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Identification of Fake Images Using Illumination Classification

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ABSTRACT: For decade photo graph have served as evidence or real time event, in court. One of the most common forms of photo graphic manipulation known as image splicing or image composition. And this concept is analyzed in this paper image splicing is one of most common type of image tampering operating. The goal of image forgeries is to distinguish between original and manipulated image. In this paper, we are focusing on authenticity of images which are based on concept of illumination color classification or estimation the illumination color is estimated using to method i.e. physical based method as well as statistical edge method which make use of inverse intensity chromaticity color space. The estimation of illuminant color is extracted from various small regions. This illuminant classification method does not have any expert knowledge and this is a machine learning approach. By the concept of machine learning require minimum user interaction. For the classification purpose SVM (support vector machine) concept are use.

KEYWORDS: Forgery detection, Illuminant color estimation, Color constancy approach, SVM

I. INTRODUCTION

uuiguhkm**E**very day, millions of digital image and document are produced by variety of device and all this information are distributed by news paper, magazines, website and television also.With the advance technology and availability of computing resources. It is not very difficult to manipulate the digital image[1].Detecting humans in image is challenging work to their different appearance and wide range of poses that present in all image. The first is robust feature which allow human form to be discriminated cleanly, also in background under difficult or various illumination condition. We used Histogram Gradient Oriented (HOG) [2]descriptor for human detection to provide excellent performance relative to other existing feature set including wavelet.Effective techniques for human detection are learn about in computer vision since many applications involve people's poses such as locations and movements[3]. Significant research has been loyal to detect, locate and track all people in images and videos. Along last few years the problem to detect humans in single images has received considerable interest. Difference between illumination and shadows, as well as frequent inter- and intra-person occlusion provides challenging task[3].In this paper there are two main approaches for human detection have been explored over the last few years. The first class of methods consists of a generative process where detected parts of the human body are combined according to a prior human model. The second class of methods consists statistical analysis that combine a set of low -level features within a detection window to classify the window as containing a human or not.

To distinguish between original or tampered image is a big challenge in real world. Hence copy-move image forgery is done either for hiding some image information or adding more precise resulting in forgery. In both the case, originality of image have lost. Although these technologies have many advantages but it can be used as a confusing tool for hiding information and evidences. But the main problems are that digital images are easy to manipulate because of the availability of the powerful editing software and sophisticated digital cameras. Experts can easily access technique and modify image content and therefore its meaning without leaving visually detectable traces[2][4]. Low-cost user friendly editing tools the art of tampering and counterfeiting visual content is no more restricted to experts. As a result, the modification of images for malicious purposes is now more common. At the starting, the manipulation is just improving the image's performance, but now many people started to change the image's content and by this reason quality of image being immoral. By this reasons, it is important to develop a credible method to detect whether a digital image is tempered or not[7].Face recognition technology is challenging work and for this countless application, it has

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attracted the research group from universities and company in this world. Greatfully Thanks to research effort by this recognition technology are growing among these challenges illumination effect appearance variation not solved satisfactory.Various technique has propoed in research with the imapact of illumination ranging from simple image enhancement technique such as histogram equalization, anisotropic smoothing or logarithmic total variation model[]. In this spirit, Riess and Angelopoulou [5] proposed a method to analyze illuminant color estimates from local image regions. The interpretation of their resulting image so-called illuminant maps is left to human experts. As it turns out, this decision is often challenging .In this work, the important step towards minimizing user interaction for an illuminant-based tampering decision-making[1]. We propose a new semiautomatic method that is also significantly more reliable than other approaches. Accurate and greatly traffic classification is critical in network security and traffic engineering. Traditional methods which is base on port numbers and Protocols in terms of dynamic port allocation and packet encapsulation. Signature Matching methods which require a known Signature set and processing of packet payload can only Handle the signatures of a limited number of IP packets in real-time. Simple machine learning method which based on SVM (support vector machine) is proposed in this paper for accurate Internet traffic classification[4].

II. RELATED WORK

Literature review areas of research considered in the past, to be explained the approaches used and the new ideas. It is an assignment of previous task done by some authors and collection of information or data from research papers published in journals to progress our task. It is away through which we can find new ideas, concept. There are lot of literatures published before on the same task; some reference papers are taken into consideration from which idea of the project is taken, the other reference will be discuss later. HOG-based detectors that incorporate motion information using block matching or optical flow fields.

