Gesture Based Music Player Controller

Sarhan K S (1BY16EC039)[1], Shivakumar C A (1BY17EC413)[1], Dr. Jayadeva G. S.[2]

[1]Students of VIII Semester Electronics Department,BMSIT&M

[2]Professor in Electronics and communication department, BMSIT&M

ABSTRACT :

By keeping in mind the similarities of human hand shape with four fingers and one thumb, this paper aims to present a real time system for hand gesture recognition on the basis of detection of some meaningful shape based features like orientation, status of fingers, thumb in terms of raised or folded fingers of hand and their respective location in image. A primary goal of gesture recognition research is to create a system which can identify specific human gestures and use them to convey information or for device control. The proposed system mainly focuses on scenarios where we are multitasking that is working on many applications at a time or running various programs at a time on our desktop and along with that listening to music in background that is music being played in one of the windows. At such times if we wish to pause or switch a particular music track we have to make some movements like switching to the music window and doing the desired operation. This process is a bit long and time consuming as well. Suppose if you can do this operation without switching to the media player and by doing just one hand movement, it will save some time and also keep you linked with the work you are doing currently. With the help of Music Controller, one can simply wave or do a simple gesture of hand movement in front of the webcam which will in turn switch or pause the particular music track that was being played.

Keywords:Gesture sensor,Embedded arch,Hand gestures.

1 INTRODUCTION

Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via mathematical algorithms. Controlling a computer using hand gestures has long been the stuff of science fiction, the most memorable occasion being the movie Minority Report, where Chief John Anderton (played by Tom Cruise) controls a computer by deftly moving his hands around in a 3D space.It is now possible to control the music on your computer simply by making a few hand gestures. Through the use of

a few simple hand movements, you can play, pause, forward or replay your music. Gesture-based technology has been booming the past several years, especially with the creation of the Microsoft Kinect for PCs and the Xbox 360. Computer-integrated programs can be something for the future, especially because it simplifies tasks such as changing a song while

you're reading something important

Controlling music playback (e.g. play, stop, pause, and next) is often used to demonstrate new interfaces and inter- action techniques. Using a set of function to control music playback has also been used to demonstrate and evaluate gesture recognition algorithms. In order to derive meaningful conclusions from an evaluation of a gesture recognition algorithm it is, however, helpful to use a gesture set which is not purely based on the designer's intuition, the algorithms capabilities, or chance. Most work in the area of gestural interaction focused on algorithms and robust recognition of gestures. How- ever, gestural interfaces must fulfils the same requirements as any other interaction technique. In particular, it is important to define usable gestures for the functionalities that the particular application offers. In order to deduce usable gestures a process that ensures valid results must be employed.

2 METHODOLOGY AND PARTICIPANTS

The study was split into two halves. In the first half, we assessed people's music listening goals and needs in different situations through semi-structured interviews. In the second part, we presented them a simple prototype that recognises CDs using a webcam and plays the according music in order to get initial feedback about desired functionality and behaviour of the system. To not limiting the participants' creativity we did not reveal our intention to design a gestural interface to the participants.

First we asked about situations in which listening to mu- sic plays an important role for the interviewed person. For the rest of the interview, one of these situations was picked by the interviewer. Our aim here was to cover a wide range of different situations. In the following part of the interview,

more in-depth questions about participant's goals during the respective situations and the role of the music were asked. Then, we investigated which steps the users usually perform while listening to music, what types of music players were used, and how satisfied the participants were with these solutions. Here we aimed at understanding, which functionality of music players would be most important in this situation.

Definition of gesture sets

The proposals for gestures must be formalised to define a consistent set of gestures. In contrast to Nielsen et al. we propose to derive multiple gesture sets. By not limiting the outcome to a single set of gestures the risk to reject promising candidates is reduced. Nonetheless, every gesture must be part of a consistent gesture set to ensure that a gesture can be combined with other gestures in a reasonable way. I.e. it must be avoided to define the same gesture or very similar gestures for different functions.

Music listening habits

Situations. We identified three kinds of situations were music was listened to that differ in the meaning of the music. We distinguished between situations were music is the key aspect, music play a major role, and music is secondary.

However, the borders between the three classes are blurred and the meaning of the music in each situation can vary constantly, depending on the current context.

Music was considered the key aspect when the participants reported to listen consciously to it while doing nothing else as a primary task. These situations typically occurred in the home or in the car when driving alone and usually about once a week and if the situation occurs it does not last very long. The second class of situations were those, were music was an integral part of the situation, such as at parties, at work, or in some cases while doing sports. These situations typically occur not daily but last for a longer time then the previous class of situations. The third class of situations were those, were music was listened by the way, while the participants were typically involved into other primary tasks. These comprised house work, surfing the internet, playing video games, and car driving. In general, this kind of situation occurs often and lasts long.

The role of music

The role of the music strongly de- pends on the respective situation. The participants' answers were mostly related to emotions. The most important effect of music was keeping, changing, or amplifying emotions. For example, in cases of parties, music played an important role in supporting good vibrations. When participants listen to music while relaxing, the music should calm them down. Another commonly named role was helping the participants in concentration while they were busy with another task, such as working or playing a video game

.

Music players

Participants reported the use of a wide range of music players that fell into the classes of computer media player, portable mp3-player, CD-players, and radio. The participants mostly use pre-installed or old versions of computer media players. The vantages named by the participants about the system they use typically were associated with convenience aspects, such as simple user interface, familiarity, or immediately available music.

