

Insights- Hand Gesture Recognition System & Future Aspects

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Abstract— Nowadays researchers around the world are actively engaged in development of robust and efficient gesture recognition system, more specially, hand gesture recognition based man-machine interface for various applications. No matter how strong and powerful, we need to be close to machines and working along with them. And that is the prime reason hand gesture has become integral part of non-verbal communication for human beings. Recognition of Gestures helps and enables the humans to interact and communicate with computers and IT devices in a natural way. Hand Gesture can be termed as interactive process of interaction without physical connectivity. The main goal is to interpret and understand Hand gestures through process of Algorithms. Gesture recognition helps in the environment known to be HMI (humans communication with the machine and interact) and that does not include touch of mechanical devices. Techniques such as Image process are at prime and sometimes use of hard ware devices become redundant as moving towards hand gesture recognition. The Literature works include working, types of Gesture Recognition, applications involved and Technology adopted with inclusion of insights on the Future Aspects of Hand Gesture Recognition Systems

Index Terms— Hand Gesture Recognition, Human Computer Interface

I. INTRODUCTION

Interactions nowadays are everywhere and majorly between humans and IT devices using various devices. And to improve the interaction between human, devices and machines in a virtual platform there is automatic gesture recognition. What as communication medium? And there is Gesture which helps in non verbal communication with some suitable commands. We can perform number of gestures at a particular frame of time. A Gesture can be discussed or defines in a broader sense as movement of part of the body, hand or different body parts, it can be a series of actions responding to commands for instance stop, go and move. Specifically hands and face are major providers of that in case of Airport traffic and Road traffics Gesture can be part of traditional and ancient mode of communication. Most of the times it can also be known as movement of limbs for better expression and impression. Nowadays Robotic expression and sign languages have a common base of Gesture and Translation gestures is becoming more vital day by day, there is mechanics ,information technology being packed with gestures and highly adopted in Smartphone technologies, Automobiles, Automation manufacturing.

Gestures help to express a lot. Emblems, Regulators, Adaptors, Metamorphic are certain types of gestures which are into practice. Affect displays include facial expression clubbed with posture focused on emotions. Gestures also include body and object focused. Medical Applications can witness a perfect solution in the practice of Robotics at Homes and Medical institutions avoiding life harming situations like

Strokes, Heart ailments. Perceptual interfaces can also be developed through Gesture Recognition system based on hand lip and smile movements. Gesture recognition systems are also very impactful in usability at homes and offices in case of remote locations and operations, decreasing the dependability on other electronic resources. Hand gesture recognition or the recognition system aims at improving the life quality in all spheres specifically for the disables and reducing the manual labor and moving and performing actions from a distance and without much stress.

II. TECHNOLOGY & HAND GESTURES

The recognition of Gesture is most important widely accepted Technology advancement. There have been commercial and non commercial products through this technology. The Gesture recognition includes different types of gestures that include goodbye gesture by hands and nodding by head.

The computers and IT devices majorly function on detection process followed by track of the object and finally recognizing it .So we can term the model as DTR. And as the technology has advanced the recognition can be experienced on the basis of color, shape and gesture.

So gesture recognition has a close association with software and primary all about software. We always try to make IT devices, computer systems more attractive, attentive and clever.

The IT devices and Computer at first understands the series of fingers and movements, reducing the physical contact between human and humans. The recognition of gesture is valuable in number of interactions and important tool for robots and human interactions.

The sensor technology is at forefront and most of the devices and gadgets come fitted with sensors today to move ahead with gesture recognition. Sensors make the most of the detection and the conversion into signals happen and passing on to devices. And there is no physical contact information between machine and device.

The facial and other body gestures focus more on making the machines to understand the emotions of human

Hand gesture recognition aims at some of the shapes of basic nature by hands. Gestures of hands can be a perfect way to express feelings and transmit message. It involves some applications like languages of signs and are used for various purposes. Aviation industry has a major use for right placing of the aircrafts in the right Bay. Gestures aims a perfect flow communication for disabled persons, through symbolic or sign language of the body and also actions of Gestures can be well noticeable by airhostess.

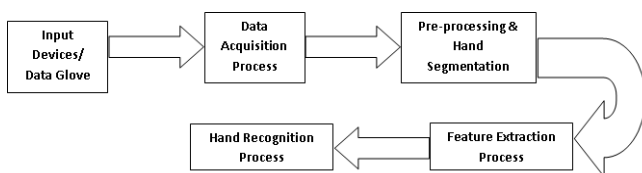
Hand gesture recognition now days termed as natural part of human interaction and is one of the growing fields. It has evolved in a step by step procedure for instance communication between the special and handicapped people has got a fresh lease of life and in the same manner and second

step has roots connected with the artificial intelligence through gesture communication between man and machine

III. SYSTEM ARCHITECTURE

Two types of gesture modes includes at Offline and Online gestures modes where Online Gestures are primarily aimed at rotation of tangible object While Offline Gestures includes the gestures and get involve and processed with object after interaction of user, for instance we say menu activation HGR system involves different types of four phases.

