# Object Interactive System

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## ABSTRACT

This article describes about an object interactive System utilizing similarity metric. This measures the highest similar values between images in the database as image captured by webcam. The main objective is to implement a system using the metric of normalized mutual information, supported by an image processing architecture. The main part of this work is the extracting the pixels of captured image where the similarity in images is measured all the image intensity pixel values specified by a region of interest on the images. Assumptions are made for the implementation of the system after considering possible object recognition problems and constraints encountered in the real situation to retrieve the information. The system will also provide additional information regarding the objects. This system also works on internet to retrieve the object information.

## Keywords

RGB Color Extraction, Object Recognition, Edge Detection, Gray Scale Image.

## 1. INTRODUCTION

The advancement of image retrieval field nowadays is actually to avoid human inputted metadata and focus more on the visual similarity in the image. Along with the rapid increment of internet users especially on online marketing; particularly on the virtual auction house, the usage of images for the items sold online is also increasing. Yet the item sold online can never reveal if it was a stolen item when its image is viewed for the This work focuses on the implementation of an object recognition technic where visual similarity in two images is measured using similarity metric. Here web camera is used to capture the object which is to be detected [9]. The object recognition is done by comparing two images at once one is selected as the reference image and another one is selected from other images in the database as the target images. The significant progress has been made toward the recognition of real, complex objects in cluttered scenes. Some of these promising systems even perform in real time. The most common target object searched for is the human face, but, in principle, these systems could be trained to detect any of a variety of objects those are small in size and shapes.

## 2. RELATED WORK

Object recognition research in the 1980s culminated in systems that could detect occluded, non-convex shapes from binary edge images. Interpretation trees, for example use a tree search to explore the space of all possible correspondences between features on an object model and features in the image [12]. Unfortunately, as the number of model features and image features grows, the space of correspondences can grow intractably large, especially if the image contains significant clutter or noise. Indexing techniques such as geometric hashing avoid the computational load of exhaustive correspondence search but they too suffer in the presence of clutter and noisy edges. In these approaches, each k-tuple of image features casts votes for the identities or poses of objects in the image, based on their geometric arrangement. If the image contains significant noise or clutter [3], the votes cast by sets of clutter features will overwhelm the votes cast by the object making it difficult to draw any conclusions about what objects are there [10]. Later there are various object recognizing methods like Shape-Based Recognition of Wiry Objects [4] [6], Real-Time Object Recognition with Neuro-Fuzzy Controlled Workload Aware Task Pipelining[8], Object recognition of web based images .Later on image category recognition is important to access visual information on the level of objects and scene types. So far, intensity-based descriptors have been widely used for feature extraction at salient points. To increase illumination invariance and discriminative power, color descriptors have been proposed. Because many different descriptors exist, a structured overview is required of color invariant descriptors in the context of image category recognition [11].

## 3. SYSTEM OVERVIEW

The overview of the system contains the description of the requirements for designing the "Object Interactive System" with overview diagrams of designer perspective the lengths of the columns so that they are equal. Use automatic hyphenation and spell checking.

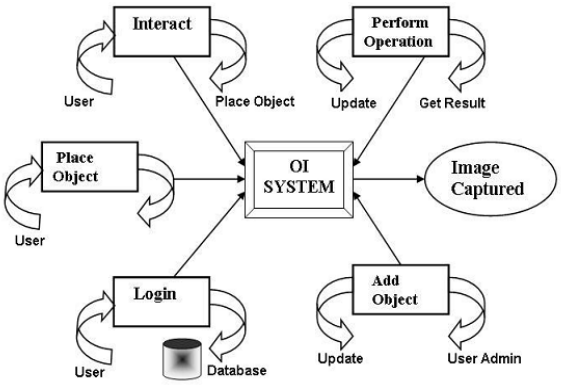


**Fig 1: System overview diagram**

## 4. SYSTEM MODELLING

This is model based approach of object interactive system. Models in systems are as follows

### 4.1 Image Capturing

Here we will be having a web camera with a magnification of about 2 or above mega pixels with LED in order to point the image. Then there will be a base as monitor is provided in to keep the object at the defined position so that we will be

able to get the most possible accurate image. The web camera is fixed at specific height from surface monitor to capture image of different objects which are placed on that surface.

## 4.2 Image Acquisition

Now for this we will be using database management system, thus the images will be stored in a specific folder within the software with a name specified in the database. The image will be stored after segmentation so this will help in reducing the amount of space required and will also help in reducing the execution speed. Image store in database is in the form of pixel values. These pixels are in format of RGB color model.

## 4.3 Preprocessing

Here we will be first performing extraction of image pixel from captured image. RGB values are depends on intensity of light. RGB values give exact pixel colors of image. Intensity degrades image quality in capturing. Pixel values are stored in columns in database.

