



भारतीय सूचना प्रौद्योगिकी संस्थान उना

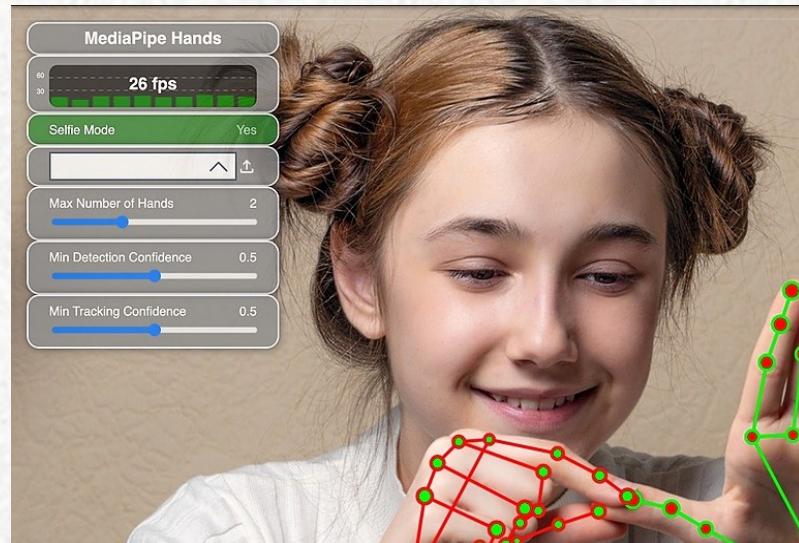
(An Institute Of National Importance Under MoE)

Indian Institute of Information Technology Una

Advanced CV with Python Controlling computer using hand Gestures

Project Phase – 1

Review – II



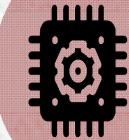
Team Members :-

Divyansh Tak(20210)
Navneet Kumar (20222)
Parvinder Kumar (20228)

Project Guide :-

Dr. Gurpreet Kaur

Thursday, December 22, 2022



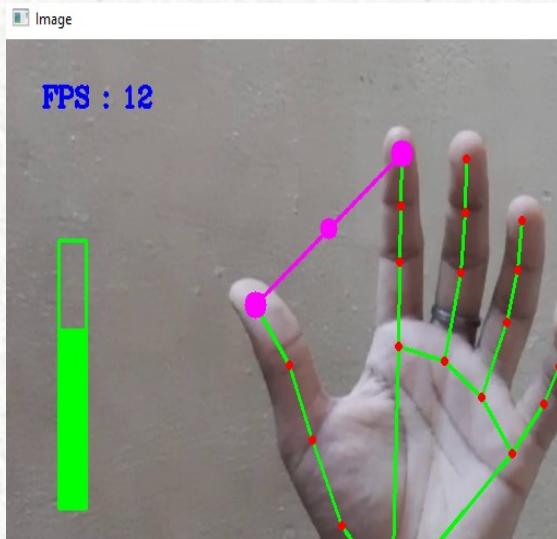
Motivation



- Imagine what would happen if Computers could “see” for themselves, analyze and recognize events happening around them.
- The motivation for using computer vision is **the human vision system which is richest sense that we have** and we want to use it for making virtual touch screen and Games that could help humans in real life.

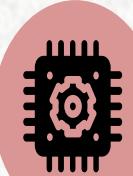
Literature Review

Some Literature Review



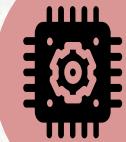
Thursday, December 22, 2022

SL NO.	PUBLICA-TION YEAR	PROPOSED	MERITS
1	Ghotkar, A. S., Khatal, R., Khupase, S., Asati, S., & Hadap, M. (2017)	Hand gesture recognition for Indian Sign Language. 2017 International Conference on Computer Communication and Informatics. In this paper, we introduce a hand gesture recognition system to recognize the alphabets of Indian Sign Language. In our proposed system there are 4 modules: real time hand tracking, hand segmentation, feature extraction and gesture recognition	The first one was a new feature extraction technique, includes the feature of three different existing feature extraction techniques. easy-to-use and inexpensive approach to recognize single handed as well as double handed gestures accurately.
2	Islam, M. R., Mitu, U. K., Bhuiyan, R. A., & Shin, J. (2018). Hand Gesture Feature Extraction Using Deep Convolutional Neural Network for Recognizing American Sign Language.	Interacting with computers, human Hand Gesture Recognition (HGR) is the most significant way and the major part of HCI. Extracting features and detecting hand gesture from inputted color videos is more challenging because of the huge variation in the hands. For resolving this issue, this paper introduces an effective HGR system for low-cost color video using webcam. In this proposed model, Deep Convolutional Neural Network (DCNN) is used for extracting efficient hand features to recognize the American Sign Language (ASL) using hand gestures.	Distinct person hand gesture is used for validation in this paper. The proposed model shows satisfactory performance in terms of classification accuracy, i.e., 94.57%.



