Gesture Recognition Technology

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Abstract: Gesture Recognition Technology had seen vast improvements over these years. The past has seen the contemporary Human – Computer Interface techniques and their drawbacks, which limit the speed and naturalness of the human brain and body. As a result gesture recognition technology had been developed with a view to achieve ease and reduce the dependence on devices like keyboards, mouse and touchscreens. Various attempts have been made to combine human gestures to make use of the technology around us to make ideal use of our body gestures which in turn makes our work faster and human friendly. The present has seen large development in this field including devices like virtual keyboards, video game controllers to advanced security systems which work on face, hand and body recognition techniques. It also opens the doors to a whole new world where users can experiment with other, gesture-based forms of input. The future of this technology is golden with prototypes of amazing devices in research and development to make the world equipped with digital information at hand whenever and wherever required.

Index Terms: Gesture, gesture recognition, technology

I. INTRODUCTION
Just like the name, gesture recognition is developed to recognize the physical movements, or "gestures," of people. It is categorized as a kind of touchless user interface (TUI).

II. WHAT IS GESTURE
A gesture is a form of non-verbal communication in which visible bodily actions communicate particular meanings.Gestures are an important aspects of human interactions, both interpersonally and in the context of man-machine interfaces. Gestures are simply the movements of the hands , face or other parts of the body.

III. TYPES OF GESTURES
Gestures are mainly classified into two types:

OFFLINE GESTURE:
These gestures are processed after the user interact with the object.Eg : Military Air Marshals use hand and body gestures to direct flight operations .

ONLINE GESTURE:These are the interaction in which users action on objects lead to immediate results on the screen . It is used to scale or rotate a touchable object.
Eg: Smart tv recognizing hand movements to control channels or other options.

IV. GESTURE RECOGNITION TECHNOLOGY
Gesture Recognition Technology is a subject in computer science and language technology with the aim of interpreting human gestures through mathematical algorithms . It is an important dexterity for robots that work closely with humans.
In this technology a camera interprets the movement of the human body and communicates the data to a computer that uses gestures as input to control devices and applications.

V. WORKING OF GESTURE RECOGNITION TECHNOLOGY
The working of Gesture Recognition technology is based on the cameras and sensors.The first step is that the performed gesture ie the gesture input is sensed by the sensors and cameras through sensing chip and the corresponding data is processed and passed into the gesture segmentation where the inputed gestures are analysed. In the next step after segmentation ,the gesture is recognized by the system and corresponding output is produced.

VI. APPLICATIONS
The various applications of gesture recognition technology are:

1) MEDICAL OPERATIONS
Gestures are used to manage the handling of resources in hospitals, interaction with medical instruments, control visualization displays, and also help handicapped users as part of their rehabilitation therapy .This can be used to develop the medical facilities to a whole different level.
Eg: surgeons can control the motions of laparoscope by making specific gestures.

2) GAMING CONTROL
Gaming field which was limited to only keyboards ,mouse and joysticks now with the help of gesture recognition technology uses the gestures for corresponding actions which enhances the level of gaming and improves the overall gaming experience .Users can try a whole different level of interaction but the algorithms must be robust and efficient where the focus should be on gesture recognition.

3) CONTROLLING HOME APPLIANCES
The user-friendly and effortless interaction for appliances is considered as one of the extremely promising fields for researches in the area of smart home and environment. Unlike the traditional interface methods, users in smart environment can control smart appliances via their hand gestures. We can control appliances including tv ,refrigerator ,fans ,lightbulbs etc with this technology

4) GESTURE CONTROLLED CAR DRIVING

Gesture recognition improves driver safety and experience. Gesture control can reduce the usage of touchscreens, making them less diverting, and can accompany voice. For example, drivers can ask a virtual assistant to play a certain music and then, with the rotation of hand can increase or decrease the volume while their eyes stay on the road the entire time without being distracted.

VII.   ADVANTAGES

▢   Gestures provide the user with a new form of interaction that reflect their experience in the real world. With this technology the user can interact with a device without any direct physical contacts. Moreover, they are a more natural form of communication which is effortless.

▢   It is also fast,simple and no training is required.

VIII. DISADVANTAGES

▢   Different users make dt gestures in a different manner causing difficulty in identifying motions.

▢   Many gesture recognition systems do not read motions accurately due to factors such as insufficient background light etc.

IX.   CONCLUSION

Gesture recognition permits humans to connect with the machine and interact naturally lacking any mechanical devices It interprets human gestures and actions via mathematical algorithms. Cameras detect gestures and these systems do various process to interpret them. This technology is very useful in robotics and gaming zone and makes the control more easier. This technology also has vast scope for further improvements in the future.

X. ACKNOWLEDGMENT

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