Recognition and analysis of human gesture using computer technology

Renuka V.Rithe[1], Prof.Rahul Dhuture[2]

[1](renukarithe@gmail.com,ECE,TGPCET,INDIA)
[2](rmdhuture@gmail.com,ECE,TGPCET,INDIA)

Abstract: *Face tracking plays major role in many computer vision and relative fields, such as robot vision, intelligent meeting and video surveillance systems. However, in practice, a face tracker often fails to track target under various environmental condition. Therefore a good face tracking algorithm of real-time and robustness becomes a challenging task. These problems are overcome in improving the camshift algorithm. Application of this is used in medical fields such as it is more useful for physically disable person having face movements. The user is ready to use a mouse and open and close a file.*
Keywords: *Face tracking, real-time and robustness, CamShift algorithm*

I. INTRODUCTION

Gestures recognition system has now become a significant part of human-computer interaction. Gestures can be formed from any bodily motion or but most commonly it originates from the face or hand. A gesture is a movement of the body parts that has got information about the feelings. Example is waving your hand to say good bye. Pressing keys on the keyboard does not indicate any gesture. All that matters is which key was pressed. The definition of gesture has still remained an arbitrary term as it has been defined by many scholars in different ways .A system that automatically detects and recognizes human head gestures such as nodding and shaking in complex background conditions using Web camera under uncontrolled conditions is head gesture recognition. The output of a particular procedure is measured in terms of Performance improvement, and then the procedure is modified to increase the output,and efficiency also, or increase the effectiveness of the procedure. Face detection is a technique that finds out the locations and also the size of human faces in digital images. It detects face and other things are ignored by it, such as buildings and trees for instance. Face detection can actually be considered as a more general case of face localization. In face localization, the task is to find the locations and sizes of a known number of faces (usually one). In face detection,first face is processed and then it is matched bitwise with the underlying face image in the database. Even a little change in facial expression, such as smile and movement of lips, will not match the face. Face detection can be considered as a specific case of object-class detection. In object-class detection, the main task is to find the locations and sizes of all objects in an image that belong to a given class. Best instances include upper torsos, pedestrians, and cars. Face-detection algorithms focus on the detection of frontal human faces. It is similar to image detection in which the image of a person is matched bit by bit. Image matches with the image stores in database. Any facial feature changes in the database will invalidate the matching processes.

II. CAMSHIFT

The Camshift algorithm actually depends on the Mean Shift algorithm. The working of mean shift algorithm is based on statistics distribution. Camshift also depends on dynamically changing distributionsCAMSHIFT's is able to handle dynamic distributions by readjusting the search window size for the next frame based on the zeroth moment of the current frames distribution. So the algorithm can anticipate object movement to quickly track the object in the next scene. The CAMSHIFT algorithm is a variation of the MEAN SHIFT algorithm. CAMSHIFT works by tracking the hue of an object, in this case, flesh color. The movie frames were all converted to HSV space before individual analysis.

III. SURF

In image recognition technology, Speeded Up Robust Features (SURF).It is used for object recognition. It is partly inspired by the scale invariant feature transform (SIFT) descriptor. In order to determine the interest point hessian blob determinant is used by SURF.SURF descriptors can be used to locate and identify objects, people or faces, to make 3D scenes, to track objects and also to extract points of interest. The surf algorithm is work as shown in fig. 1
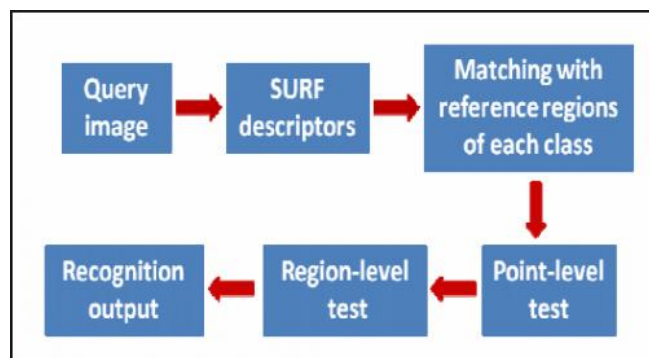
Fig.1 Flow chart of SURF algorithm.

IV.ADVANCED CAMSHIFT

First of all the position and the size of search window of the object is initialized, after that the image is converted from RGB color space to YIQ color space, and then the objectback projection is calculated. Next is to calculate the centroid within the search window, and then regard the centroid as the center of the track window.Return to above step, the iteration will be stopped when the moving distance is less than thethreshold value or has reached a certain number of iterations to converge.In the next frame of video image, with the center which was saved in previous steps to again re-initializethe size and position of the search window, and next step is to calculate window size, the size of widthof search window is: $w = 2* \sqrt{M_{00}/256}$

Jump to the Step second and then repeat the operation.However, improvedCamshaft can eliminate these effects of the background and similar skin-color and becomes more robust to noise.Although, we have been solved the effects of background, when the other object appears aroundthe object, CamShift algorithm will thus automaticallyinclude similar skin-color, so the window willexpand . So, Surf algorithm will also be employed.

V.LITERATURE REVIEW

1)Parth B. Pancha ,Vimal H. Nayak, "A Hand Gesture Based Transceiver System for Multiple Application"IEEE SPONSORED 2ND INTERNATIONAL CONFERENCE ON ELECTRONICS AND COMMUNICATION SYSTEM (ICECS 2015)

Research in hand gesture recognition aims to design and development of such systems than can identify explicit human gestures as input and process these gesture representations for device control through mapping of commands as output. Various different messages can be displayed on touch screen LCD and it can be change according to change in accelerometer position or different angles of accelerometer.

