ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

Static Hand Gesture Recognition to Control Secondary Equipment in Cars

Anshula Mukadam[1], Dr. V.V Dixit[2]

Student, Department of E&TC, Sinhgad College of Engineering, Savitribai Phule Pune University, Pune, India.[1]

Professor, Department of E&TC, Sinhgad College of Engineering, Savitribai Phule Pune University, Pune, India[2]

ABSTRACT: While driving, controlling multiple devices steals drivers' attention from the road and it has become the cause of accidents in 1 out of 3 cases. A lot of research efforts are being used to design, manufacture and test Human-Machine Interfaces which can allow a user to operate secondary devices in car without requiring driver's attention. Gesture control is proposed in the literature as a technique which deserves to be explored as it can tremendously simplify numerous interactions between the car and the driver and/or other passengers. Key characteristics of such HVI devices include reliability, robustness, and stability of the entire system, ranging from the acquisition of the gesture to its recognition and tracking in real-time.

KEYWORDS: Driver Control, Hand Gesture Recognition, Human Machine Interface, HVI Devices

I. INTRODUCTION

One of the principal causes of car accident is driver distraction. The secondary devices like mobile phones, GPS, radio, and, recently, the use of tablets to view web pages, watch videos or look at maps are increasing day by day, causing driver distraction. Due to increase in secondary devices in car, there should be a safer user interfaces which will help drivers to pay attention on the road.

Thus, gesture recognition technology is necessary which will help humans to communicate with the machine (HMI) and interact naturally without any mechanical devices.

A gesture is a form of non-verbal communication in which visible bodily actions communicate particular messages, either in place of speech or in parallel with words. Gestures include movement of the hands, face, or other parts of the body. Gestures are an important aspect of human interaction, both interpersonally and in the context of man-machine interfaces.

Gesture recognition is interfacing with computers using gestures of the human body, typically hand movements. It is an important skill for robots that work closely with humans. Gesture recognition is especially valuable in applications involving human interaction for several reasons.

The objective of gesture recognition technology is gesture control mechanism which allows driver to control devices by some actions of their hands. It can provide more scalability and expandability. The new gestures can be easily and fast designed and added to the corresponding system when new services or functions are presented.

II. RELATED WORK

Poonam Sonwalkar, Tanuja Sakhare, Ashwini Patil, Sonal Kale, "Hand Gesture Recognition for Real Time Human Machine Interaction System", International Journal of

Engineering Trends and Technology (IJETT) – Volume 19 Number 5 – Jan 2015. Proposed system demonstrates the Real Time Human-machine Interaction system using hand gesture Recognition to handle the mouse event , media player , image viewer.

Jinhua Zeng, Yaoru Sun, and Fang Wang, "A natural hand gesture system for intelligent human-computer interaction and medical assistance", 2012 Third Global Congress on Intelligent Systems. It was developed for the intelligent wheelchair control. The hand gesture vocabulary consists of five key hand postures and three compound states, and has the advantages of the minimal hand motions, users distraction detection and human-based strategy.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

Francisco Parada-Loira, Elisardo González-Agulla, José L. Alba-Castro , "Hand Gestures to Control Infotainment Equipment in Cars, 2014 IEEE Intelligent Vehicles Symposium (IV) June 8-11, 2014. Dearborn, Michigan, USA. In proposed system a visible-infrared camera mounted on the ceiling of the car and pointing to the shift-stick area, and is based in a combination of some new and some wellknown computer vision algorithms.

III. SCHEME OF IMPLEMENTATION

A. BLOCK DIAGRAM

The proposed scheme can be used to develop a real-time gesture recognition system. After hand region detection image segmentation techniques is proposed which classify two major classes, edge-based segmentation and region based segmentation techniques. The entire system captures the real-time image which is color image as input. The system uses serialized database for storing gestures. The proposed scheme can be used to develop a real time gesture recognition system. The first option is to eliminate most background regions to remain the hand region when the background of implemented environment is less complex. The second option is to detect hand regions by color or brightness. The hand region detection is a very important procedure for identifying the shape and area of each hand. This system can work well in real time service system.

In proposed system we use region based method to extract hand region. The proposed scheme first binarizes each captured video frame by Otsu's dynamic thresholding method. In order to reduce these noises, some common noise filter methods, e.g. Gaussian filter and median filter methods can be used to smooth video frames before the image binarization. In order to reduce the effects of the illumination changing in different environments, the convenient histogram equalization method is used to perform illumination normalization. Besides hands, most other objects usually are invariable between each video frame when the camera device is fixed. Thus, background reference images can be obtained in certain time intervals to remove most non-hand objects by considering these objects as the background, and the proposed scheme can gain more performance in the connected component labeling procedure.

