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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
SCHOOL OF COMPUTING  
1156CS701- MAJOR PROJECT(INHOUSE)  
WINTER SEMESTER 22-23  
REVIEW - II**

# **“HAND GESTURE RECOGNITION USING CNN AND CONTROL VLC MEDIA PLAYER”**

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# AGENDA



- ABSTRACT
- OBJECTIVE
- INTRODUCTION
- LITERATURE REVIEW (SOFT COPY OF PAPERS TO BE LINKED AS HYPERLINK)
- DESIGN AND METHODOLOGIES
- IMPLEMENTATION
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- INPUT AND OUTPUT
- INCLUDE DEMO VIDEO-1 (Till REVIEW-1)
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# ABSTRACT

- Hand gesture recognition systems received great attention in the recent few years because of their manifoldness applications and the ability to interact with machines efficiently through human-computer interaction. Due to the effect of lighting and complex background, most visual hand gesture recognition systems work only under restricted environment.
- With the rapid development of computer vision, the demand for interaction between human and machine is becoming more and more extensive. Since hand gestures are able to express enriched information, the hand gesture recognition is widely used in robot control, intelligent furniture and other aspects.
- One of the technical possibilities to implement hand gesture detection systems is to use the vision-based approach. The dataset uses all the required gestures. With all the features, an OpenCV and keras a hand gesture prediction model is built. The validation results indicate the precision and accuracy of the proposed model. The model is then used for controlling the VLC media player.



# OBJECTIVES

## **Aim:**

Hand Gesture is one of the major factors in our communication society. There are lot of Sign languages that are actively present in the world. So we can't able to classify the action easily. So this project can easily classify the hand gesture which is used to control the VLC media player.

## **Scope of the Project:**

Hand Gesture images are collected. We have to train the machine to classify the types of gesture. This project contains different types of gesture like ThumbsUp, Thumbsdown, etc. We train to teach the machine to achieve the accuracy and get the possible outcome. Accessing VLC media player with the gesture.



# INTRODUCTION

- Hand gestures are an important part of nonverbal communication and form an integral part of our interactions with the environment. Notably, sign language is a set of hand gestures that is valuable to millions of disabled people. However, deaf/dumb users experience difficulty in communicating with the outside world as most neither understand nor can use sign language.
- Gesture recognition and classification platforms can aid in translating the gestures to those who do not understand sign language. There are two major approaches in the classification of hand gestures.
- The first approach is the vision-based approach. This involves the use of cameras to acquire the pose and movement of the hand and algorithms to process the recorded images. Although this approach is popular, it is very computationally intensive, as images or videos have to undergo significant preprocessing to segment features such as the image's color, pixel values, and shape of hand.



# LITERATURE REVIEW

- TITLE : 3D-CNN based Dynamic Gesture Recognition for Indian Sign Language Modeling
- AUTHORS: Dushyant Kumar Singh
- PUBLISHER: Elsevier B.V
- YEAR: 2021
- ADVANTAGES: The base 3DCNN architecture is used for analyzing the modeling exercise for these dynamic gestures. Experimentation outcomes justifies the model performance with a good accuracy values achieved.
- DESCRIPTION: In this paper, they have used a 3-dimensional convolutional based Convolution Neural Network to model the most utilized gestures of the Indian community. The trained model can provide a natural language output corresponding to the signs of the ISL.



# LITERATURE REVIEW

- **TITLE:** How does hand gestures in videos impact social media engagement - Insights based on deep learning
- **AUTHORS:** Kartik Anand, Siddhaling Urolagin, Ram Krishn Mishra
- **PUBLISHER:** Elsevier
- **YEAR:** 2021
- **ADVANTAGES:** The vision-based methodology was researched in the accompanying investigations including, the recognition and order of hand signals. This method can be considered the most practical option as this avoids the usage of additional equipment.
- **DESCRIPTION:** Here they propose a technique based on deep learning, Convolutional Neural Network (CNN), to recognize hand gestures from a video or image input. ResNeXt-101 model is used for the classification of hand gestures.