Technical Issues

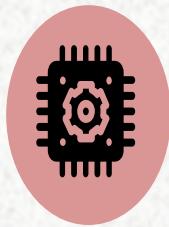
- Problem of constructing dataset for face and recognizing it using PiCam in real-time.
- Open Cv and Mediapipe (processing time series data) library
- Under fitting of Training data.
- Imperfections in Algorithms when data grows.



Objectives



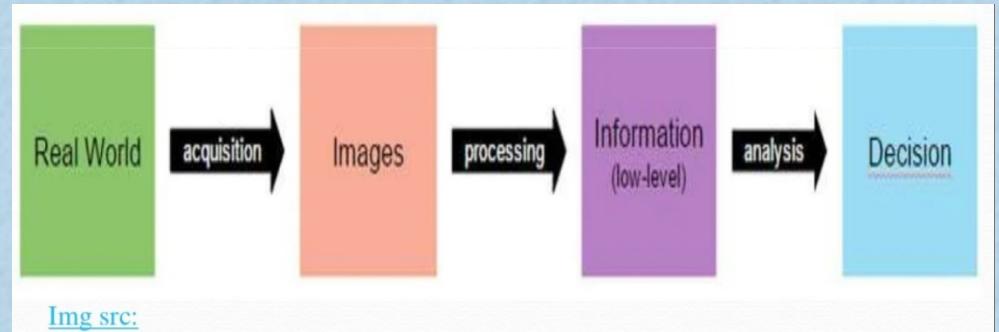
- To make a virtual screen on which we can virtually draw with our fingers and it will display it on our device screen to which the camera is connected
- The detection, segmentation, localization, and recognition of certain objects in images (e.g., Parts of Human body)
- Utilizing latest trends in Machine Learning and OpenCV package.
- Automating the whole process so that we have digital environment.
- Encouraging the use of technology in daily lives.



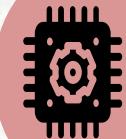
Methodology

Computer Vision emulates human vision using digital images through three main processing components, executed one after the other in the form of pipeline:

1. Image acquisition.
2. Image Processing.
3. Image analysis and understanding.



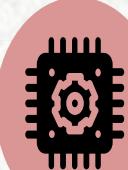
As our human visual understanding of world is reflected in our ability to make decisions through what we see providing such a visual understanding to computers would allow them the same power.



Milestones Completed

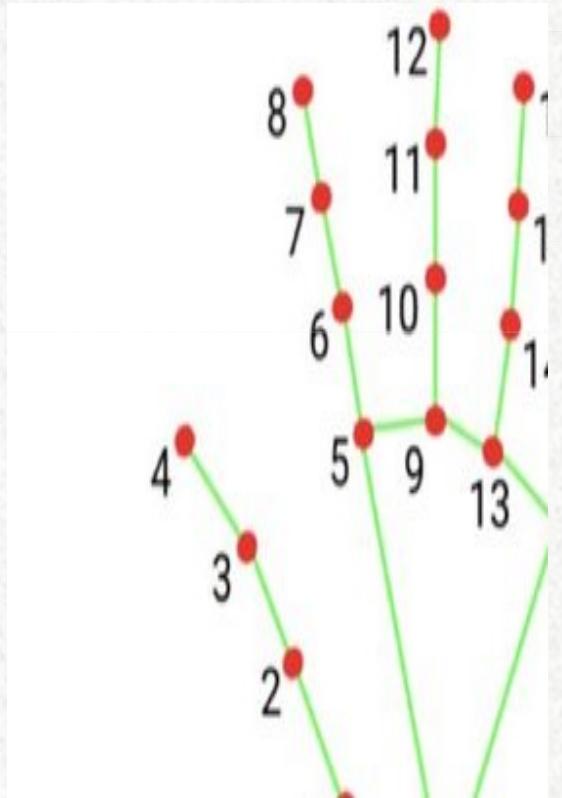


- Week 1 Gathering basic information about the project
- Week 2 Learning about the different systems required to execute the project
- Week 3 Learning Python language and its basic commands
- Week 4 Learning about creation of dataset from Kaggle
- Week 5 Learning some basic Machine learning algorithms.
- Week 6 Applying algorithms in PyCharm.
- Week 7 Applied Hand-Tracking system in Pycharm.
- Week 8 Started learning Pose Elimination Technique in PyCharm.



References

1. F.K.H. Quek, Unencumbered gestural interaction, *IEEE MultiMedia* 3 (1996) 36–47.
2. M. Turk, Gesture recognition, in: K.M. Stanney (Ed.), *Handbook of Virtual Environments: Design, Implementation, and Applications*, Lawrence Erlbaum Associates, Hillsdale, N.J, 2002, pp. 223– 238.
3. S. Lenman, L. Bretzner, B. Thuresson, Using marking menus to develop command sets for computer vision based hand gesture interfaces, in: *NordiCHI '02: Second Nordic Conference on HumanComputer Interaction*, ACM Press, New York, NY, USA, 2002, pp. 239–242.



Thank You

