

# “Implementation Of Identifying Tigers Through Their Pugmark On Android Phone Application”

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**Abstract** - The Bengal Tiger was declared as the enclosing-embracing zoological of India in April 1973, adjacent to the beginning of Movement Tiger, to defend the tigers in India. Material's power narrative to leave alone run after of all about movements by each tiger. They used radio collars on tiger shoulder and micro chips which is in tiger body to trace the tiger. These both are quite tough jobs. Another method is to track tiger is through their pugmarks. Additional approximate is to run after tiger is look over their pugmarks. Consent to Forest next of kin underpinning stamp the tiger by identifies their pugmarks. But all this distinction is culminate manually which is cry nearly to that level of correctness. This paper is presenting result of the identifying tiger through their pugmarks using image processing and recognition techniques. This technique can be used to acquire sex-ratio as well as identifications of the tiger in tiger population in areas where pugmark can be easily obtained. The pugmarks for many different tigers will be collected from the forest. The identification is based on matching of parameters of pugmark which stored in database. In this paper, we have correctly performed tiger identifications with their pugmarks by performing their match with the corresponding tiger stored in the database. This will speed up to know the name and sex of the tiger of which pugmark user gets.

**Key Words:** Android phone camera, individual identification, internet connection, Tiger pugmark (footprints).

## 1. INTRODUCTION

The tiger is considered an icon for conservation. Due to its endangered and flagship status, accurate and reliable population estimates here arise the requirement of monitoring individual tiger in their natural habitat and create their profile for better surveillance. Each tiger has a pattern of stripes and facial markings unique to itself and individuals can thus be identified.

All this could be monitored if we could identify them individually. Forest officials are using radio collars or micro chips which are in tiger body to locate the tigers [3]. These radio collars are heavy (about 1.5-2 kg) and it disturbs the

normal behaviour of tigers. Collaring the tiger is also a very tough task. Sometimes tigers attack on forest officials during collaring process. This process is very time consuming and not good for tigers health. Another method is tracking a tiger using trap cameras. Tiger-finding starts long before a tiger actually needs to be found.

Another method is to track tiger is through their pugmarks. Experience Forest people identify pugmarks of several tigers by inspecting visually. Features in a pugmark, e.g. the shape and relative size of the right, left or bottom lobe of the pad, the top edge of the pad, the relative sizes and placing of the toes with respect to the pad and several other features vary from tiger to tiger. An individual can be identified from a study of a combination of these features unique to itself, from frequent tracings of pugmarks recorded in the field.

The pugmark of a tiger can be clearly identified the gender of a tiger, its approximate age which is useful data to measure the population of tiger. This paper is proposed an android phone application using an algorithm for identification of tigers through their pugmarks.

This project uses phone gap which is an android application development platform to develop an android application to capture the images of the pugmark and uploading on server. Eclipse is famous for our Java Integrated Development Environment (IDE). You can easily combine language support and other features into any of our default packages, and the Eclipse Marketplace allows for virtually unlimited customization and extension. HeidiSQL is a useful and reliable tool designed for web developers using the popular MySQL server, Microsoft SQL databases and Postgrey SQL. It enables you to browse and edit data, create and edit tables, views, procedures, triggers and scheduled events. All this tools are used to develop android application and the server programming to calculate the dimensions of the pugmark.

## 2. ANALYSIS OF PROBLEM

Forest officer used radio collars on tiger shoulder and chips which is in his body to trace the tiger. These both are quite

tough jobs. Another method is to track tiger is through their pugmarks. Experience Forest people can identify the tiger by identifies their pugmarks.

Forest officials [1] are using radio collars to locate the tigers. These radio collars are heavy (about 1.5-2 kg) and it disturbs the normal behaviour of tigers. This process is very time consuming and not good for tigers also.

Another method is tracking a tiger using trap cameras. Tiger-finding starts long before a tiger actually needs to be found. A database first needs to be built. To do this, researchers set up camera traps inside tiger conservation areas and photograph as many tigers as they can. They then analyze each tiger's stripes using imaging software, storing their unique patterns in a database in order to identify them as individuals. But this is a time consuming and expensive method to trace the tiger and it is not necessary that the tiger will move from the front of cameras.

The currently used technique of tiger population estimation based on pugmarks is believed to have the many drawbacks. Due to such above mentioned reasons, this project proposed a new concept to develop the android application using image processing technique to trace the individual tigers.

### A. Traditional Method to Measure the Pugmark



Fig-1 Measuring Size of Pugmark & POP Method

## 3. PROPOSED WORK AND OBJECTIVES

In this proposed work, the main objective is to trace or identify the tiger using their pugmark images. Nowadays, smart phones having operating systems such as Android are equipped with high definition cameras. It will be an economical and flexible approach, to capture images by smart phone and process them on a central system. The use of smart phone for capturing can also lower the capturing time and processing overheads. The protection of wildlife and forests is a major responsibility of

human beings. Forest's officials use to keep track of all movements by each tiger.