# LITERATURE REVIEW

- **TITLE:** A Deep Convolutional Neural Network Approach for Static Hand Gesture Recognition
- **AUTHORS:** Adithya V, Rajesh R
- **PUBLISHER:** Elsevier B.V
- **YEAR:** 2020
- **ADVANTAGES:** The method has been tested on two publicly available datasets (NUS hand posture dataset and American fingerspelling A dataset) and achieved better recognition accuracies.
- **DESCRIPTION:** This paper proposes a methodology for the recognition of hand gestures, which is the prime component in sign language vocabulary, based on an efficient deep convolutional neural network (CNN) architecture.





# LITERATURE REVIEW

- TITLE: Hand Gesture Recognition Using CNN for Post-Stroke People
- AUTHORS: Norah Alnaim, Abdulrahman Albar, Maysam Abbod
- PUBLISHER: Maysam Abbod
- YEAR: 2019
- ADVANTAGES: Results show that testing accuracy is 99% using CNN and is an effective technique in extracting distinct features and classifying data.
- DESCRIPTION: Hand gesture recognition is not only useful for people who are hearing impaired or disabled but also for the people who experienced a stroke, as they need to communicate with other people using different common essential gestures such as the sign of eating, drink, family and, more. In this paper, an approach for recognizing hand gesture based on Convolutional Neural Network (CNN) is proposed.



# LITERATURE REVIEW

- **TITLE:** Static Hand Gesture Recognition using Convolutional Neural Network with Data Augmentation
- **AUTHORS:** Md Zahirul Islam, Mohammad Shahadat Hossain, Raihan Ul Islam, Karl Andersson
- **YEAR:** 2018
- **ADVANTAGES:** The model with augmented data achieved accuracy 97.12% which is nearly 4% higher than the model without augmentation (92.87%).
- **DESCRIPTION:** Since, CNN can learn complex and non-linear relationships among images, in this paper, a static hand gesture recognition method using CNN was proposed.



# DESIGN AND METHODOLOGIES

- MODULE 1

## **Data Preparation**

- MODULE 2

## **Implementing CNN architecture**

- MODULE 3

## **Prediction of Hand Gesture**

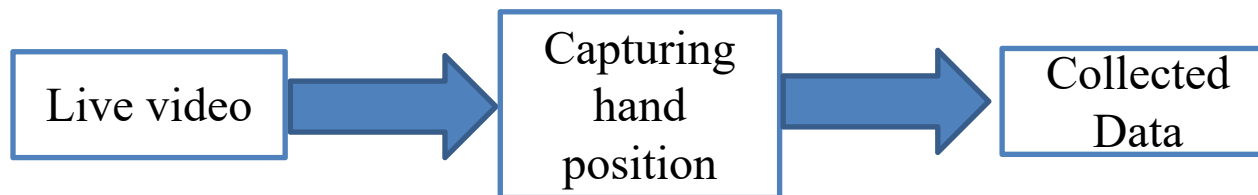
# MODULE:1



## 1. Data Preparation

The dataset collection is the very important part of our project. The collection of the dataset is based on the hand posture. Using open CV we can access the live videos. With the help of open CV we record the videos frame by frame. First we record the videos one by one. And save the hand position data as a image in a folder. We repeat this process for the gestures which are needed for us.

### MODULE DIAGRAM:





## DATASET PREPARATION

```
In [ ]: import cv2
from cvzone.HandTrackingModule import HandDetector
import numpy as np
import math
import time

cap = cv2.VideoCapture(0)
detector = HandDetector(maxHands=1)

offset = 20
imgSize = 300

folder = "data/Test/Three"
counter = 0

while True:
    success, img = cap.read()
    hands, img = detector.findHands(img)
    try:
        if hands:
            hand = hands[0]
            x, y, w, h = hand['bbox']

            imgWhite = np.ones((imgSize, imgSize, 3), np.uint8) * 255
            imgCrop = img[y - offset:y + h + offset, x - offset:x + w + offset]
```



# MODULE:2

## 2.Implementing CNN architecture :



- A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.
- The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics.
- The architecture of a ConvNet is analogous to that of the connectivity pattern of Neurons in the Human Brain and was inspired by the organization of the Visual Cortex. Individual neurons respond to stimuli only in a restricted region of the visual field known as the Receptive Field.