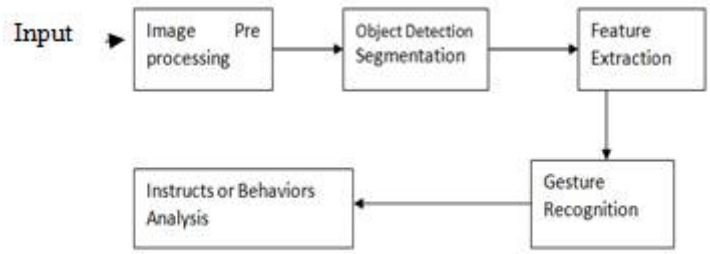

Figure 1. Proposed system

B. MODELLING

Hand detection: Hand detection is important for a gesture interface as it functions as a switch to turn on the interface. Hand detection methods are sensitive to complicated background. Hand detection uses extended Adaboost method.

Hand tracking: Texture or appearance based methods have been improved to be more robust for the non-rigid objects. In this method, we use a multi-modal technique which combines optical flow and color cue to obtain stable hand tracking. Flock of features method feasible in the articulated object tracking.

Hand segmentation: A single Gaussian model can be used to describe hand colour in HSV colour space. Histogram method is based on the assumption that no other exposed skin colour part of user in the certain area around the hand. Wooden objects passing through the area, the histogram will deviate and segmentation results will be rapidly degraded. In that case our method can get better results.

Gesture recognition: Hand gestures using local oriental histogram feature distribution model, but background in experiments are quite simple and sleeve colour and texture are restricted. Scale-space features detection have been widely applied in object recognition, image registering. For planar hand shape, the scale-space feature detection can be

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

used to detect blob and ridge structures, i.e. palm and finger structures. In this method multi-scale feature detection with hand tracking and segmentation is used.

IV. CONCLUSION

In recent years, the gesture control technique has become a new developmental trend for many human-based electronics products. This technique let people can control these products more naturally, intuitively and conveniently. This paper proposes a gesture recognition scheme with well accuracy and efficiency. This scheme can be applied to be the human-machine interface for users to control some service system just by their hands and can work well in an actual telematic service system. The proposed scheme also can be further applied to be HMI for other applications, such as, intelligent televisions, playing games, robots, bulletin board and so on.

ACKNOWLEDGMENT

The author is thankful to E&TC department, Sinhgad College of Engineering, Savitribai Phule Pune University for providing research facilities.

REFERENCES

1. Francisco Parada-Loira, Elisardo González-Agulla, José L. Alba-Castro , "Hand Gestures to Control Infotainment Equipment in Cars, 2014 IEEE Intelligent Vehicles Symposium (IV) June 8-11, 2014. Dearborn, Michigan, USA
2. Poonam Sonwalkar, Tanuja Sakhare, Ashwini Patil, Sonal Kale, "Hand Gesture Recognition for Real Time Human Machine Interaction System", *International Journal of Engineering Trends and Technology (IJETT) – Volume 19 Number 5 – Jan 2015*
3. Jinhua Zeng, Yaoru Sun, and Fang Wang, "A natural hand gesture system for intelligent human-computer interaction and medical assistance", 2012 Third Global Congress on Intelligent Systems
4. Yikai Fang, Kongqiao Wang, Jian Cheng and Hanqing Lu, 'Real-time hand gesture recognition method' for National Lab of Automation, Chinese Academy of Sciences, Beijing (IEEE paper).
5. Y. Cui and J. Weng, "View-based hand segmentation and hand sequence recognition with complex backgrounds," in Proceedings of 13th ICPR. Vienna, Austria, Aug. 1996, vol. 3, pp. 617– 621.
6. Mathias Kolsch, "Vision based hand gesture interfaces for wearable computing and virtual environments," PHD Dissertation,UCSB, 2005.
7. Lars Bretzner, Ivan Laptev, Tony Lindeberg, "Hand Gesture Recognition using Multi-Scale Colour Features, Hierarchical Models and Particle Filtering", Computational Vision and Active Perception Laboratory (CVAP) 2 Centre for User Oriented IT Design (CID) Dept of Numerical Analysis and Computing Science, KTH, 100 44 Stockholm, Sweden.