# A REVIEW OF CHARACTER AND OBJECT RECOGNITION USING SMART PHONE

**Prof. Sanjay Jondhale[1], Nayan Thorat[2] , Shubham Sethi[3] ,Kalpesh Patil[4] ,Kiran Narkhede[5]**
[1]Asso. Prof. at Computer Department,PREC,Maharashtra,India, [2345]Student, Computer Department,PREC,Maharashtra,India.

***ABSTRACT:*** ***People may have difficulty in reading Chines books because there always exist some unfamiliar Chinese characters, so it would be valuable if an application can help users including foreigners to learn them. This paper presents a platform based on mobile devices for helping people to recognize the unfamiliar characters at any time or any place. Firstly, we collect various dataset of Chinese characters to build a complete character set, then create the image library according to that set by segmenting. Secondly, the so-called SIFT features are extracted from the image library to establish feature library. To improve the recognition performance, we filter the SIFT feature points of similar images obtained by SIFT feature matching. Finally, compress the storage of SIFT descriptors to accommodate mobile platform with Similarity Sensitive Coding(SSC) algorithm. At the stage of recognition, the high-dimensional indexing algorithm is applied in finding the top k Chinese characters similar to the image of unfamiliar character by SIF feature , which has the strong versatility and the extension malleability. Then these characters are reordered by SIFT feature matching. The final recognition result is based on the locations of each character in SIFT matching result respectively. We apply that algorithm in Android platform. It shows great performance in recognition and gives smooth experience to users.***

***Keywords: - SIFT, Chinese character recognition, mobile platform.***

---

## INTRODUCTION

Today computer and mobile plateforms like Android have become a integral part of our day to day life. we do all sort of technical things by using both. So we thought of using both together to develop a system called character recognition which will recognize multiple characters of other languages. There is no need of a mobile phone but the camera quality of mobile phones is very good as compared to that of a laptop. So to start with we chose chinese character recognition and then recognize other languages such as marathi, english, hindi etc.

A mobile Chinese character recognition platform is valuable. First, it is quite convenient to use the phone camera of the mobile to capture some unfamiliar Chinese characters, especially traditional characters when reading classic Chinese books. Second, although there are many popular mobile Chinese recognition applications, such as YunMai, DaubNotethe, CamScanner and ABBYY TextGrabber, accuracy is not very high. It has much space for further development.The reasons are manifold: (a) The structure of a Chinese character can be very complicated. (b)The massive Chinese characters engenders considerable computation and storage cost. (c) what features to represent the character image and how to compress the storage of features to accommodate the mobile platform. (d) the efficient method search nearest neighbour in high-dimensional space will pe applied in recognition procedure, which should have high accuracy and smooth experience shown to users. So the feature extraction and the recognizing procedure are two important issues to be considered in the platform.

In general we thought of using many algorithms that can be used to perfrom character recognition from ready made OCR (Optical Chractaer Recognition ) librarires. Then after a a few studies we found SIFT algorithm as the best approach in performing chracter recognition which is simple and fast and can traverse through a huge database fast. The accuracy of the algorithm is also very high as compared to other algorithms.

## Literature Review

This chapter describes the fundamentals of tweet analysis. It helps in understanding various ideas put forward by various technical papers published by various pulishers.

**Fast Chinese calligraphic character recognition with large-scale data**
**Authors :- Gao PengchengWu, Jiangqin, Lin YuanXia, YangMao Tianjiao**
**Publication Year :- 2014**

Chinese calligraphy draws a lot of attention for its beauty and elegance. But due to the complexity of shape and styles of calligraphic characters, it is difficult for common users to recognize them. Thus it would be great if a tool is provided to help users to recognize the unknown calligraphic characters. The well-known OCR technology can hardly help people to recognize the unknown characters because of their deformation and complexity of the characters. In CADAL which has a set of character images labeled with same meaning and is created and provided to users to use online. With the help of CalliCD, user can understand more about the unknown calligraphic character by analyzing similarity based searching. But as with the growth of CalliCD, it takes long and tedious time to do the similarity based searching on images. Techniques that can handle large scale data are needed. In this paper, a fast recognition schema based on image retrieval is proposed and implemented. In addition, a novel shape descriptor, called GIST-SC, is given to represent character image for good retrieval. The schema works in three main steps. Firstly approximate nearest neighbors of the character image to be recognized are found quickly and efficiently. Secondly, one-to-one fine matching between approximate nearest neighbors and the character image to be recognized is performed and analyzed. Finally the recognition based on semantic probability is given and shown .

