GESTURE RECOGNITION USING COMPUTERS

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Abstract- The paper proposes a system to recognize the gestures and to do some corresponding actions. The paper deals with the enhancement of human interaction with the digital world. Miniaturization of computing devices allows us to be in continuous touch with the digital world. Restriction of information on traditional platforms like paper, digital screen etc. is overcome with the help of this technology. Dependency on traditional hardware input devices like keyboard; mouse etc. will be reduced considerably, thereby allowing portability. It makes use of hand movements/gestures to feed input to a computer or any other digital device. It works on a similar principle of hand movement/gesture control to perform simple functions like Right/Left click, Scroll control etc., which would otherwise have to be performed with the help of a mouse or a keyboard. Image processing technique is an important basis for the implementation of this technology. The key features of this technology include media player volume control, power point slide control, camera control, scrolling, mouse control, initiation and termination of call.

Keywords- mouse control, hand movements or gestures, player volume control, power point slide control, camera control, scrolling, initiation and termination of call.

INTRODUCTION

The motivation behind our venture is to diminish the utilization of keyboard and mouse. People impart principally by vision and sound. Because of the colossal development of advanced world man and machine interface is required for correspondence. The keyboard and mouse are right now the principle interfaces amongst man and PC. The headway in current innovation has brought about the development of different advancements like qwerty keypad, touch screen and so forth .Another such advancement in this field is the intuition innovation which goes about as an interface between digital information and the physical world. The extent of this undertaking incorporates recognition of the pointer utilizing characterized shading data for controlling PC capacities like dial cushion control and mouse control with clicks, power point slide control, media player control with no contact to the screen. The gadget comprises of programming segments like MATLAB, Visual Basics and equipment parts like camera, GSM modem, shading stickers and receiver. The fundamental part of this signal based gadget is the catching of hand developments by the camera which deciphers and procedures the procured data. The handling of this data,as pictures is finished with the help of MATLAB programming adaptation MATLAB programming comprises of the Image Processing Tool stash and Acquisition Processing Toolbox which is utilized to examine the contents of the picture.

METHODOLOGY

In [1], the paper proposes a fast algorithm for automatically recognizing a limited set of gestures from hand images for a robot control application. Hand gesture recognition is a challenging problem in its general form. So by considering a fixed set of manual commands and a reasonably structured environment, and develop a simple, yet effective, procedure for gesture recognition. The approach contains steps for segmenting the hand region, locating the fingers, and finally classifying the gesture. The algorithm is invariant to translation, rotation, and scale of the hand. We demonstrate the effectiveness of the technique on real imagery.

In [2], In this paper we have actualized a remote vision based portable robot control through hand motion acknowledgment in light of perceptual shading space, for example, HIS, HSV/HSB, HSL.Vision-based hand motion acknowledgment is a critical issue in the field of human-PC collaboration, since hand movements and motions could possibly be utilized to interface with PCs in more common ways. The robot control was done absolutely taking into account the introduction histograms a straightforward and quick calculation on the framework which would perceive static hand signals with HSV shading spaces as significant parameters. The remote based portable robot framework utilizing hand signals is a new creative UI that determines the difficulties of utilizing various remote controls for different applications. In light of one brought together arrangement of hand signals, this framework deciphers the client hand motions into pre-characterized orders to control the remote robot. The test results are exceptionally promising as the framework creates constant reactions and exceedingly precise acknowledgment towards different motions under various lighting conditions.

In [3],In this paper we display a novel technique for hand motion acknowledgment taking into account Gabor channels and bolster vector machine (SVM). Gabor channels are initially convolved with pictures to secure desirable hand signal components. The essential segments examination (PCA) strategy is then used to diminish the dimensionality of the component space. With the diminished Gabor highlights, SVM is prepared and misused to play out the hand motion recognition task. To confirm the robustness of the proposed strategy, a dataset with huge postured edge (≫45 deg.) of hand signals is made. The test result demonstrates that the acknowledgment rate of 95.2% can be accomplished when SVM is utilized. An ongoing video framework for hand signal acknowledgment is likewise given a preparing rate of 0.2 s for each casing. This outcome demonstrates the productivity and prevalence of the proposed Gabor-SVM Strategy.