The detail review of Histogram of Oriented Gradient for human detection has been proposed by Navneet Dalal and Bill Triggs. Detecting human in images is important task to their variable appearances and different positions that they can adopt.Hence for that problem we use feature sets for human detection showing that Histogram Oriented Gradient descriptor provides excellent performance to other feature set.The author Mikolajczyk AL[2] used combination of orientation position histogram with binary threshold gradient magnitude to build a method which contain detectors for faces, head, front side, upper and lower body part. In contrast our proposed detector uses simple architecture with single detection windows and gives higher performance on pedestrian image. In 2005 author propose method which is base on evaluating well normalized local histogram of image gradient orientation in dense grid. In this paper author give information about Scale invariant feature transformation approach to wide base line image matching. SIFT provide underlying image patch descriptor for matching. HOG-based detectors that incorporate motion information using block matching or optical flow fields. By using locally normalized histogram of gradient orientations features which is similar to SIFT descriptors in a dense overlapping grid gives very good results for human detection, reducing false positive rates by more than an order of magnitude relative to the best Haar wavelet based detector form.After reviewing the edge based and gradient based descriptor perform outstanding feature sets for human detection.

The detail review of partial least square for human detection has been proposed by author W.R. Schwartz and A. Kembhavi. In 2010 author propose human detection method that augment widely used edge base feature with texture and color information which provide us with much richer descriptor set.In real world Human detection in images is considered among the challenging examples of object detection problems. The variable structure and different appearance of the human body are combined with illumination and pose variations gives complexity of the problem [4]. This training sample is much smaller than dimensionality feature space by order of magnitude. And extraction of feature from densely sample grid structure leads high degree of multi co linearity. To circumvent these data characteristic we used partial least square analysis, an effective dimensionality reduction technique which preserved significant discriminative information to project data on lower dimension spaces. For structure activity correlation, Partial Least Square (PLS) has many important advantages the ability to robustly handle more descriptor variable than compound, non-orthogonal descriptor as multiple biological result, while providing more proactive accuracy and much lower risk of chance correlation[10].

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The detail review of illumination estimation method for locally estimating the color of the illuminant from a single image and apply these method to images in image forensics. The main task of image forensics is to identify original and manipulated images. In 2010 C. Riess and E. Angelopoulos [5] proposed illumination color as a new indicator for the assessment of image authenticity. This paper presented a different method by using a physics-based color constancy algorithm which operates on specularity pixels. In this technique, the automatic detection of highly specular pixel regions is avoided. It allows segmenting the image to estimate the illuminant color locally per segment. Also recolor each image region according to its local illuminant estimate yields a so-called illuminant map. Illuminant color estimation from a single image is under constrained. Therefore, every method fails under certain conditions. Using a physics-based model increases the chances that an educated user can explain the failures Drawback is that the authors do not provide a numerical decision criterion for tampering detection. Thus, an expert is require for the difficult task of visually examining an illuminant map for evidence of tampering.

In 2011 author ArjanGijsenij and Theo Gevers proposed method for color constancy[10]. Color constancy means perceiving same color object despite large difference of illumination. Color constancy algorithm like white patch algorithm, gray world algorithm, shade gray world algorithm is use in this paper. In this entire algorithm are based on color distribution technique. Author proposed method which is the most appropriate color constancy algorithm of an image. These techniques are based in statistical contents of the image and also based on Application of Weibull-parameterization which expresses image characteristics properly.The method which proposed is use Weibul-distribution approach which support to choice of proper set of different color constancy method. In color constancy method Reflection model serve special purpose for illuminance scene by using one light source and the observed color of the light source. In Illuminant estimation techniques two well established algorithms are used i.e. Gray-world algorithm and white patch algorithm .Advantage of this method approaches is that it identify the most important characteristic of color image by using Weibull parameterization[6].

Color information is an important part for many alogorithm and methods including color correction, tracking and image retrieve technique[12]. Color Constancy methods are based on spectral distribution of light source which is uniform across scene.The detail review of color constancy for multiple light has been proposed by A.Gijsenij , T. Gevers and J van de Weijer [9] which base on single light source and multiple light source. Previous Techniques has a disadvantage that they all are based on single uniform light source, which is always not true. Color constancy is the ability to recognize color of object independent of the color light source. In this paper, we will address more accurate scenario where uniform or single light source assumption is too restrictive. With the help of color constancy we can correct the effect of illuminant color by computing invariant feature. An image may be affected by different sources of light and hence multiple sources of light are considered to estimate the color of the light source. Multiple light source methodology is reliable than uniform light source. Experimental result and visual results show the higher superiority of this technique over techniques. This paper is identify the most important characteristics of color images and also provide very efficient results by considering Multiple Sources of Light.This Paper uses Grey world hypothesis algorithm and Gamut mapping technique by which give better performance under multiple light source. But drawback is that they are based on complex technique and all require an image data set with known light sources for calibration[11].

