International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 04 Issue: 07 | July -2017 www.irjet.net p-ISSN: 2395-0072

Object Detection using SURF features

Miss Kirti Bhure[1], Mrs. J D Dhande[2]

[1]*M-Tech Student, VLSI Department BDCOE, Wardha, Maharashtra, India*
[2]*Assistant Professor, Electronics and Telecommunication Department, BDCOE, Wardha Maharashtra, India*

Abstract - *Nowadays, computer Vision Technology is playing a very important role to understand the information present in image format. The object details those are in the form of image can be treated to find .This paper proposes the object finding method to help visually impaired people. The SIFT can extract distinctive features in an image to match different objects. 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 database.*

Key Words: SURF, Feature points, Morphological operations, matching, descriptor.

1. INTRODUCTION

The World Health Organization estimated that in year 2002 of the world's total population was visually impaired [3]. Visually impaired people face many challenges when interacting with their surrounding environments. One challenge is finding dropped or misplaced personal items. The goal of this paper is to develop an effective algorithm to help people with visually impairments to find personal items such as keys, wallets, sunglasses, cell phones, and other objects. In this paper, a method to identify objects using feature detection is introduced. When the system finds the requested item, an audio signal will be produced. In our method, based on the blind user's request, the time required for processing is obtained with the number of features. If matches are found the output is obtained in audio form using Microsoft text to speech software.

2. SURF OVERVIEW

In computer vision SURF is patented as local feature detector and descriptor. SURF detector has been used to locate and recognize objects. SURF was first presented by Herbert Bay at 2006 European Conference on Computer Vision [2]. Interest points are detected using SURF method in which determinant of Hessian and Blob detector approximate values are calculated. Its feature descriptor is based on sum of the Haar wavelet response around the point of interest. SURF algorithm is implemented in three divisions as Interest point detection, local neighbourhood description and matching.

2.1 Detection

Surf uses square shaped filters as an approximation of Gaussian smoothing. Filtering the image with a square is much faster when the integral image is used

$$S(x, y) = \sum_{i=0}^{x} \sum_{j=0}^{y} I(i, j)$$

The sum of the original image within a rectangle can be evaluated quickly using the integral image requiring evaluation at the rectangle's four corners. In SURF blob detector based on the Hessian matrix used to find points of interest. The determinant calculated from Hessian matrix is the measure of change around the point and with the maximum value of determinant points are selected.

2.2 Descriptor

Descriptor is to provide a unique and robust description of an image feature. The dimensions of the descriptor have direct impact on its computational complexity as well point-matching as well as accuracy.

The first step is to fix a reproducible orientation based on information from a circular region around the interest point. Then a square region aligned to the selected orientation is found, and the SURF descriptor from it is extracted.

2.3 Matching

Matching pairs are found using the comparison of descriptors obtained from various images.

2.4 Local Features

Local features refer to a pattern or distinct structure found in an image, such as appoint, edge, small patch. They are related to the image patch that differs from its surrounding. This difference is based upon texture, color or intensity. Blobs, corners and edge pixels give the examples of local features.

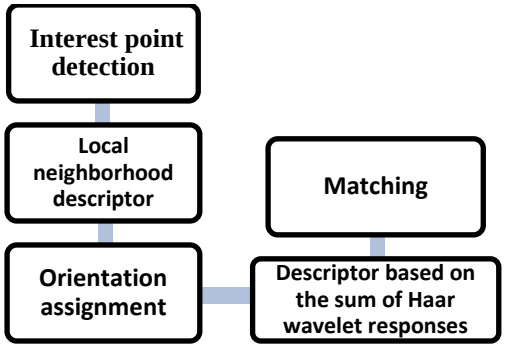


Fig -1: SURF Algorithm

3. AUDIO TRANSLATION

The recognized text codes are recorded in script files. Then, employing the Microsoft Speech Software Development Kit to load these files and display the audio output of text information. Blind users can adjust speech rate, volume, and tone according to their preferences [9].

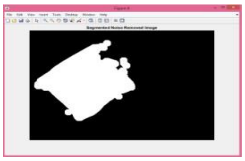
4. OUTPUT

Input Image

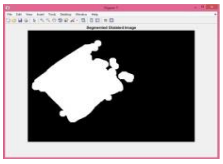
Median filtered Image

Green Channel Filtered Image

Dilated Image



Segmented Noise Removed Image



Dilated Image

Detected Image

Fig -2: Output images obtained for SURF Algorithm

5. PERFORMANCE ANALYSIS RESULT OF SURF ALGORITHM

Table -1: Performance analysis of SURF algorithm on different object images

SURF Analysis					
Input Image	**Angular changes (Degrees)**	**Processing Time(Sec)**	**Feature Points Detected**	**Object Identified**	**Correct/ Incorrect**
B,png	0	7.2201	145	Bournvita	Correct
B,jpeg	0	7.0617	145	Bournvita	Correct
B36.png	36	5.3844	90	Not Detected	Incorrect
B36.jpeg	36	5.2735	90	Not Detected	Incorrect
B3d.png	3d rotation	4.5076	346	Colin	Incorrect
C45.png	45	6.869	100	Colin	Correct
C130.png	130	5.30	84	Not detected	Incorrect

6. CONCLUSIONS

The Analysis result of SURF algorithm indicates that SURF gives good results for the images without scale variations or rotations however, for the rotated images it gives unsatisfactory result though the time required is less. The feature points found using SURF algorithm are satisfactory.