**Chinese Optical Character Recognition for Information Extraction from Video Images**
**Authors :- Wing Hang Cheung, Ka Fai Pang, Michael R Lyu, Kam Wing Ng, Irwin King**
**Publication Year :- 2010**

Due to different characteristics between Chinese and English new methods are urgently needed for Chinese character extraction. Applying OCR techniques to video frames and extracting character texts from videos and comparing them with the database. By doing this we can automatically convert video contents to text and then exploit the Chinese subtitles for indexing and searching in a digital video library. This paper covers ways to alter the heavy noise and segment out each Chinese character in video segments. We also describe how we perform the OCR for Chinese and evaluate it.

**Image Processing using SIFT**
**Authors :- Kirti Bhure, J. D Dhande**
**Publication Year :- 2017**

Nowadays, computer Vision Technology is playing a very important role to recognize the information in an image. The object details those are in the images can be found.This paper proposes the object finding method to help blind people. The SIFT can extract different features and key points in an image to match different objects. The proposed recognition process begins by matching individual features of the user queried object with different objects present in the database. In SIFT algorithm key points of objects are extracted from a set of reference images and stored in a database with multiple features and key points. An object is recognized in a image by matching each feature from the new image to the database of images that has been stored and candidate matching features are found based on the Euclidean distance between their feature vectors. With all the contest and subsets of the key point that agree on the object recognition and its location, scale, and orientation in the new image are identified to filter out good matches and the key points can be printed. Each of the SIFT key points specifies a two dimensional location etc. and each matched key point in the database has a record of its parameters realated to the training image in which it was found and compared with the queried image.

**A An Advanced Technique of Image Matching Using SIFT and SURF**
**Authors :- Preeti Mandle, , Bharat Pahadiya**
**Publication Year :- 2016**

Image matching is a method of identifying an image from the already stored images in the database by the user. Feature detection and feature matching are two important stages of the image matching process and identifying the similarity. This paper explains and identifies the improved method of image matching to enhance the performance of two well known images matching methods SIFT and SURF techniques by considering the color information present in the images and provides an algorithm for reducing the matching time and enhancement of performance of object recognition. The technique of feature detection algorithms is compared by taking one image of different conditions like illumination, scale, rotate, etc with the image of similar ones. The performance is evaluated and compare the results of SURF with SIFT by using a dataset of five images with a queried image. SURF algorithm is better than the SIFT algorithm in terms of speed and will give better matching and ability to identify the image.

**Finding objects for blind people based on SURF features**
**Authors :- Ricardo Chincha,YingLi Tian**
**Publication Year :- 2011**

Nowadays computer vision technology is helping the visually impaired by recognizing objects in their surroundings. Unlike research of navigation and and finding a way, there are no camera-based systems available in the market to find personal items for the blind. This paper proposes an object recognition method to help visually impaired people find missing items using Speeded-Up Robust Features (SURF) algorithm. SURF features can extract peculiar invariant constant that can be utilized to perform reliable matching between different images in multiple scenarios. These features are invariant to image scale, translation, rotation, illumination, and partial occlusion. The proposed recognition process begins by matching individual features of the user queried object to a database of features with different personal items which are saved in advance in a database of images. Experiment results demonstrate the effectiveness and efficiency of the proposed method.

**Proposed System**

We in our system propose a novel client server architecture between a laptop and a android smartphone where laptop will be server and smartphone will be client.

The smartphone increases the quality of the image that has to be matched with the image database using SIFT.

We construct a databse with lot of images from various languages and not only recognize chinese but other regional and foreign languages.