III. PROPOSED ALGORITHM

We classify each pair of faces in the images as either consistent or in consistent by illumination method [1].In proposed scheme five steps are involved:

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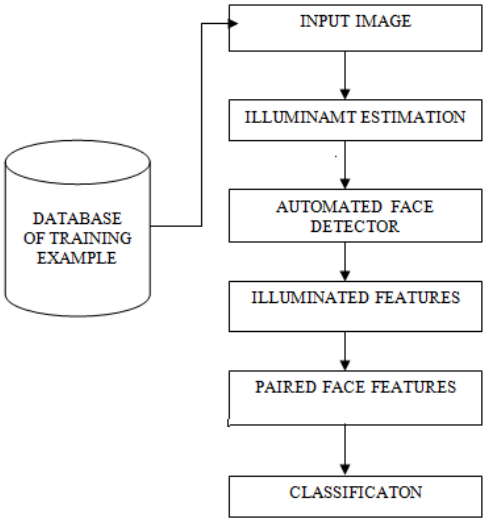

Fig: Proposed System

1) Dense Local Illuminant Estimation:-

To find a dense set of localized illuminant color estimations, the input image is segmented or divided into subpixels, i. e., regions of approximately constant chromaticity. Per subpixel, the color of the illuminant is estimated.The statistical generalized gray world estimates is used to estimate color of light. Recoloring each superpixel with the estimated illuminant color chromaticity yields an illuminant map(IM).

There are two method for estimates of light first is gray world assumption and second is Inverse intensity chromacity (IE).

- **Gray world assumption:-**

The gray world assumption states that the average color of a scene is gray. And deviation of the average of the image properties from the expected gray color is due to the estimation of light. The generalized gray world assumption was used to estimate the illuminant color and reoccurring the true color of images.

Fig : Gray world assumption

- **Inverse Intensity Of Chromaticity:**

In light there are two types of light are present i.e. test light and matching light.Test light is fixed.It doesn't change.But matching light is not constant.So in this method we have to fixed this light source component until test light and matching are same.

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Fig: Inverse Intensity Chromaticity

2) Face Extraction:- It is the only step that may require human interaction. An operator set rectangular box around face in the image.So that illuminant estimates of face region may remain.For the face extraction used viola jonne method is used**.**

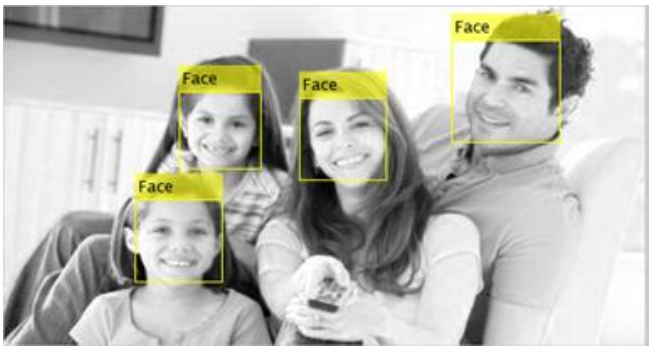

Fig :Face Extraction

3) Computation of Illuminant Feature:- In this process all face region gradient based and texture based feature are computed on IM values. For computing feature used SURF i.e Speed Up Robust Feature. It has robust object recognisation as compare to other descriptor.For an image with n faces construct (n(n-2)/2) joint feature vector , consist all pair of faces. It is to access wheather pair of faces in an image is consistently illuminated or not.

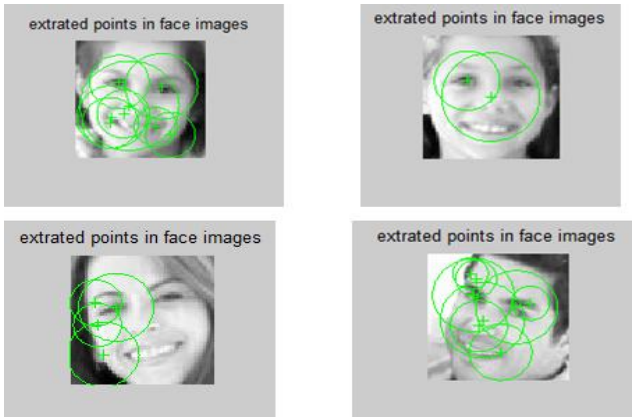

Fig : Feature Extraction

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5) Classification:- This process is use matching learning approach to automatically classify the feature vectors. The proposed method requires only a minimum amount of human interaction and provides a crisp statement on the authenticity of the image .This can be explain by given figure

