Project ID : PNT2022TMID38774
Team Leader : Vignesh V
Team Members : Tharun Karthick DS
Ragu JS
Ramji R
Project Title : Gesture-based tool for sterile browsing of radiology image

Literature Survey

Paper 1 :

Title	:Gesture Interaction and Evaluation Using the Leap Motion for Medical Visualization.
Author	:Édimo Sousa Silva,Maria Andréia Formico Rodrigues.
Journal	:2015 XVII Symposium on Virtual and Augmented Reality.
Year	:25-28 May 2015
Methodology	:Visualization, Three-dimensional displays ,Solid modeling,Computational modeling, Biomedical imaging, Support vector machines, Usability
Scope	:They conducted to verify important application requirements, among which, the asepsis in the working environment, accuracy of the interaction gestures, interaction time, level of interactivity, naturalness, effectiveness, ease of use and of learning, visual quality of the interface, utility, satisfaction and the non-occurrence of fatigue (physical and mental). The results show the effectiveness of the application in the recognition process of the modeled gestures and a very high level of overall satisfaction of the participants, indicating its strong potential as a touchless support tool in medical tasks guided by radiological images conducted in operating rooms.

Paper 2 :

Title	:Hand Gestures Recognition Using Radar Sensors for Human-Computer-Interaction.
Author	:Shahzad Ahmed, Karam Dad Kallu.
Journal	:Department of Electronic Engineering, Hanyang University, 222 Wangsimini-ro, Seongdong-gu, Seoul 133-791, Korea.
Year	:2 February 2021
Methodology	:Hand-gesture recognition; pulsed radar; continuous-wave radars; human–computer interfaces; deep-learning for radar signals
Scope	:Particularly, variants of CNN have shown promising applicability. Although radar sensors offer several advantages over the other HGR sensors (i.e., wearable sensors and cameras), the adoption of radar-based HGR in our daily lives is still lagging behind these competing technologies. Attention must be paid to miniature hardware development and real-time recognition algorithms' development.

Paper 3 :

Title	:Gesture-Based Human-Machine Interaction: Taxonomy, Problem Definition, and Analysis.
Author	:Alessandro Carfì, Fulvio Mastrogiovanni
Journal	:IEEE Transactions on Cybernetics
Year	:15 December 2021
Methodology	:Robot0s,Taxonomy,Trajectory,Mobile robots,Keyboards,Intelligent systems,Task analysis
Scope	**:** The literature about gestural interaction is not homogeneous, and it is characterized by a lack of shared terminology. They leads to fragmented results and makes it difficult for research activities to build on top of state-of-the-art results and approaches. The analysis in this aims at creating a common conceptual

	design framework to enforce development efforts in gesture-based human-machine interaction (HMI). The main contributions of this article can be summarized as follows: 1) They provide a broad definition for the notion of functional gesture in HMI; 2) They design a flexible and expandable gesture taxonomy; and 3) They put forward a detailed problem statement for gesture-based HMI. Finally, to support our main contribution, this article presents and analyzes 83 most pertinent articles classified on the basis taxonomy and problem statement.

Paper 4 :

Title	:A Transformer-Based Network for Dynamic Hand Gesture Recognition.
Author	:Andrea D'Eusanio; Alessandro Simoni; Stefano Pini; Guido Borghi; Roberto Vezzani; Rita Cucchiara
Journal	:2020 International Conference on 3D Vision (3DV)
Year	:25-28 November 2020
Methodology	:Feature extraction,Computer architecture,Task analysis,Vehicle dynamics,Gesturerecognition,Visualization,Three-dimensional displays
Scope	: They show that the employment of a single active depth sensor, specifically the usage of depth maps and the surface normals estimated from them, achieves state-of-the-art results, overcoming all the methods available in the literature on two automotive datasets, namely NVidia Dynamic Hand Gesture and Briareo. Moreover, They test the method with other data types available with common RGB-D devices, such as infrared and color data. They also assess the performance in terms of inference time and number of parameters.

Paper 5 :

Title	:Real-time hand gesture recognition with EMG using machine learning.
Author	:Andres G. Jaramillo; Marco E. Benalcazar
Journal	:2017 IEEE Second Ecuador Technical Chapters Meeting (ETCM)
Year	:16-20 October 2017
Methodology	:Electromyography,feature extraction,gesture recognition,learning (artificial intelligence),medical signal processing,signal classification,time-frequency analysis
Scope	:The primary goal of this research is to obtain a real-time hand gesture recognition model for various applications in the field of medicine and engineering with a higher recognition accuracy than the real-time models proposed in the scientific literature and a higher number of gestures to recognize (i.e. in the order of the dozens). The proposed model has five stages: acquisition of the EMG signals, preprocessing (e.g., rectification and filtering), feature extraction (e.g., time, frequency and time-frequency), classification (e.g., parametric and nonparametric) and post-processing. Generally, the main difficulties of the hand gesture recognition models with EMG using Machine Learning are: the noisy behavior of EMG signal, and the small number of gestures per person relative to the number of generated data by each gesture (e.i., curse of dimensionality). Solving these two issues could also lead to solutions for other problems such as face recognition and audio recognition, for which these two issues are a major concern.

Paper 6:

Title	:A Comparison of Hardware Based Approaches for Sign Language Gesture Recognition Systems.
Author	:Uzma Farooq; Ayesha Asmat; Mohd Shafry Bin Moh Rahim; Nabeel Sabir Khan; Adnan Abid.
Journal	:2019 International Conference on Innovative Computing (ICIC)
Year	:01-02 November 2019
Methodology	:Sign language recognition
Scope	:The machine is able to understand the gesture performed by a person. Many different approaches involving a variety of hardware including gloves, Microsoft Kinect, and sensors have been used for this purpose. The literature survey reveals that the most significant and advanced work in this regard has been accomplished in American Sign Language (ASL). Whereas, recently noticeable research is being conducted for the development of different Asian sign languages as well. This work presents a study of hardware-based approaches for gesture recognition in ASL and Asian sign languages.