
Hand Gesture Recognition And Device Control

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ABSTRACT

Hand gesture based electronic device control is gaining more importance nowadays. Most of electronic devices focus on the hand gesture recognition algorithm and the corresponding user interface. This paper presents hand gesture recognition based Device control by using microcontroller. Gesture recognition is interpretation of human motion by computing device. An automatic gesture segmentation algorithm is developed to identify individual gestures in a sequence and The device is control by microcontroller. The purpose of project is to design & develop a hand gesture based Device control which can be easily controlled by the help of gesture recognition system.

Keyword – Hand Gesture, Microcontroller, Camera.

I. INTRODUCTION

Gesture recognition enables humans to communicate with the machine and interact naturally without any mechanical devices. Using the concept of gesture recognition, it is Possible to point a finger at the computer screen so that the cursor will move accordingly. This could potentially make conventional input devices such as mouse, keypads and even Touch screens redundant. Gesture recognition can be conducted with techniques from computer vision and image processing. The literature includes on going work in the computer vision field on capturing gestures or more general human pose and movements by cameras connected to a computer. The purpose of this project is to design & develop a hand gesture based Device control which can be easily controlled by the help of gesture recognition system. Gesture is defined a motion of limbs or any other body part which are made to emphasize speech. It can also be defined as an act or a remark made as a sign of attitude. A gesture is scientifically categorized into two distinctive categories: dynamic and static. A waving hand means goodbye is an example of dynamic gesture and the stop sign is an example of static gesture. It is necessary to explain all the static and dynamic gestures over a period of time in order to understand full message. Gesture recognition is interpretation of human motion by computing device. The

development and investigation of alternative mobility device control is presented in this work. The system uses 2D visual information, which is acquired from an ordinary webcam, and controls the electrical drives of the device by tracking and recognizing the gestures of the hand. Hand tracking is achieved by using an algorithm, which combines two methods: a statistical Gaussian method and a discrete Fourier transformation. Proposed algorithm is adaptive and flexible allowing utilizing unique gesture commands which depend on person's motor abilities. Experimental investigation proves the stable robustness, performance and high accuracy of the proposed device controller. A standard 2D camera can be used for gesture recognition where the resources / environment would not be convenient for other forms of image based recognition. Earlier it was thought that single camera may not be as effective as stereo or depth aware cameras, but some companies are challenging this theory. Software based gesture recognition technology using a standard 2D camera that can detect robust hand gestures. After detecting the hand gesture camera will send output to microcontroller via serial communication. Then Microcontroller will on or off the device As per gesture

II. Related Research Studies

The essential aim of building hand gesture recognition system is to create a natural interaction between human and computer where the recognized gestures can be used for controlling a robot or conveying meaningful information [1]. How to form the resulted hand gestures to be understood and well interpreted by the computer considered as the problem of gesture interaction[2].

Human computer interaction (HCI) also named Man-Machine Interaction (MMI) [3] refers to the relation between the human and the computer or more precisely the machine, and since the machine is insignificant without suitable utilize by the human [3]. There are two main characteristics should be deemed when designing a HCI system as mentioned in [3]: functionality and usability. System

functionality referred to the set of functions or services that the system equips to the users [3], while system usability referred to the level and scope that the system can operate and perform specific user purposes efficiently [3]. The system that attains a suitable balance between these concepts considered as influential performance and powerful system [3]. Gestures used for communicating between human and machines as well as between people using sign language [4]. Gestures can be static (posture or certain pose) which require less computational complexity [5] or dynamic (sequence of postures) which are more complex but suitable for real time environments [5] [6]. Different methods have been proposed for acquiring information necessary for recognition gestures system [7][8]. Some methods used additional hardware devices such as data glove devices and color markers to easily extract comprehensive description of gesture features [7]. Other methods based on the appearance of the hand using the skin color to segment the hand and extract necessary features [7], these methods considered easy, natural and less cost comparing with methods mentioned before [7]. Some recent reviews explained gesture recognition system applications and its growing importance in our life [9] especially for Human computer Interaction HCI, Robot control, games, and surveillance, using different tools and algorithms [8][10]. This work demonstrates the advancement of the gesture recognition systems, with the discussion of different stages required to build a complete system with less erroneous using different algorithms.

III. Proposed method

Broadly speaking, a smart camera can be defined as a vision system in which the primary function is to produce a high level understanding of the imaged scene and generate application specific data to be used in an autonomous and intelligent system. The reason a smart camera is 'smart' lies in the fact that there exists inside the camera a processing unit which performs application specific information processing (ASIP). The primary goal of the ASIP is to extract information from the captured images that is useful to an application. For example, a motion triggered surveillance camera captures video of a scene, detects motion in the region of interest, and raises an alarm when the detected motion satisfies certain criteria. In this case, the ASIP is motion detection and alarm generation. Strictly speaking,

a smart camera is a standalone, self contained embedded system that integrates image sensing, ASIP and communications in one single box. However, there are other types of vision systems that are often referred to as smart cameras as well, such as PC based smart cameras.

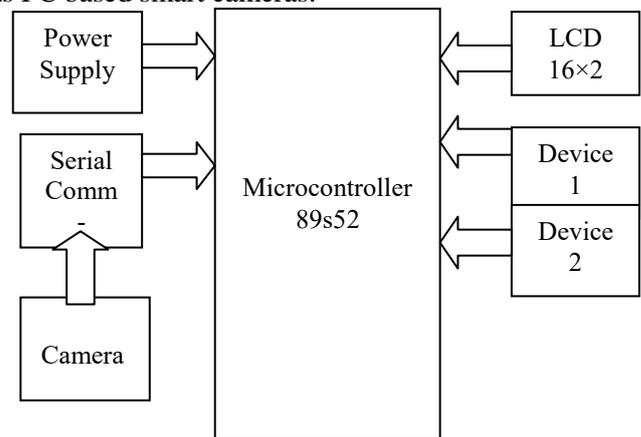


Fig.1. Block Diagram

Following are the important blocks of this system: 1. Microcontroller. 2. LCD. 3. Camera.

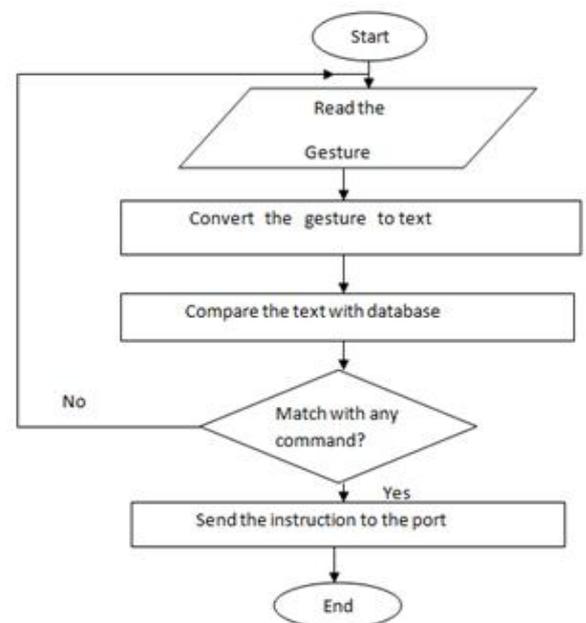


FIG.2. General flow diagram of a System

IV. ADVANTAGES

1. It can be used for industry purpose, handicapped people or many other places.
2. Easy to use.

V.CONCLUSION

In this paper we have studied the various method of gesture recognition. We discuss our project idea of hand gesture recognition and device control by using basic block diagram and flow chart.

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