IV. SIMULATION RESULTS

Method	HOG		SURF	
	Features	**Feature Value**	**Features**	**Feature Value**
Image With Single Face	43	0.34	54	9.84
Image With Two Faces	190	0.64	237	0.78
Image With Multiple Faces	294	0.96	367	1.55
No Faces	77	0.45	96	0.58

Table:Performance of HOG & SURF Method by features

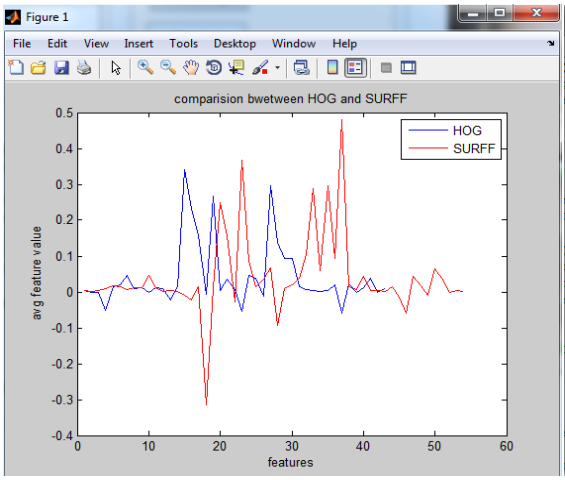

Fig.1: Graph with single face

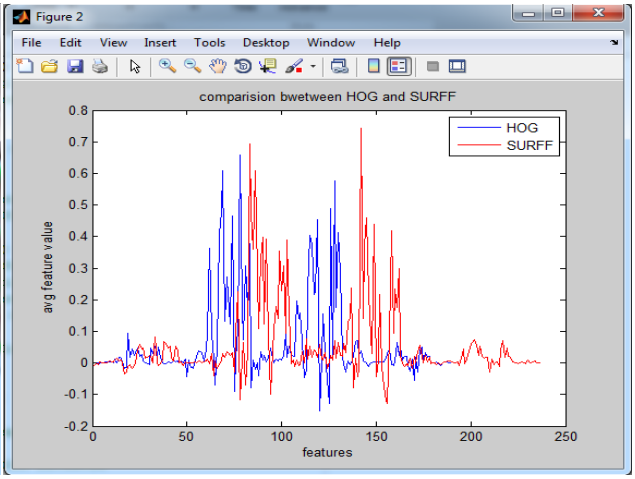

Fig. 2: Graph with two face

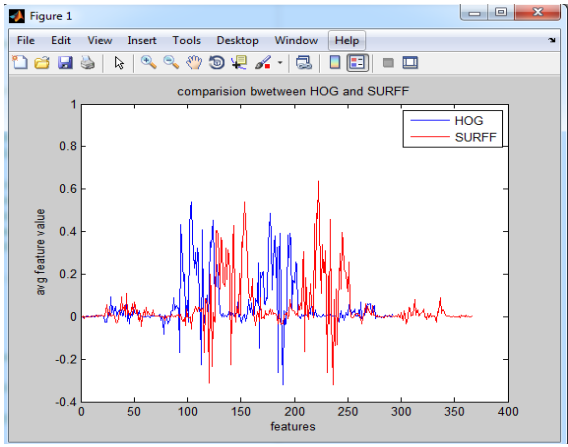

Fig. 3: Graph with multiple face

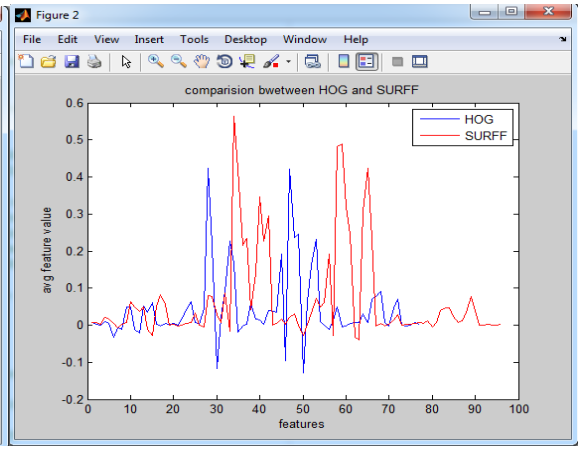

Fig 4: Graph with no face

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V. CONCLUSION AND FUTURE WORK

In this Paper, we detect wheather image is original or not by illumination classifiacation.We presented a new method for detecting forged images of people using the illuminant color.. We calculate the illuminant color using a statistical gray edge method and a physics-based method which exploits the inverse intensity chromaticity color space. We also extract information on the distribution of edges on these maps. We combine these complementary cues using machine learning late fusion..Further improvements can be achieved when advanced color constancy algorithms are used for illuminant estimation. This is the subject of future work

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BIOGRAPHY

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