the related works of basic literature papers. Section III contain the methodology and

 

algorithms section IV explain the comparative study between different algorithms and at last conclusion and future scope.

## II. RELATED WORK

Hiteshree H. Lad and Mayuri A. Mehta (2017) developed system for Analysis of Feature based Object Mining and Tagging Algorithm Considering Different Levels of Occlusion. They have used FOMTA Feature Based Object Mining and tagging method is used. They have used Features SIFT, Surf and Combination of PCA and Sift with different classifiers i.e. NB (Naive bais), ID3 (Iterative Dichotomies 3), SVM(support vector machine), KNN(K-Nearest Neighbor) and ADABOOST . Among all SVM gives 86.83% accuracy. [1]

Adrian Llopart ,Ole Ravn , Nils A. Andersen and Jong-Hwan Kim (2017) developed system for Generalized framework for the parallel semantic segmentation of multiple objects and posterior manipulation. They have used end-to-end generalized framework for object handing. They have used Features Image segmentation and Region of interest with classifiers i.e. CNN (Convolutional Neural Net). [2]

Ali Vashaee Reza Jafari, Djemel Ziou and Mohammad Mehdi Rashidi (2016) developed system Rotation invariant HOG for object localization in web images. The Rotation Invariant HOG (RIHOG) feature to cover the different possible orientation of the object in the image. They have used other Features i.e. SURF, SIFT, HOG with classifiers RRM. They have used top-down searching technique. [3]

Amin Mohamed Ahsan and Dzulkifli Bin Mohamad (2017) developed system for Machine learning technique for object detection based on SURF feature. They have used a supervised learning techniques (ANN) for object detection based on interest point features with different hidden layer setting and different thresolds. A new labelling data represent the human faces and the cars objects were prepared as a contribution to object detection field. Used caltech101. [4]

Zahid Mahmood, Mahammad Nazeer, Muhammad Arif , Imran Shahzad , Fahad Khan and Mazhar Ali (2016) developed system Boosting the Accuracy of AdaBoost for Object Detection and Recognition. They apply own developed multi-scale Retinex (MSR) algorithm as a pre-processing module to boost the accuracy of the AdaBoost algorithm. [5]

Pawel Forczmanski and Andrzej Markiewicz (2016) developed system for Two-stage approach to extracting visual objects from paper documents. They have used a novel approach to the extraction of visual objects from digitized paper documents. Its main contribution is a two-stage detection/verification idea based on iterative training and multiple features-classifier pairs.They give accuracy for LLF feature set is several time highr than in case of any other feature set. [6]

Muhammad Sipan, Supeno Mardi Susiki and Eko Mulyanto Yuniarno (2017) developed system for Image Block Matching Based on GLCM Texture Feature on Grayscale Image Auto Coloring. Color image blocks are used as templates and Grayscale image blocks as targets, searching for similarities between two image blocks by subtracting both GLCM texture feature values and comparing the target of GLCM value with the template value to obtain the smallest or near-zero value in the color block. [7]

Nikhil Rasiwasia and Nuno Vasconcelos (2012) developed system for Holistic Context Models for Visual Recognition. They system solved the problem like scene classification, image annotation, image retrieval, object recognition/localization and object detection.They have proposed an approach to context modeling based on the probability of co-occurrence of objects and scenes. The proposed modeling is quite simple, and builds upon the availability of robust appearance classifiers. [8]

## III. METHODOLOGY

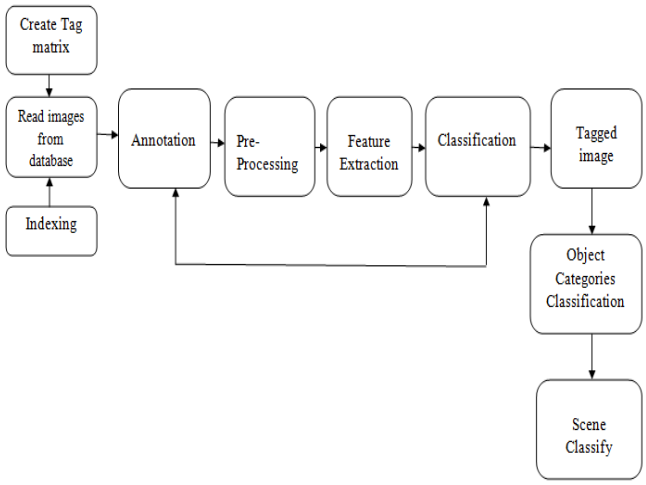


Figure 2. Basic Steps For object mining and tagging algorithm

### A. *Preprocessing :*

During a preprocessing step, RGB image is converted into grayscale image using rgbToGray() function to make the processing and manipulation of images faster[1].

Typically, images are in RGB form that contains multiple intensity values (R, G and B) for every pixel. Moreover, number of intensity values is different for each image. On the other hand, the gray scale image contains fixed 0 to 255

 

intensity values and hence, the processing becomes faster with gray scale image [1].

### *B. Feature Extraction:*

Object recognition accuracy and speed of object mining and tagging algorithm are highly dependent on the selection of feature extraction technique. To choose an appropriate feature extraction technique, we have studied several feature extraction techniques:

**i. Scale Invariant Feature Transform (SIFT):**
Majority of object mining techniques use SIFT for feature extraction. Though SIFT accurately extracts features, it takes higher time due to construction of image pyramid [1, 3].