In [4], this paper proposes a dream based strategy that vigorously extrats hands from foundations regardless of light conditions. Numerous hands following frameworks construct a skin shading model before the framework runs and afterward they track hands by utilizing the shading model. Be that as it may, the framework is unsteady in light of the fact that the pre-characterized colors can't be adjusted to different illumination and human skin colors. To evade the issue, we delay the hand shading demonstrating model until the framework runs. The framework can confirm whether an article is a hand or not, and the checked hand is utilized for displaying a skin shading. The strategy is compelling not just for precise hand extraction additionally to reduce noises of foundations on the grounds that the skin shading model is streamlined to the client's hand and the present enlightenment. The test result demonstrates that the technique significantly enhances exactness's of hand following and motion recognition.

In [5], Compared with the traditional interaction approaches, such as keyboard, mouse, pandect, vision based hand interaction is more natural and efficient. In this paper, we proposed a robust real-time hand gesture recognition method. In our method, firstly, a specific gesture is required to trigger the hand detection followed by tracking; then hand is segmented using motion and color cues; finally, in order to break the limitation of aspect ratio encountered in most of learning based hand gesture methods, the scale-space feature detection is integrated into gesture recognition. Applying the proposed method to navigation of image browsing, experimental results show that our method achieves satisfactory performance.

In [6],Hand movement following and signal acknowledgment are a major innovation in the field of proactive figuring for a superior human PC connection framework. In this paper, we have built up a 3-D hand movement following and signal acknowledgment framework by means of an information glove (to be specific the KHU-1 information glove comprising of three tri-pivot accelerometer sensors, one controller, what's more, one Bluetooth). The KHU-1 information glove is equipped for transmitting hand movement signs to a PC through remote correspondence by means of Bluetooth. Additionally we have executed a 3-D advanced hand model for hand movement following and acknowledgment. The executed 3-D advanced hand model is based on the kinematic chain hypothesis using ellipsoids and joints. At long last, we have used a principle based calculation to perceive basic hand motions specifically scissor, shake, and paper utilizing the 3-D advanced hand model and the KHU-1 information glove. Some preparatory trial results are exhibited in this paper.

In [7],The use of singular values for classification of elementary actions performed by human hands is known in the writing. However, typically just the primary particular right-vector is utilized. This methodology is appropriate when a solitary elementary activity is performed; therefore it is utilized for arrangement, as it diminishes an extensive arrangement of information to a solitary vector with the same number of passages as the number of elements. In any case, while considering complex activities, the second solitary quality may increment its significance as for the first. This proposes a procedure for division of elementary activities in view of the investigation of the second-to-method, both in fragmenting and in ordering and perceiving complex moves.

In [8], A sign language is a language which, instead of acoustically conveyed sound patterns, uses visually transmitted sign patterns. Sign languages are commonly developed for deaf communities, which can include interpreters, friends and families of deaf people as well as people who are deaf or hard of hearing themselves. Developing a sign language recognition system will help the hearing impaired to communicate more fluently with the normal people. This paper presents a simple sign language recognition system that has been developed using skin color segmentation and Artificial Neural Network. The moment invariants features extracted from the right and left hand gesture images are used to develop a network model. The system has been implemented and tested for its validity. Experimental results show that the average recognition rate is 92.85%.

In [9], This paper reports some early results of study on continuous Korean sign language (KSL) recognition using color vision. In recognizing gesture words such as sign language, it is very difficult to segment a continuous sign into individual sign words since the patterns are very complicated and diverse. To solve this problem, we disassemble the KSL into 18 hand motion classes according to their patterns and represent the sign words as some combination of hand motions. Observing the speed and the change of speed of hand motion and using fuzzy partitioning and state automata's, they reject unintentional gesture motions such as preparatory motion and meaningless movement between sign words. To recognize 18 hand motion classes we adopt the hidden Markov model. Using these methods, we recognize 15 KSL sentences and obtain 94% recognition ratio.

In [10], The paper "Mouse control using Hand Gestures" presented by Ankush Chaudhary ,Ashish Kumar,Sharma,Jyoti Dalal, Leena Choukiker describes research efforts towards new approach for Human Computer Interaction (HCI) and to control the mouse cursor movement and click events of the mouse using hand gestures. The Hand gesture depend upon camera based color detection technique. This method mainly focuses on the use of a Web Camera to develop a virtual human computer interaction device in a cost effective manner.