ACKNOWLEDGEMENT

I am thankful to Mrs. J. Dhande and Mr. P. Indurkar Co-Ordinator of M-Tech VLSI for guiding me. I am thankful to BDCOE, for making labs available.

REFERENCES

[1] Juan and O. Gwon. "A Comparison of SIFT, PCASIFT and SURF". International Journal of Image Processing(IJIP), 3(4):143– 152, 2009.
[2] https://en.wikipedia.org/wiki/Speeded_up_robust_features
[3] Hanen Jabnoun, Faouzi Benzarti,and Hamid Amiri, "Object recognition for blind people based on

features extraction" IEEE IPAS'14: INTERNATIONAL IMAGE PROCESSING APPLICATIONSAND SYSTEMS CONFERENCE 2014.

[4] Ricardo Chincha and YingLi Tian, "Finding Objects for Blind People Based on SURF Features" 2011 IEEE International Conference on Bioinformatics and Biomedicine Workshops.

[5] Hanen J abnoun I, F aouzi Benzarti I, Hamid Amiri I, "Object Detection and Identification for Blind People in Video Scene", 2015 IEEE

[6] Lamya ,Hessah, Hind Abahussain, Lama, Masheal, Reem, Sara "Toward designing efficient application to identify objects for visually impaired" 2014zIEEE Humanitarian Canada Inte rnational Technology Conference .

[7] Chen Alan L. Yuille, University of California, Los Angeles, CA 90095, "A Time-Efficient Cascade for Real-Time Object Detection: With applications for the visually impaired "Proceedings of the 2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition.

[8] Abhinaba, Indrani, Ankana, Debasish Sauvik Gupta, "A Novel Probabilistic approach of Colored Object detection and design of a Gesture based Real-time Mouse Tracking along with Virtual Teaching intended for Color-Blind people." 2015 2nd International Conference on Signal Processing and Integrated Networks (SPIN)

[9] Lukas T, Hendrik, Andrea Finke and Helge Ritter Center of Excellence Cognitive Interaction Technology – CITEC Gaze-contingent audio-visual substitution for the blind and visually impaired" Lukas T, Hendrik, Andrea Finke and Helge Ritter Center of Excellence Cognitive Interaction Technology – CITEC

[10] Vibhutesh Kumar Singh, Sanjeev Baghoriya and Vivek Ashok Bohara Wirocomm Research Group Department of Electronics and Communication, Indraprastha Institute of Information Technology (IIIT), Delhi," HELPER: A Home assisted and cost Effective Living system for People with disabilities and homebound

[11] Elderly", 2015 IEEE 26th International Symposium on Personal, Indoor and Mobile Radio Communications – (PIMRC): ServicesApplications and Business.

[12] H. Bay, A. Ess, T. Tuytelaars, and L.V. Gool. "SURF: Speeded Up Robust Features". Computer Vision and Image Understanding (CVIU),110:346–359, 2008.

[13] B. Durette, N. Louveton, D. Alleysson, and J. H´erault. "Visuo-auditory sensory substitution for mobility assistance: testing The VIBE". In Workshop on Computer Vision Applications for the Visually Impaired, Marseille, France, 2008.

[14] D. Dakopoulos and N. G. Bourbakis, "Wearable obstacle avoidance electronic travel aids for blind: A survey," IEEE Trans. Syst., Man, Cybern., vol. 40, no. 1, pp. 25–35, Jan. 2010

[15] Kirti Bhure, J. D Dhande. "Image Processing using SIFT", International Journal of Advance Research, Ideas and Innovations in Technology.

[16] K. Kim, K. Jung, and J. Kim, "Texture-based approach for text detection in images using support vector machines and continuously adaptive mean shift algorithm," IEEE Trans. Pattern Anal. Mach. Intell., vol. 25, no. 12, pp. 1631–1639, Dec. 2003.

[17] S. Shoval, J. Borenstein, and Y. Koren, "Auditory guidance with the Navbelt: Acomputerized travel for the blind," IEEE Trans. Syst.,Man, Cybern. C. Appl. Rev., vol. 28, no. 3, pp. 459–467, Aug. 1998.

[18]] Y. Tian, M. Lu, and A. Hampapur, "Robust and efficient foreground analysis for real-time video surveillance," in Proc. IEEE Comput. Soc. Conf. Comput. Vision Pattern Recognit, 2005, pp. 1182–1187