# MODULE:3

## 3.Prediction of Hand Gesture:

After training the model we have to use the trained model to use for deployment. In this deployment model we use opencv to access the live video. It capture the videos and it will help to recognize the pattern and make it sequential data and those recognized data will flow through our trained model. Finally the model will predict the gesture and it will display the text based on the sign gesture.

### Module Diagram:



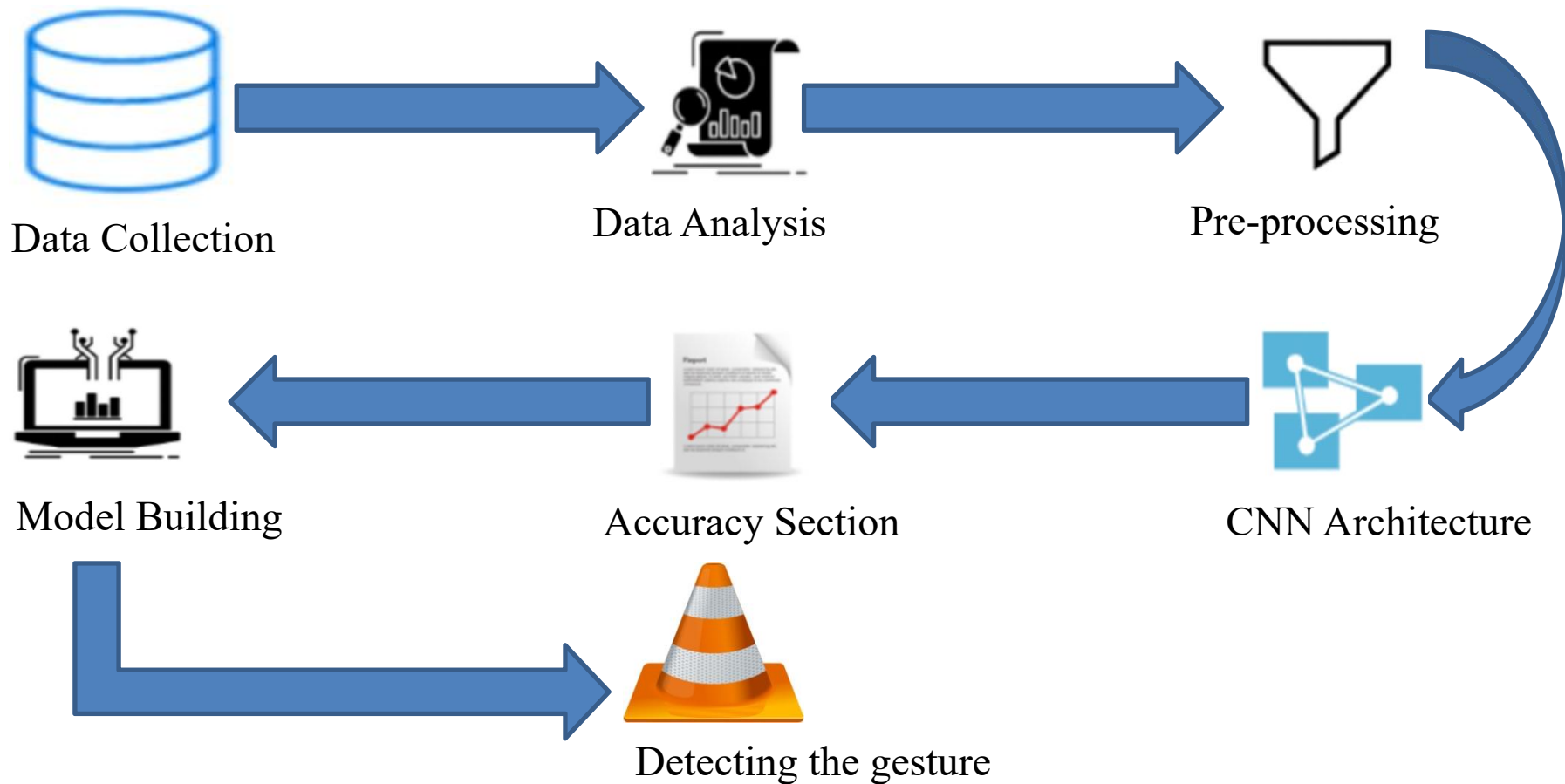


# IMPLEMENTATION

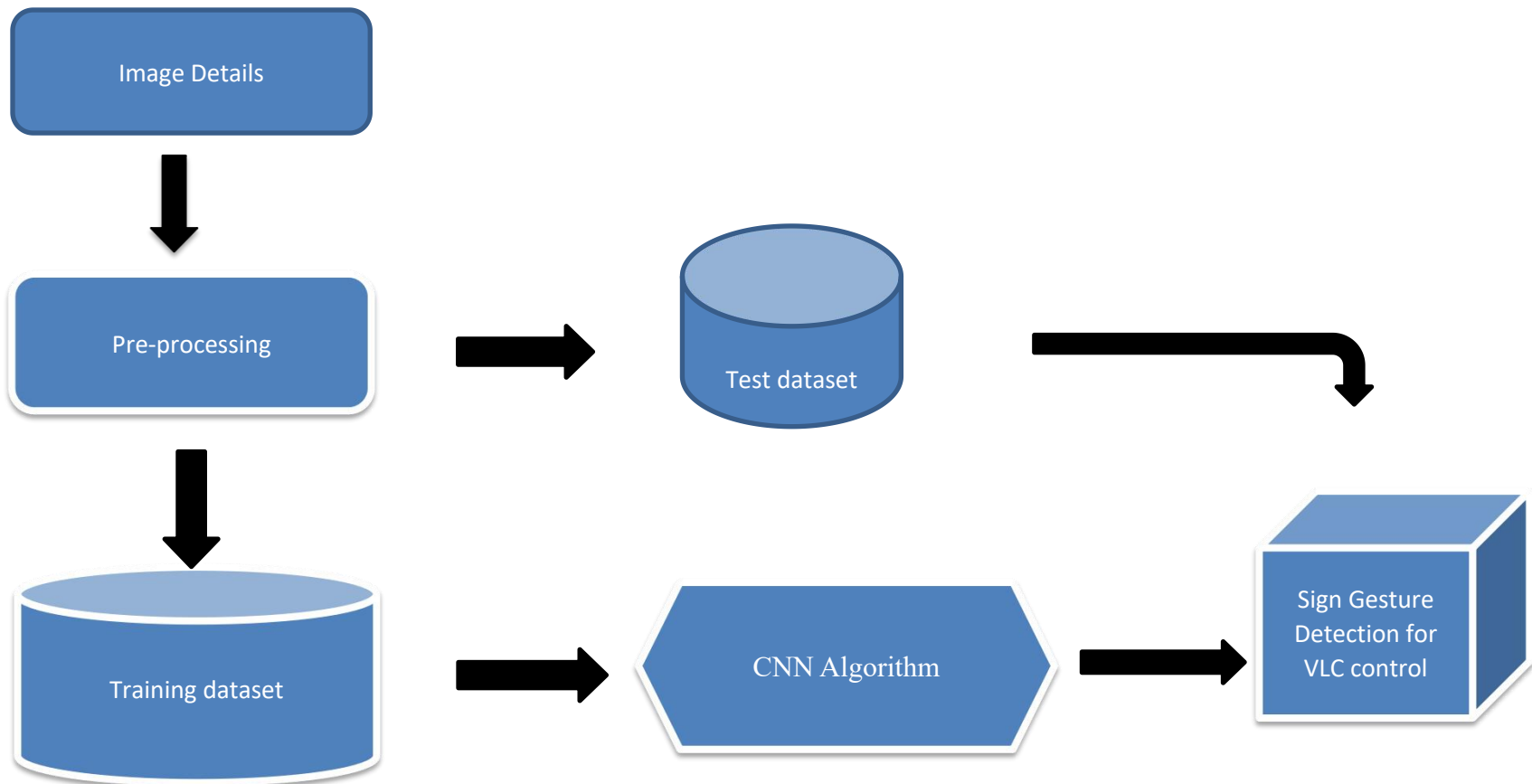
- ARCHITECTURE DIAGRAM
- DATA FLOW DIAGRAM
- ER DIAGRAM
- SEQUENCE DIAGRAM
- COLLABORATION DIAGRAM