Initial purpose of this work of Identification of Tigers (Panthera Tigris) through their Pugmark using Pattern Recognition on android phone application provide an easy applications to forest department to trace or identify the individual tiger.

## A. Proposed Algorithm

In this paper, we have proposed to use the algorithm name SURF which is the Speed up version of SIFT. In our project, this algorithm is suit best as it mainly used for performing parameters matching based on different criteria. As we are detecting the pugmarks of the tiger that we are getting as images, we have match its parameters that is effectively perform by SURF algorithm.

The SURF uses an approximated Difference of Gaussian (DoG) and also the integral image trick. The integral image methodology is incredibly like the strategy employed in which is very similar to the method used in the famous Viola and Jones' adaboost face detector. SIFT uses Difference of Gaussian over various scales of an image and is the most accurate feature detector and descriptor. SURF uses Haar wavelet and is the fastest feature detector and descriptor. Both SIFT and SURF are scale invariant.

To detect interest points, in our proposed work SURF uses an image approximation by converting every image into same dimension that is of 400 \* 400, which can be computed with the pre-computed integral image of same size. Its feature descriptor is based on the matching of images parameters response around the point of interest. These can also be computed with the aid of the integral image. The SURF descriptors can be used to locate and recognize objects, people or faces, to make 3D scenes, to track objects and to extract points of interest. Now, by using the SURF algorithm and its matching techniques the implementation of our pugmark detection is given in the below section.

## A. Implementation Methodology and workflow

### A.1 Taking Input

Android mobile phones are used by many people now days. They provide good features. Our aim is to use the mobile camera to capture the image of tiger pugmark by mobile camera and uploaded it to server for further operations. If there is an network problem in forest we are providing second option is to upload the image to server which is selected from gallery and then uploaded to server for further processing. The screenshot of image capture from mobile and uploaded to server is given in figure below:

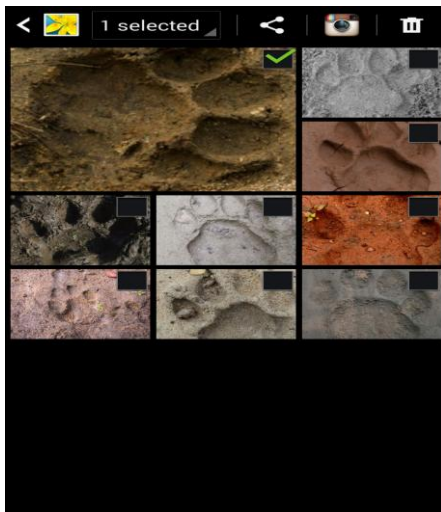


Fig- 2: Image Capture by mobile and share on server

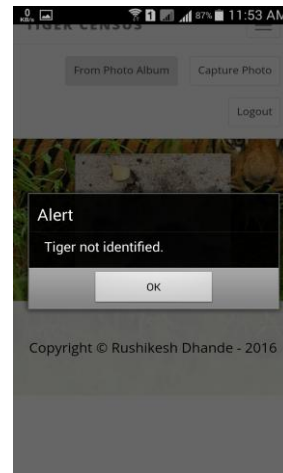
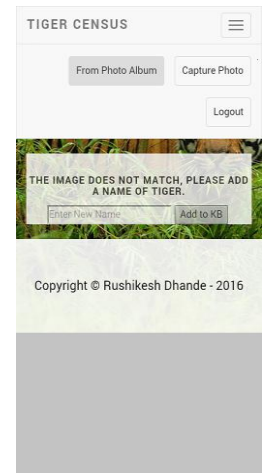


Fig - 3: Result for not matching so Adding new tiger entry



After capturing the image by camera it is then uploaded to server by sharing it for further operations. We have more space on server as compare to the device so the operation and the algorithm will work efficiently on server and not affect on the processing on the mobile phone working.

### A.3 Image conversion and Comparison

In this section the uploaded image is converted to 400\*400 dimensions to compare with existing images of tiger pugmark in the database. By resizing our image we will get the uniform display size of the image.

After getting the uniform display size we will go to the Server where we can process our pugmarks. Here comparison is takes place and the result which we are getting can be saved on server its copy is return on the mobile phone. After calculating dimensions on server the calculated dimensions can be compare with the existing data on server. All the processing is done on the server and image comparison is done.

### A.3 Result returning on mobile phone

After performing image comparison and its recognition with existing images in database the result of image matching on server is displayed in the android mobile phone. This section contains two possibilities depending on the server results for uploaded image. First, if it matched with existing images then it will simply sends existing tiger with the corresponding pugmark and if it does not match it will provide an option to make new entry of that tiger. Figure . below shows the result for not matching and Figure . shows the options for adding new tiger entry.