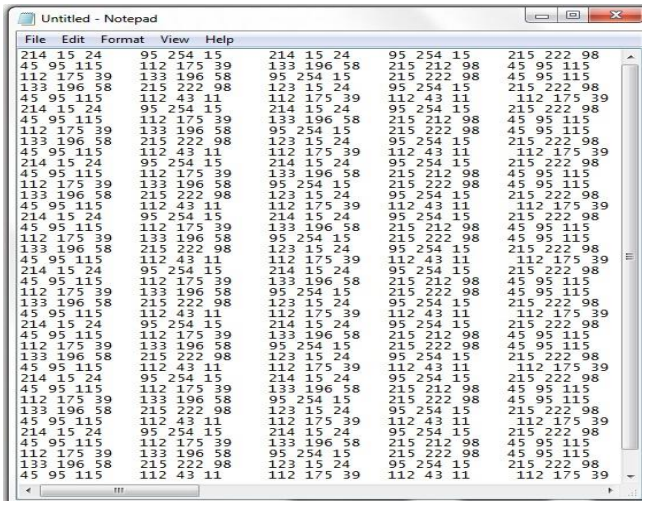


**Fig 2: Extracted Pixel values of image**

## 4.4 Image comparison

The above image in fig (2) with values will then be used for comparison purpose with the image values stored in database as preprocess on object it helps to compare with database where the objects stored [7]. We select images with comparison ratio greater than 85 %. Already stored image pixel values are comparing with current values of image. While comparing with current image in database, if image pixel value ratio is below than predefined ratio then image values will be added in database.

## 4.5 Retrieving Information

After comparing the image pixel of an object the information can be retrieved by the internet and will be displayed on the screen. Similarly it can locate the place and shows related information. Also the information regarding particular place where this object is used can be retrieved by using Map.

# 5. OBJECT RECOGNITION STRATEGY

In an object recognition strategy, two stages are involved; that are acquisition and recognition. Acquisition of images is to form a database based on descriptions of the object presented in the image. Recognition is when an image is given to the system as a reference (webcam) and it is compared to other images in the database to retrieve the similar object on the target image represented by the reference image [1].as shown Fig (3) the OIS system is shown with web cam at top of the screen .When object is place (mobile as an object) the web cam capture the image of it, then object recognition process performed in two steps color extraction process, canny edge detection.

**Fig 3: Object Recognition Strategy**

## 5.1Color Extraction Process

The image that needed to be processed must use appropriate method according to the processing concept. For this project, we use RGB color extraction concept is applied to analyze and determine the color of the capture images. Here we use pixel value analysis concept, color can be extracted at needed point from the image and also it more accurate [2].

### *5.1.1 Color Range Definition*

The color range definition is the important aspects that need to be consider. Usually colors are defined in three dimensional color spaces. These could either be RGB (Red, Green and Blue), HSV (Hue, Saturation and Value) or HSB (Hue, Saturation and Brightness). Most image formats such as JPEG, BMP and GIF use the RGB color space to store information. The RGB color space is defined as a unit cube with red, green and blue in pixel value. Thus, a vector with three values in pixel represents the color in image.

### *5.1.2. Color Decision Making*

After color been extract from the captured image, it pixel will be compare to the data base, where the data regarding all color and their respective pixel value is store. Comparison is done on the basis of pixel value. If pixel value is match with those in database then color of matched one will be taken for that pixel.

**Table1: Different color with RGB value**

| RGB Values | Color |
|---|---|
| r>=153 g>=153 b<=102 | Yellow |
| r>=255 g>=102 b<=255 | Magenta |
| r>=102 g>=153 b<=153 | Cyan |

| | |
|---|---|
| r>=153 g>=102 b<=102 | Red |
| r>=102 g>=153 b<=102 | Green |
| r>=102 g>=102 b<=153 | Blue |
| r>=255 g>=255 b<=255 | White |
| r>=0 g>=0 b<=0 | Black |

### *5.1.3. Histogram*

Once the pixel value is calculated the next step is draw a histogram. A histogram uses a bar graph to profile the occurrences of each gray level present in an image. It begins at zero and goes to the number of gray levels (256 in this example) [4]. Each vertical bar represents the number of times the corresponding gray level occurred in the image. Fig (4) shows the image with its histogram [5].