Human Computer Interaction today greatly emphasizes on developing more spontaneous and natural interfaces. This mouse system can control all mouse tasks, such as clicking (right and left), double clicking. One approach, by Erdem et al, used fingertip tracking to control the motion of the mouse. A click of the mouse button was implemented by defining a screen such that a click occurred when a user's hand passed over the region. Another approach was developed by Chu-Feng Lien. He used only the finger-tips to control the mouse cursor and click. His clicking method was based on image density, and required the user to hold the mouse cursor on the desired spot for a short period of time, likewise many methods were done. In this paper, we use Web camera to detect color tapes for cursor movement. The clicking actions were performed by calculating the distance between two colored tapes in the fingers. As compared with the traditional segmentation method this method has two benefits one is that it uses colored tape and another is that it requires no special object model with relative high performance which the system applicable to the augmented reality systems or other real-time systems. Since the system is based on image capture through a web-cam, it is dependent on illumination to a certain extent. Furthermore the presence of other colored objects in the background might cause the system to give an erroneous response. Although by configuring the threshold values and other parameters of the system this problem can be reduced.

CONCLUSION

This technology recognizes the objects around us, displaying information automatically and letting us to access it in any way we need .This is a kind of Sixth Sense prototype which implements several applications that demonstrate the usefulness, viability and flexibility of the system. Allowing us to interact with this information through natural hand gestures. The potential of becoming the ultimate "transparent" user interface for accessing information about everything around us.It could change the way we interact with the real world and truly give everyone complete awareness of the environment around us. It will definitely revolutionize the world.

REFERENCES

[1] A. Malima, E. Ozgur and M. Cetin, "A Fast Algorithm for VisionBased Hand Gesture Recognition for Robot Control", IEEE, 2006.

[2] Manigandan M and I.M Jackin, Wireless Vision based Mobile Robot control uses Hand Gesture Recognition through Perceptual Color Space IEEE International Conference on Advances in Computer Engineering, 2010, pp. 95-99.

[3] D.Y. Huang, W.C. Hu and S.H. Chang, Vision-based Hand Gesture Recognition Using PCA+Gabor Filters and SVM, IEEE Fifth International Conference on Intelligent

Information Hiding and Multimedia Signal Processing, 2009, pp. 1-4.

[4] E. Koh, J. Won and C. Bae,On-premise Skin Color Modeing Method for Vision-based Hand Tracking, The 13th IEEE International Symposium on Consumer Electronics (ISCE), 2009, pp. 908-909.

[5] Y. Fang, K. Wang, J. Cheng and H. Lu, A Real-Time Hand Gesture Recognition Method, IEEE ICME, 2007, pp. 995-998.

[6] J.H. Kim, Nguyen Duc Thang and Tae-Seong Kim, 3-D Hand Motion Tracking and Gesture Recognition Using a Data Glove, IEEE International Symposium on Industrial Electronics (ISlE), July 5-8, 2009, Seoul Olympic Parktel, Seoul , Korea, pp. 1013-1018.

[7] A. Cavallo,Primitive Actions Extraction for a Human Hand by using SVD, IEEE 9th International Symposium on Intelligent Systems and Informatics (SISY), September 8-10, 2011, Subotica, Serbia, pp. 413-419.

[8] M.P. Paulraj, S. Yaacob, Mohd S.B.Z Azalan, R. Palaniappan, A Phoneme Based Sign Language Recognition System Using Skin Color Segmentation,IEEE 6th International Colloquium on Signal Processing & Its Applications (CSPA), 2010, pp. 86-90.

[9] J.B. Kim, K.H. Park, W.C. Bang and Z. Z. Bien, Continuous Gesture Recognition System for Korean Sign Language based on Fuzzy Logic and Hidden Markov Model, IEEE, 2002, pp. 1574-1579.

[10] Ankush Chaudhary,Ashish Kumar Sharma,Jyoti Dalal, Leena Choukike,AmityUniversity,Haryana,"Mouse control using Hand Gesture", Journal of Emerging Technologies and Innovative Research(JETIR), March 2015, Volume 2, Issue 3