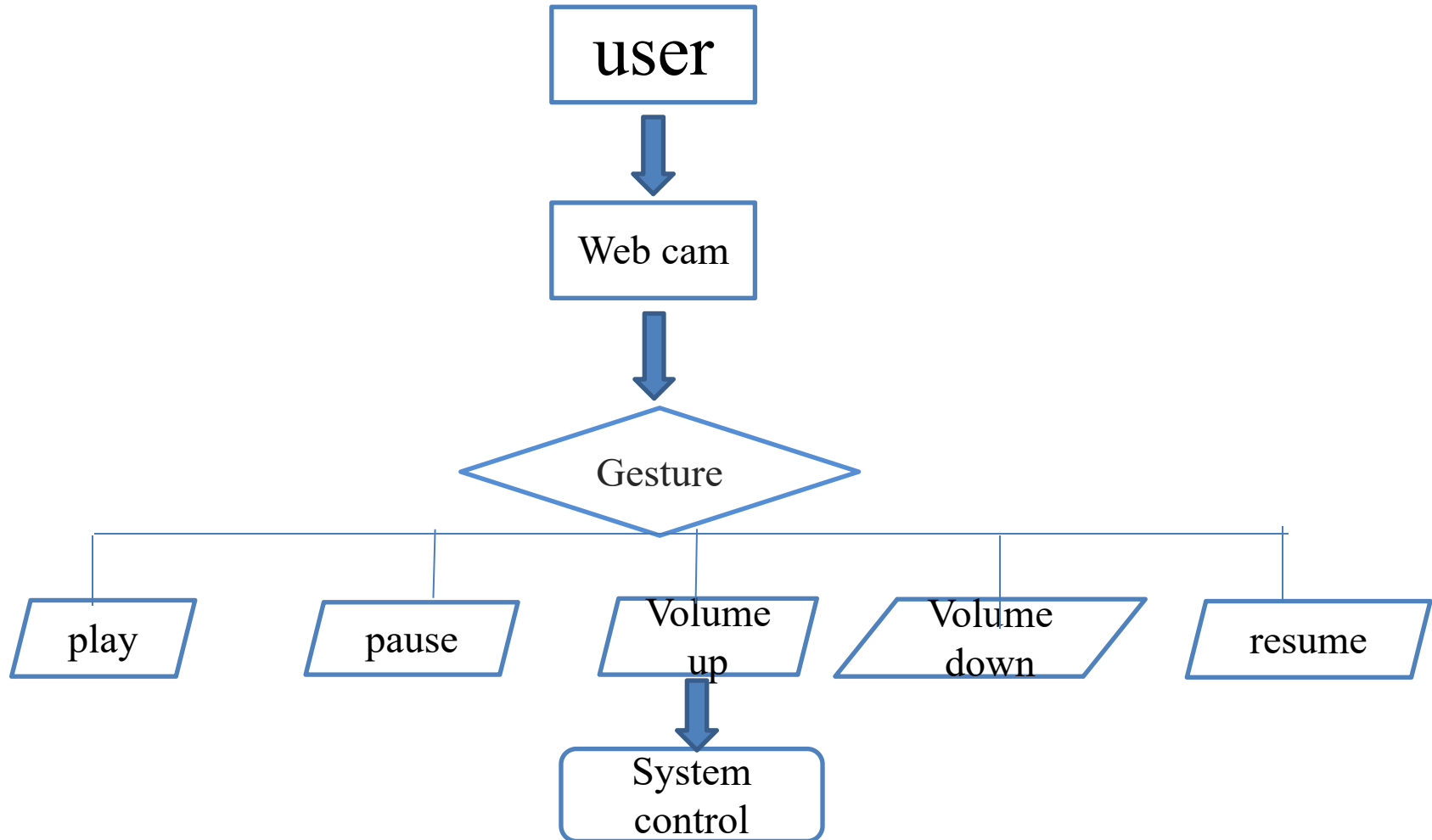
# ARCHITECTURE DIAGRAM



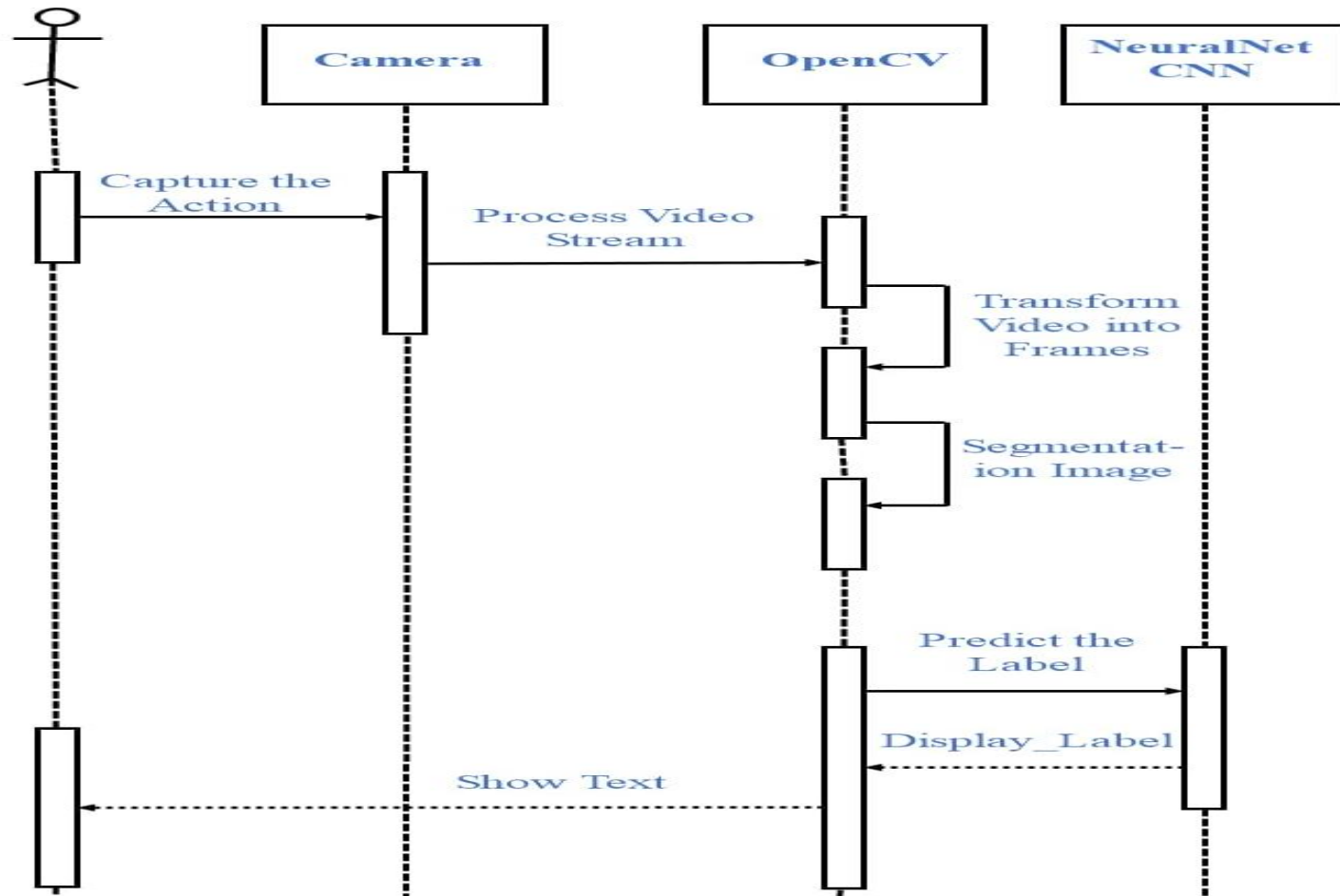