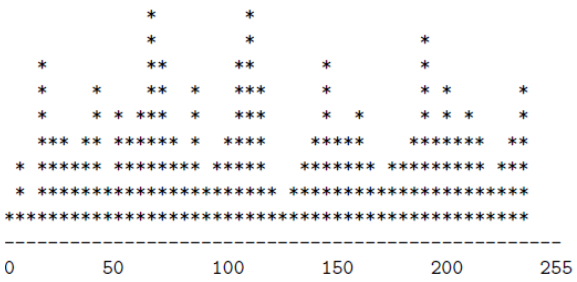


**Fig 4: Histogram of object**

## 5.1 Edge Detection

Edge detection refers to the process of identifying and locating sharp discontinuities in an image. The discontinuities are abrupt changes in pixel intensity which characterize boundaries of objects in a scene.. There are an extremely large number of edge detection operators available, each designed to be sensitive to certain types of edges. Variables involved in the selection of an edge detection operator include Edge orientation, Noise environment and Edge structure. The geometry of the operator determines a characteristic direction in which it is most sensitive to edges. Operators can be optimized to look for horizontal, vertical or diagonal edges.

Steps in Edge Detection

Filtering – Filter image to improve performance of the Edge Detector w.r.t. noise

Enhancement – Emphasize pixels having significant change in local intensity

Detection – Identify edges - thresholding

Localization – Locate the edge accurately, estimate edge orientation

Using these steps of canny edge detection algorithm we can find the edge of placed object, which will be helpful for finding different parameter(height, width) of object [14], [15], [16].

## 5.2 Gray Scale Images

A Gray scale image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images in gray scale are known as black-and-white images. Images are composed exclusively of shades of gray, varying from black at the weakest intensity to white at the strongest.Gray scaleimages with only the two colors, black, and white also called bilevel or binary images. Gray scale images have many shades of gray in between. Gray scale images are often the result of measuring the intensity of light at each pixel.

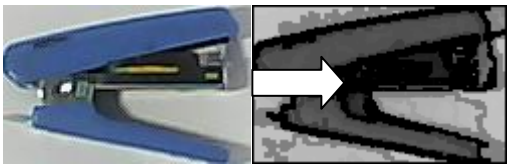

**Fig 5: Conversion of normal image to gray scale image**

To convert any color image into a gray scaleimage we required RGB values of those images. We can get the values of RGB from RGB color extraction algorithm. Using those values we can convert input image into gray scale image as shown in fig: 5.

# 6. SYSTEM WORKING

## 6.1Phone Connectivity

The OIS system also supports the phone connectivity in this we can enable to see images in our phone on screen for this we have to just click on tab connect phone and all images in phone appear on the screen. If user wants related image of current image then he just click on that image related result will appear on the screen e.g. if there is Taj Mahal photo when user click then all Taj Mahal photo available on internet will appear.

## 6.2 Web Support

In this part the system is connected to the Google search to provide information retrieving about place object.as shown in fig (5) when mobile phone is placed on system then system detect it and give result as mobile but if user want more information about the object the he click on “more information” button at top then the system is connect to Google search engine and relative query is fire, then related search about place object is visible. If user wants to go detail in some particular website of place objects then he just click on that link.

**Fig 6: Web Connectivity**

## 6.3 Gmap Support

Google map support is main functionality in this system, the gmap is used to search object location on user defined place. For that user have to place object, then it will detected by the system then that object related places can be search on gmap for e.g. fig (6) shows the famous coffee shop in Nashik when user placed coffee cup on the system. Here also users

have choice to select location where he want to know the places related to object.

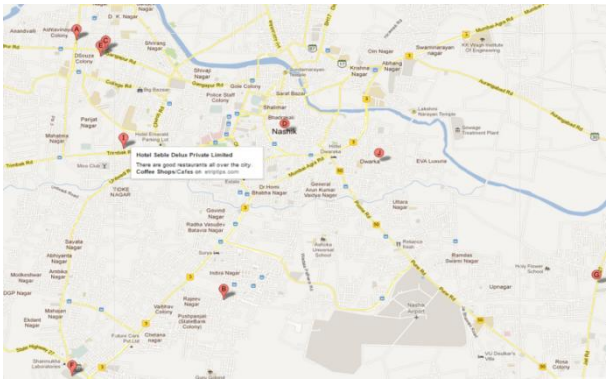

**Fig 7: Google Map**

## 7. ACKNOWLEDGMENT

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## 8. CONCLUSION

This paper has documented software of an object recognition system implementation based on image pixel value. There is no external software required to run this algorithm. The results produced are relative to the image database, which means that the risks of handling the real situation of the problems are not yet tested. For future work the problem of low noise in the images being compared can also be improvised by using the concept of binning to the joint histogram. The software implementation can be enhanced for different comparison of image for better result, focusing on every two images comparison and provide for easy handling when any number of images are required for a comparison. System also supports the gmap which enhanced system functionality. The Google support provide good source of information.

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