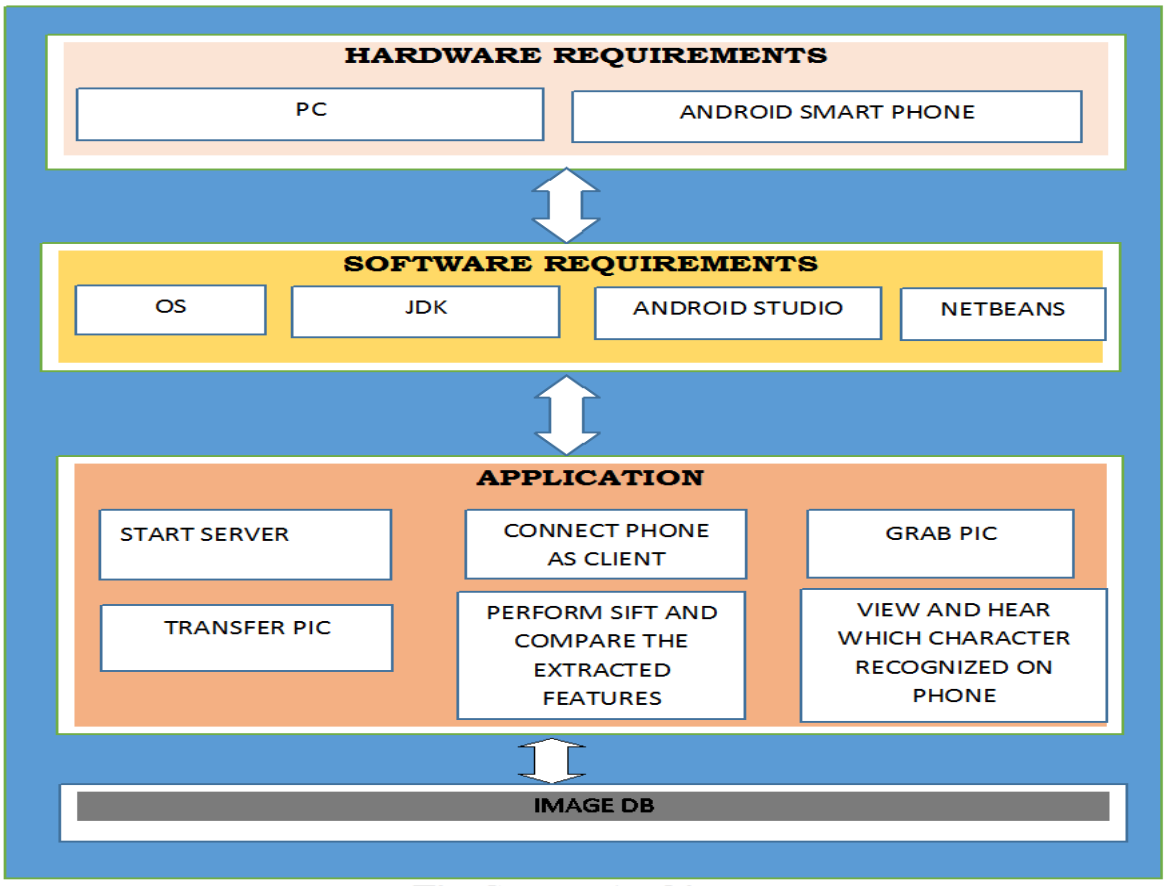
The SFIT algorithm will first extract features of test image from phone and than extract features from image database and than return the nearest neighbour result according to statistics.

**Contribution in This Work**

In the base paper the proposed system makes use of of a combination of a smart phone and a power of PC together to achieve a good character recognition technique using SIFT algorithm. We are also going to contribute the process of including multiple languages in the process of character recognition.

**SYSTEM ARCHITECTURE/SYSTEM OVERVIEW**

The following diagram show that the system architecture.




Our project can be divided into following modules as disccussed in brief to understand the importnace and work of each module:-

**Server using PC:-**

In this module the PC will listen to a certain IP address and port for client to get connected.

**Client using Android Phone**

In this module the Phone will connect to server using IP address and port and create a client server architecture using WIFI.

**Grabbing photo:-**

In this module the Phone is used to grab a pic of character as the quality of camera of smartphone is very good.

**Transfer pic:-**

In this module the Phone will transfer pic to PC using TCPIP communication

**OpenCV handler:-**

In this module the OpenCV library is initlialized to implement the SIFT algorithm.

**Perform SIFT:-**

In this module the PC will extract features from Pic using SIFT algorithm.

**Feature matching:-**

In this module the PC will match features extracted by SIFT algorithm with Image DB where each picture features will also extracted and then matched with each other.

