A Gesture-Based tool for sterile browsing of Radiology images

Domain: Artificial Intelligence

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Paper 1: Design and evaluation of freehand gesture interaction for light field and display.

Publication Year: 2015

Author: Adhikarla V.K, Jakus G, Sodnik J

Journal Name: 17th International Conference on Human-computer Interaction.

In this paper, vision based hand gesture recognition has become a highly emerging research area for the purpose of human computer interaction. Such recognition systems are deployed to serve as a replacement for the commonly used human-machine interactive devices such as keyboard, mouse, joystick etc. in real world situations. The major challenges faced by a vision based hand gesture recognition system include recognition in complex background, in dynamic background, in presence of multiple gestures in the background, under variable lighting conditions, under different viewpoints etc. In the context of sign language recognition, which is a highly demanding application of the hand gesture recognition system, coarticulation detection is a challenging task. The main objective of this chapter is to provide a general overview of vision based hand gesture recognition systems as well as to bring into light some of the research works that have been done in this field.

Paper 2: A Vision based gesture recognition technique.

Publication Year: 2018

Author: AL-Shamayleh AS, Ahmad R, Abushriah M, Alam KA, Jomhari N

Journal Name: Multimedia Tools and Applications.

The aim of this study is to aggregate and synthesize experiences and accumulated knowledge about Vision-Based Recognition (VBR) techniques. The major objective of conducting this Systematic Literature Review (SLR) is to highlight the state-of-the-art in the context of vision-based gesture recognition with specific focus on hand gesture recognition (HGR) techniques and enabling technologies. After a careful systematic selection process, 100 studies relevant to the four research questions were selected. This process was followed by data collection, a detailed analysis, and a synthesis of the selected studies. The results reveal that among the VBR techniques, HGR is a predominant and highly focused area of research. Research focus is also found to be converging towards sign language recognition. Potential applications of HGR techniques include desktop applications, smart environments, entertainment, sign language interpretation, virtual reality and gamification. Although various experimental

research efforts have been devoted to gestures recognition, there are still numerous open issues and research challenges in this field. Lastly, considering the results from this SLR, potential future research directions are suggested, including a much needed focus on grammatical interpretation, hybrid approaches, smartphone devices, normalization, and real-life systems.

Paper 3: A Kinetic-based Gesture Recognition Approach for a Natural Human Robot interface.

Publication Year: 2018

Author: AL-Shamayleh AS, Ahmad R, Abushriah M, Alam KA, Jomhari N

Journal Name: Multimedia Tools and Applications.

In this paper, we present a gesture recognition system for the development of a human-robot interaction (HRI) interface. Kinect cameras and the OpenNI framework are used to obtain real-time tracking of a human skeleton. Ten different gestures, performed by different persons, are defined. Quaternions of joint angles are first used as robust and significant features. Next, neural network (NN) classifiers are trained to recognize the different gestures. This work deals with different challenging tasks, such as the real-time implementation of a gesture recognition system and the temporal resolution of gestures. The HRI interface developed in this work includes three Kinect cameras placed at different locations in an indoor environment and an autonomous mobile robot that can be remotely controlled by one operator standing in front of one of the Kinects. Moreover, the system is supplied with a people re-identification module which guarantees that only one person at a time has control of the robot. The system's performance is first validated offline, and then online experiments are carried out, proving the real-time operation of the system as required by a HRI interface.

Paper 4: A real time vision-based hand gesture interaction
Publication Year: 2010
Author: Pang YY, Ismail NA, Siang Gilbert PL
Journal Name: Asia modeling Symposium.

Moving beyond mouse and keyboard, the evolution of human-computer interaction (HCI) has been an interesting research in recent years which witnessed the development from text-based like using a keyboard to graphic user interface (GUI) based on a mouse, from cumbersome data gloves and tracking devices to visual-based computer application. One of the interest fields is by using hand gestures to interact with computers. However, the complexity of a hand sets a lot of challenges to be tracked. In real-time, the application requires high accurate detection and recognition. In addition the real and clutter environments have a big impact on the recognition process because it includes irrelevant information from the application point of view. In this paper, a real time vision based hand gesture interaction prototype was proposed. Currently a prototype has been built for controlling the desktop cursor and concerned with the tasks involved in navigation the desktop cursor by using hand gesture input modality.

Paper 5: A hand gesture interface device
Publication Year: 1987
Author: Zimmerman TG, Lanier J, Blanchard C, Bryson S, Harvill Y
Journal Name: ACM SIGCHI Bulletin.

This paper reports on the development of a hand to machine interface device that provides real-time gesture, position and orientation information. The key element is a glove and the device as a whole incorporates a collection of technologies. Analog flex sensors on the glove measure finger bending. Hand position and orientation are measured either by ultrasonics, providing five degrees of freedom, or magnetic flux sensors, which provide six degrees of freedom. Piezoceramic benders provide the wearer of the glove with tactile feedback. These sensors are mounted on the light-weight glove and connected to the driving hardware via a small cable. Applications of the glove and its component technologies include its use in conjunction with a host computer which drives a real-time 3-dimensional model of the hand allowing the glove wearer to manipulate computer-generated objects as if they were real, interpretation of finger-spelling, evaluation of hand impairment in addition to providing an interface to a visual programming language