- Data acquisition
- Pre-processing and Hand segmentation
- feature extraction
- Recognition



Generalized System Architecture for Hand Gesture Recognition

Image Processing involves form of processing of signals acting as input and also involves digital image process. Image processing and capturing includes input devices to catch and track different movements and performance and that includes: Stereo cameras, Single camera, and wired gloves.

Technology and Wired gloves provide inputs to the electronic devices such as computers using mechanical tracking devices. It can include optic cables for appropriate hand pose. The Gloves are fitted with hyper sensors for providing the information regarding hand and finger position. In the case of depth aware cameras they can be use of structured lights and there is creation of map or an image and can e use full in the capture of hand gestures. And then there are two lens cameras with two lenses and at one particular time can two pictures and can be help full in 3D representation.

Technology on the basis of vision: Image based models and Model based techniques. Model based techniques involve three dimensional model using hands and in the Image based methodology the gestures are detected by capture of motions of users during gesture process.

Controls and Technology Process: The controller in the gesture capturing process plays an important part, when any gesture is performed; the software tends to capture the body motion. It involves input gesture followed by detection and feeding to the device and the path is followed as conveyed by the gestures. Hand recognition system involves high rate of hand rotation using magnetic devices and it includes the system design and can be termed Architecture design which is followed by Input that includes image, Processing of image hand detection and extraction and tracking and output. The software designing involves gesture recognition and Motion recognition, Analysis, Extraction and Tracking

IV. GESTURE BASED APPLICATIONS

Applications based on Gestures have been classified on the basis of the Multi directional control and second is symbolic language.

3D Design: 2 Dimensional also exist with coming up of 3D but there have been some limitations regarding the motion in the 2 Dimensional .3 D works on lot of dimensions regarding motion recognition. Gesture work in form of inputs that is 3D inputs. The tracking with 3 D application has more appealing interaction and gesture recognition is more convenient with 3D gesture process of interaction. Static gestures and dynamic gestures are the two types of 3d gestures. And both types of gestures are required for a complete 3D gesture interaction.

Tele presence: Intelligence in the technology has some special aims to overcome shortcomings. Tele presence helps in the Technical assistance and intelligence to support the gesture process which includes connecting the operator arm to the Robotic systems and mapping the entire process..As sometimes there are technical failures at the remote locations. It also includes undersea and space missions and Nuclear reactor maintenance

Virtual reality: Virtual reality is the most happening thing now these days and is applicable to couple of simulated computer environment, simulating the physical presence in the reality and imaginary world. The virtual aspect involves lot of sensory process and information and involves primary visual surroundings, with special stereoscopic displays on a computer screen.

Sign Language: One of the best known natural forms in the field of language is Sign language and is also raw in nature. It's been long that sign language has become a part of te human civilization even before the verbal discussions. Now the sign language has taken a special space in the fields of specially disables, armed forces and Air traffic controls. Extremely helpful in road and long distance communication. Gestures can be termed as part of initial forms of communication to express feelings and needs with expressions. Sign language has collaborated IT and Gesture very well through the recognition aspect and its due to sign language that Hand and sign recognition has moved ahead.

Direction and Pointing: It is basically referring the objects or position or location and couple of instructions is involved in understanding the gesture position and recognition, Robotic fields are massively using direction and pointing strategies and applications

V. OPPORTUNIITES & FUTURE INSIGHTS

The Hand Gesture recognition is moving at tremendous speed for the futuristic products and services and major companies are developing technology based on the hand gesture system and that includes companies like Microsoft, Samsung, Sony and it includes the devices like Laptop, Hand held devices, Professional and LED lights. The verticals include where the Gesture technology is and will b e evident are Entertainment, Artificial Intelligence, Education and Medical and Automation fields. And with lot f Research and Development in the field of Gesture Recognition Field, the use and adoption will become more cost effective and cheaper. It's a brilliant feature turning data into features with mix of technology and Human wave. Smart phones have been experiencing

enormous amount of Gesture Recognition Technology with look and views and working to manage the Smartphone in reading, viewing and that includes what we call touch less gestures. Google Glass has been also in the same cadre. And the Technology has also been embedded into smart televisions nowadays as well, which can easily control and managed by Voice and Hand options. In the medical fields Hand Gesture may also be experienced in terms of Robotic Nurse and medical assistance. As the Technology is always revolving and changing the future is quiet unpredictable but we have to be certain the future of Gesture Recognition is here to stay with more and eventful and Life touching experiences.

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