In the above implementation, our proposed Speeded Up Robust Features (SURF) algorithm satisfy its facility of local feature detector and descriptor that can be used for tasks such as object recognition or registration. As the standard version of SURF is several times faster than SIFT and claimed by its authors to be more robust against different image transformations than SIFT. It fits completely to our idea and gives us result more efficiently. As we are performing image conversion, which converts all the pugmarks images in the same size which allows to match X and Y co-ordinates of the input image with the all images in the database. This functionality, add some speed up to our SURF comparing function, which results in the more faster response of matching.

## 4. Result Obtained

In this paper, we are performing identification of tigers (panthera tigris) through their pugmark using pattern recognition using android phone application. Most of the time we get the pug marks at forest region but many times not finds tiger. So, to identify or trace that tiger, it is necessary to make some arrangement to identify that tiger using identified pugmark. With this view we have make a software application that store the name of tiger with its corresponding pugmarks images. Along with this, as in the forest area we have only one device that is able to perform any type of computation that is our mobile phone. So, with this view we have make our tiger identification application with pugmarks images using our Android mobile phone application.

As in the above section of the paper, we have performed the pugmark recognition and matching using SURF algorithm. Our implementation section shows all the functionality that are performed successfully from capturing images to showing results. The following graph shows the

results statics of our project that are successfully recognized and compare pugmarks images.

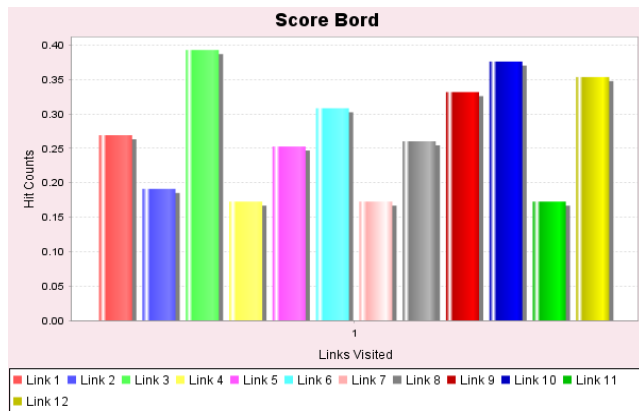


Fig- 4: Graph for pugmark not matched

Above bar graph shows the result when the image are uploaded on the server and it convert to 400\*400 dimension it starts matching with the existing images and give the result. As the matching is performed with the images that are contained in our database from all available orientations. When uploaded image is starting matching with existing image it starts comparing with the existing image in the database. When the image matches with our images in the database it gets the floating point value 0.0F. And when image does not match it generates the bar on the graph shown in the Figure. above and sends us notification to make the new entry of the tiger.

As oppose to this, when the pugmark get matches the comparison comes to 0.0F that is floating point value generated by matching all the parameters of the pugmark image. At this time, it does not generate graph after actual image matching. This is shown in the second graph that generates the result and thus bar graph at link 12 is not generated. We observed similar behaviour in terms of our other two metrics.

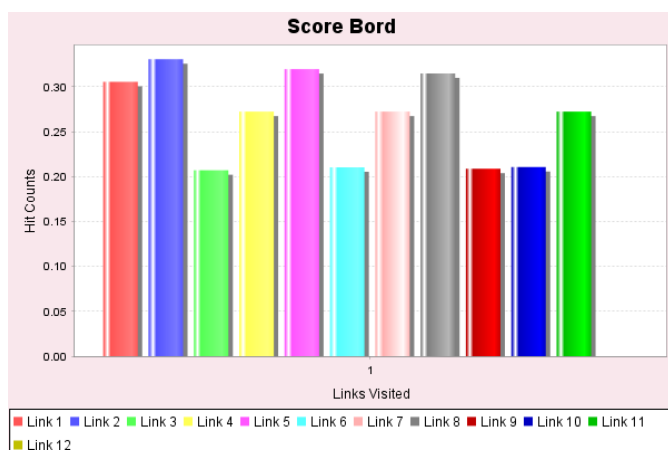


Fig- 5: Graph showing Pugmark matched with link 12 image

Hence, we satisfy our goal and obtained the satisfactory result of identifying tigers through their pugmarks. As we are using Android mobile application our implemented projects satisfy all the requirements of user friendliness and usefulness. However, we did in fact observe the same effects on the recognition performance as we changed system parameters. Once again, the results were nearly the same for different images of tiger pugmarks that are captured with any different kinds of android phones.

## 5. CONCLUSION

The paper is based on implementation of the identification of tigers by recognizing their pug marks. The pattern of each pugmark is analyzed by image processing now a day's use of smart phones increases. So the idea is to use smart phones for the benefits for the Forest department.

We have implemented the SURF algorithm to compare the images of tiger pugmark. The most important improvement, however, is the speed of the detector. Even without any dedicated optimisations, an almost real-time computation without loss in performance is possible.

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