**ii. Speeded Up Robust Features (SURF):**
SURF provides fast and more accurate feature extraction than SIFT as it generates integral images instead of image pyramid. It applies fast Hessian detectors on integral images that increase the speed of SURF [1, 3, 4]. Thus, based on our parametric evaluation on the existing techniques, we have chosen SURF to extract the features. SURF is faster than the other feature extraction techniques and hence, it is more suitable under varying values of occlusion, scale, rotation, clutter and illumination as well as under viewpoint changes. SURF features used with boosting cascade learning for face detection. SURF features also have been used for Banknote recognition [4].

**iii. Principle Component Analysis- SIFT (PCA-SIFT):**
PCA-SIFT Feature extraction speed is fast, Rotation invariance Performance is high [1].

**iv. Histogram of oriented gradients (HOG):**
The HOG descriptor is used in a top-down searching technique that covers the scale variation of the objects in images. It is used to increase the accuracy of localization.[3].

**v. Gray level co-occurance matrix (GLCM):**
Colorization is a coloring process in the image or video, which is done to provide detail and clarity to the image or video. Color grayscale images automatically by involving the GLCM texture feature using Sum of Absolute Differences. By matching the color and grayscale image texture features of each pixel block, it is expected to provide a coloring result similar to that of the template image [7].

### *C. Classification :*

Classification is achieved using either supervised learning approach or unsupervised learning approach [1]. We use supervised learning approach to classify the objects as the training of objects significantly reduces the possibility of misclassification. Testing is performed after training to test the results of classification. Many classifiers are available.

**i. Naive Bayers:**
In machine learning, naive Bayes classifiers are a family of simple "probabilistic classifiers" based on applying Bayes 'theorem with strong (naive) independence assumptions between the features. Naive bayes classifiers are highly scalable, requiring a number of parameters linear in the number of variables (features/predictors) in a learning problem.

**ii. Support vector machine (SVM):**
In machine learning, support vector machines are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. We have selected SVM classifier for FOMTA because it classifies objects with higher accuracy and hence, reduces misclassification rate [1].

**iii. K-Nearest Neighbor (KNN):**
In KNN classifier, NEAREST NEIGHBOR determines the decision boundary locally. For 1NN we assign each document to the class of its closet neighbor. For KNN we assign each document to the majority class of its k closest neighbors where k is a parameter. KNN is not very robust. The classification decision of each test document relies on the class of a single training document, which may be incorrectly labelled or a typical. KNN for k>1 is more robust. It assigs documents to the majority class of their k closest neighbors, with ties broken randomly. Also called Case-based learning, Memory-based learning and Lazy learning.

**iv. Artificial Neural Network (ANN) :**
Artificial neural network (ANN) is used to detect shape, size and color. The ANN technique is used for checking the quality. The quality is determined by using object features obtained with the help of ANN. A model for object detection with an artificial neural network (ANN) to overcome such shortage is proposed [4].supervised learning technique (ANN) for object detection based on interest point features with different hidden layer settings and different threshold [4]. The multilayer feed forward system ANN show utilized has embraced back spread calculation for preparing. The number for neurons in the enter layer may be equivalent to the number for enter features. Supervised learning [artificial neural network (ANN)] used for Medical image registration as interest point detector [4].

## IV. COMPARATIVE STUDY

Table I. Comparison between Feature Extraction Method

| Features | Advantages | Limitation |
|---|---|---|
| SURF[1,3,4] | Feature extraction speed is faster, Scale invariance & Rotation invariance performance is high | Only Work Gray Scaling |

 

| | | |
|---|---|---|
| SIFT[1,3,8] | Good recall rates (accuracy), Feature are robust to occlusion and clutter, Relatively efficient compared to older algorithm | still quite slow, generally doesn't work well with lighting changes and blur |
| HOG[3] | Robust to scaling,rotation and translation, Best features of local texure, shape and edge information. | safe feature, time consumption |
| PCA-SIFT[1] | Feature extraction speed is fast, Rotation invariance, Performance is high | Illumination invariance, Performance is low |
| GLCM [7] | Used for Textural properties can be calculated | high cost , long development |

Table II. Comparison between Classification Extraction Method

| Classifier | Advantages | Limitation |
|---|---|---|
| Naiver Bayer [1,6] | Fast to train, Fast to classify | Strong feature independence assumption. |
| Support Vector Machine [1,4,6,8] | SVM is less complex, Produce very accurate classifiers, Less over fitting, Used for robust to noise. | SVM is binary/Parallel classifier. to complete a multi-class classification, pair-wise classifications can be used Computationally expensive, thus runs slow |
| Artificial Neural Network [4] | High degree of non-linearity possible. | Hard to tune parameters. Takes time to build model. |
| K-Nearest Neighbor [1] | Robust to noisy training data. Effective if the training data is large | Distance based learning is not clear which type of distance to use and which attribute to use to produce the best result. Computation cost is quit high. |

## V. CONCLUSION AND FUTURE SCOPE

In this paper explain different features and classifiers method based object mining and tagging algorithm. This system proposed is identify the location based on object categories for that hybrid feature with machine learning training/classification approach are use. This system solved the problem like scene classification, image annotation, image retrieval, object recognition/localization and object detection. In Future by use of hybrid features or combining two or more features system would give batter output for that increases object identification accuracy and thereby decreased misclassification rate under different levels of occlusion.

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