2)Danchi Huang, and Lijuan Li, "Face Tracking Algorithm Based on Improved Camshift and Surf Algorithm", Journal of Computational Information Systems 11: 3 (2015) 893 - 901.

This method can track object correctly, although it is occluded by the similar skin-colour objects. In this method, using the twice-matching to match the object, and update the template, so that the object can be finding correctly when the appearance of the object is changed.When the object is lost, the algorithm can refund it quickly and continue tracking.

Improvement of this algorithm is needed to better match the object with other features.

3)Yu HuiQiu, Jian Wei Zhang, Guang Lin, Yong Hui Li, and Dong FaGao, "Improved camshift tracking algorithm based on motion detection", Proceedings of the 2013 International Conference on Machine Learning and Cybernetics, Tianjin, 14 - 17 July, 2013.

In this paper, it is given that when calculating the colour histogram of a target within the rectangular box, it adds a mask layer to remove background pixels around targets. When calculating the back projection, it adds a mask layer to remove all background pixels within the window to eliminate the interference of similar colour in the background.This improved algorithm utilizes the colour feature better and keeps the tracking right even when background interference exists. The performance of the proposed depends on the accuracy of the moving object detection.

P. Jia, H. Hu, T. Lu, and K. Yuan, "Head Gesture Recognition For Hands Free Control of an Intelligent Wheelchair", Industrial Robot: An International Journal 34 / 1 (2007) 60 - 68 [ISSN 0143 - 991X] [DOI10.1108 / 01439910710718469].

A Novel hands-free control system for intelligent Wheelchairs based on visual recognition of head gesture. Adaboost face detection algorithm & Camshift object tracking algorithm are combined in this paper to achieve accurate face detection, tracking, & gesture recognition in real time. Evaluation in both indoor & outdoor environments is not done. Several conditions such as cluttered background, changing lightning conditions, sunshine, and shadows are not taken in consideration.

VI.DESIGN METHODOLOGY

Face tracking plays an important role in recognizing the face .But sometimes it also happens that the algorithm can also track the face in the incorrect manner.First of all, the face is detected in real time. Then the gesture is recognized. The following things are done to carry out the further steps. .

- Basic camera interface is implemented
- Basic algorithm for face detection is implemented
- Study and implementation of real time face detection using Camera
- Study and design of gesture recognition for different gesture based on face.

VII.CONCLUSION

Face recognition is a complex task to perform. Face recognition should be done in a robust manner to correctly detect the face. So we have implementedthe improved CAM shift algorithm to make the face recognition a robust task.

REFERENCES

[1]   Parth B. Pancha , Vimal H. Nayak, "A Hand Gesture Based Transceiver System for Multiple Application" IEEE SPONSORED 2ND INTERNATIONAL CONFERENCE ON ELECTRONICS AND COMMUNICATION SYSTEM (ICECS 2015)

[2]   Danchi Huang, and Lijuan Li, "Face Tracking Algorithm Based on Improved Camshift and Surf Algorithm", Journal of Computational Information Systems 11: 3 (2015) 893 - 901.

[3]   Yu HuiQiu, Jian Wei Zhang, Guanglin, Yong Hui Li, and Dong FaGao, "Improved camshift tracking algorithm based on motion detection", Proceedings of an International Conference on Machine Learning and Cybernetics, Tianjin, 14 - 17 July, 2013.

[4]   Tao Zhang, and ShuminFei, "Target tracking based on particle filter algorithm with multiple cues fusion", 2014, 26th Chinese Control and Decision Conference (CCDC).

[5]   Amr M. Nagy, Ali Ahmed, and Rala R. Zayed, "Particle Filter Based on Joint Colour Texture Histogram For Object Tracking", IEEE IPAS'14: International Image Processing Applications & Systems Conference 2014.

[6]   P. Jia, H. Hu, T. Lu and K. Yuan, "Head Gesture Recognition For Hand Free Control of an Intelligent Wheelchair", Industrial Robot: An International journal 34 / 1 (2007) 60 - 68 [ISSN 0143 - 991X] [DOI 10.1108 / 01439910710718469].

[7]   Bradski R. G., and Clara S. C. A., "Computer vision face tracking as a component of a perceptual user interface", In the Workshop on Applications of Computer Vision, Princeton, PP. 214 - 219 (1998).

[8]   Wang, Z. W., Yang X. K., and Xu Y., "Camshift guided particle filter for visual tracking", Pattern Recognition Letters 30(4), 407 - 413 (2009).

[9]   Ye J. H., Liu Z. G., and Zhang J., "A Face Tracking Algorithm Based on LBP Histograms and Particle Filtering", In: Proc. 6th IEEE International Conference ICNC, Volume 7, PP. 3550 - 3553 (2010).

[10]   Wu X., Li L. H., Lai J. H., and Huang J., "A Framework of Face Tracking with Classification Using CAMShift-C and LBP", In: Proc. 6th IEEE International Conference ICIG, PP. 217 - 222 (2010).

[11]   AmitSatpathy, Xudong Jiang, *Senior Member* and How-Lung Eng, "LBP-Based Edge-Texture   Features forObject Recognition", Ieee Transactions On Image Processing, Vol. 23, No. 5, May 2014