3 DEFINITION OF GESTURE SETS

The third step of the process is to formalise the proposed gestures and to define consistent sets of gestures. We found manifold gestures in the user study. Based on these gestures we define two consistent sets of gestures. To define consistent sets the first set consists of dynamic gestures only and the second set consist of static gestures. Most gestures were taken from the gestures proposed by the participants in the previous user study. Since we aimed at defining consistent gestures sets some gestures were chosen because they fit consistently with the other ones although the exact gesture was not proposed. In the following both sets are described.

Set of static gestures

Static gestures were not used as often as dynamic gestures. To form a consistent set, most gestures are similar to the symbols for the corresponding functions found on a music player.

Fig.1

Fig.2
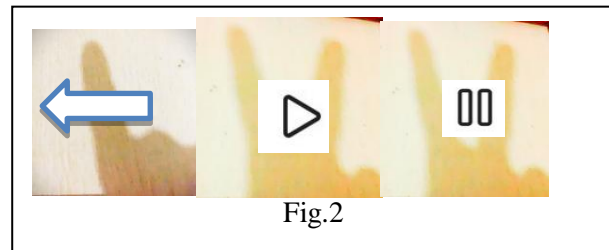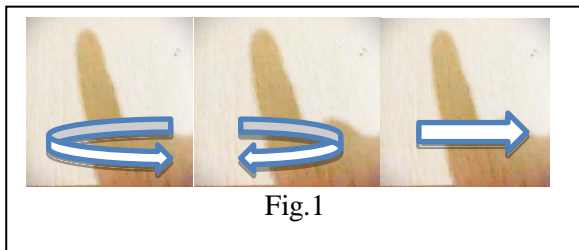
Play

This is the First operation performed in the gesture recognition to start this function two finger close to the sensor to play.

PauseSimilar to play function as the two fingers gets close to the centre to pass/stop the music

Volume up/Down

This a gesture to increase volume up and down of the music to function this operation moving one finger close to sensor and rotate clockwise/anti-clock wise to decrease and increase the volume.

Next and previous.

Again this is a gesture that is similar to the corresponding symbol on a music player. The one fingers showing in a right/left direction are representing the two arrows of the next or previous symbol on a music player. As a result this gesture should be easy to remember.

Block diagram:
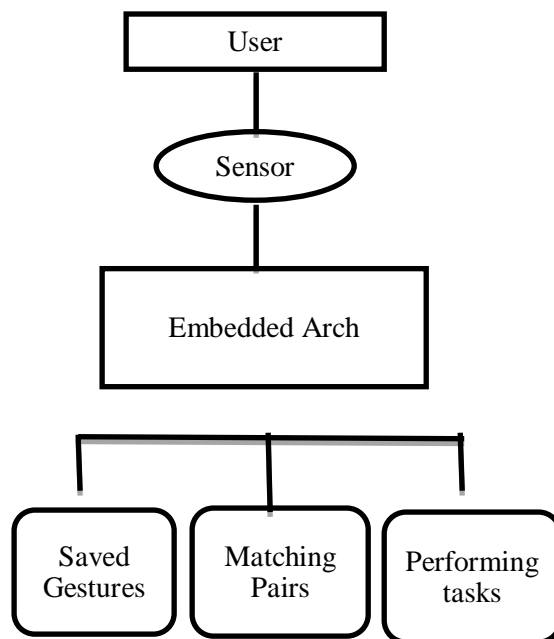
Implementation

The architecture of our system will be as shown in fig.3. Firstly the sensor will sence the input of the gesture by the user.This input will then go through various stages of background subtraction.Then the input will be sent to the database in which the predefined gestures are stored.In the database the picture recognition will play its part and one of function will be counted.Along with the counting of finger, mentation detection will take place and the actual gesture will be vent for matching.Once the gesture processed gesture is received, the pattern matching algorithm will carry out its function in find the matching by finding the pattern which is predefined in the database.When the match is found the report will be sent to the data which in turn will report to the system, The system will then carry out the task as specified in the database for that particular gesture.Once the action in performed the task loop of the application is over and it is set to receive the next gesture and perform the last required by the server.

Conclusion:

We have thus implemented Gesture recognition using various algorithms and the best method/algorithm will be used in the further development of the project. The advantages of this approach include easy detection, simplicity and ease of understanding.

Since this method does not need to be trained, the time usage is reduced thus lowering the complexity of the program. It also eliminates the need for post processing as simple matching of gestures is carried out to find the suitable task and carry it out. Additionally these algorithms can detect the orientation of the gesture which can prove helpful as similar gestures can be carried out in various orientations to provide different tasks for every gesture.

The advantages of this algorithm thus result in a lower amount of computation time and hence improving the efficiency of the program and the project.

REFERENCES :

1.Gesture recognition system Mrs Ayesha Butalia (MIT-College of Engineering), Ms Divya Shah (MIT-College ofEngineering), Doctor R.V Dharaskar (GHRCE, Nagpur).

2.Hand gesture recognition based on shape parameters Meenakshi Panwar Centre for Development of AdvancedComputing Noida, Uttar Pradesh, India.

3.www.ijrcct.org/index.php/ojs/article/view/706
4.http://in.mathworks.com/matlabcentral/fileexchange/30447-point-pattern-matching-algorithm-for-hand-gesture---american-sign-language--asl--recognition.

5.https://www.hindawi.com/journals/tswj/2014/267872/