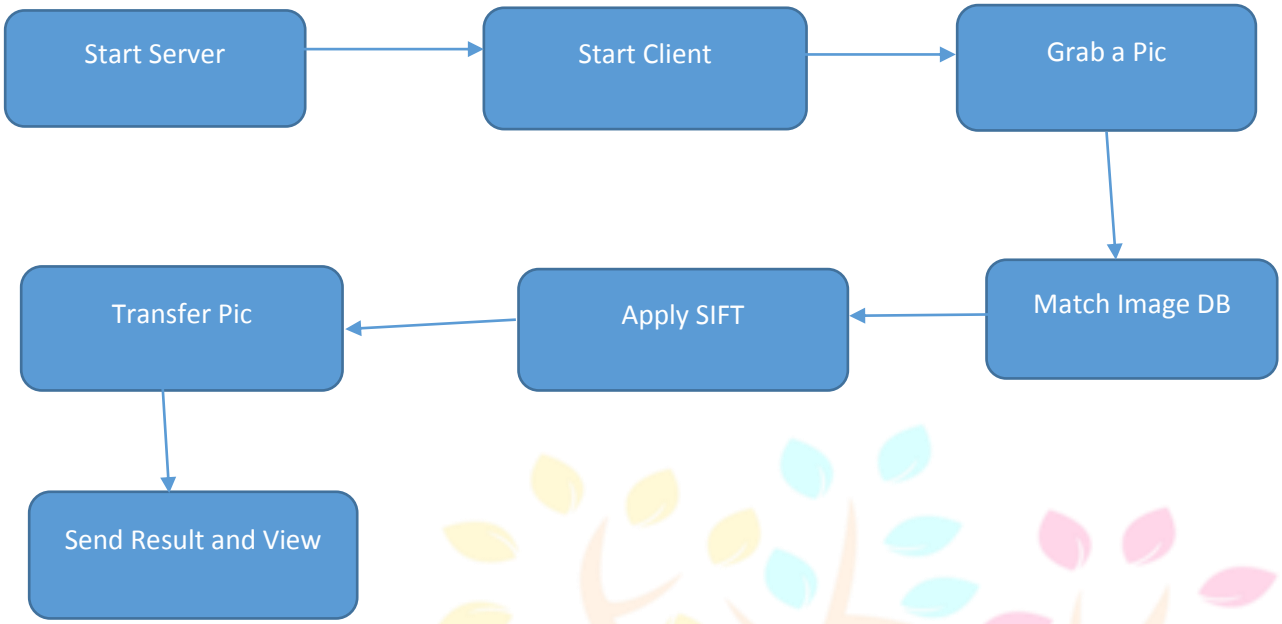
**Return Results:-**

In this module the PC will recognize the character with the best feature match and send result to Phone.

**Text to Speech:-**

In this module the Phone will speak the recognized characters and if any character is not recognized then it will say no character found.

**SYSTEM ANALYSIS**




**CONCLUSION**

In this paper, the platform is provided to help people recognize unfamiliar Chinese characters with mobile devices. We collect the most complete data set of Chinese characters from the Internet, then create the images library of Chinese characters. After that, we build the feature library by extracting SIFT features from images library. The methods of SIFT keypoints filtering and SSC encoding are compatible for the limitation of mobile devices. We also apply high-dimensional indexing algorithm in recognition to improve the performance. Experiments show that the recognizer achieves great performance and shows smooth experience to users, but there is space for improvements.

**References**

**[1]** A. Oliva and A. Torralba, "Modeling the shape of the scene: A holistic representation of the spatial envelope," *International journal of computer vision*, vol. 42, no. 3, pp. 145–175, 2001.

**[2]** G. Pengcheng, W. Jiangqin, L. Yuan, X. Yang, and M. Tianjiao, "Fast chinese calligraphic character recognition with large-scale data," *Multimedia Tools and Applications*, pp. 1– 18, 2014.

**[3]** Y. Lin, J. Wu, P. Gao, Y. Xia, and T. Mao, "Lsh-based large scale chinese calligraphic character recognition," in *Proceedings of the 13th ACM/IEEE-CS joint conference on Digital libraries*. ACM, 2013, pp. 323–330.

**[4]** D. G. Lowe, "Distinctive image features from scale-invariant key points," *International journal of computer vision*, vol. 60, no. 2, pp. 91–110, 2004.

**[5]** S. C. Mikolajczyk K, "A performance evaluation of local descriptors," *Pattern Analysis and Machine Intelligence, IEEE Transactions on*, vol. 27, no. 10, pp. 1615–1630, 2005.

**[6]** Y. Weiss, A. Torralba, and R. Fergus, "Spectral hashing," in *Advances in neural information processing systems*, 2009, pp. 1753–1760.

**[7]** Y. Weiss, R. Fergus, and A. Torralba, "Multidimensional spectral hashing," in *Computer Vision–ECCV 2012*. Springer, 2012, pp. 340–353.

**[8]** M. Muja and D. G. Lowe, "Fast approximate nearest neighbors with automatic algorithm configuration." *VISAPP (1)*, vol. 2, 2009.

**[9]** "Scalable nearest neighbor algorithms for high dimensionaldata," *Pattern Analysis and Machine Intelligence, IEEE Transactions on*, vol. 36, no. 11, pp. 2227–2240, 2014.

**[10]** D. T. Shakhnarovich G, Viola P, "Fast pose estimation with parameter-sensitive hashing," in *Computer Vision, 2003. Proceedings. Ninth IEEE International Conference on*. IEEE, 2003, pp. 750–757.

**[11]** S. C. Calonder M, Lepetit V, "Brief: Binary robust independent elementary features," in *Computer VisionCECCV 2010. Springer Berlin Heidelberg*. Springer, 2010, pp. 778–792.