# DATA FLOW DIAGRAM



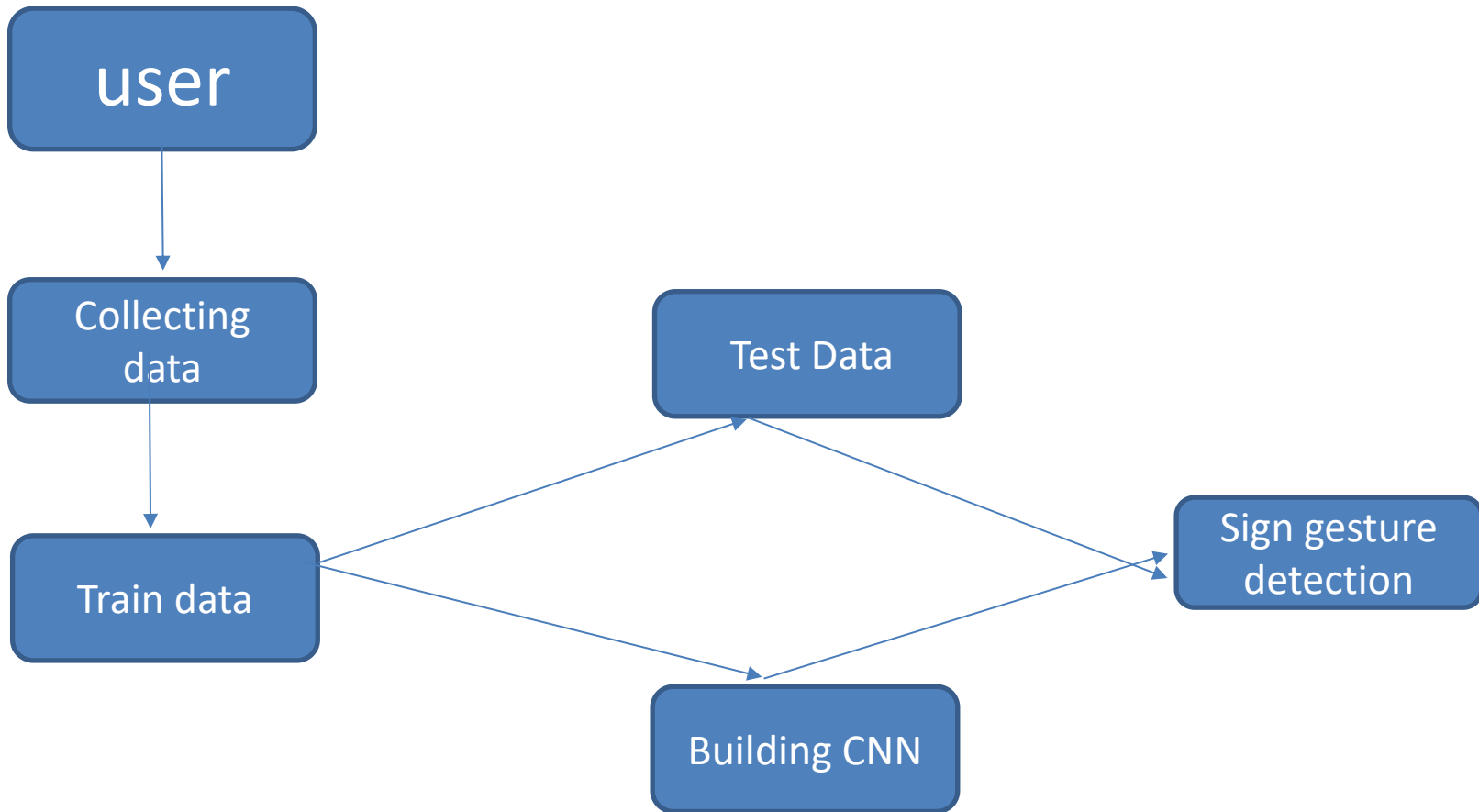
# ER DIAGRAM



# SEQUENCE DIAGRAM



# COLLABORATION DIAGRAM



# INPUT AND OUTPUT SCREENSHOTS





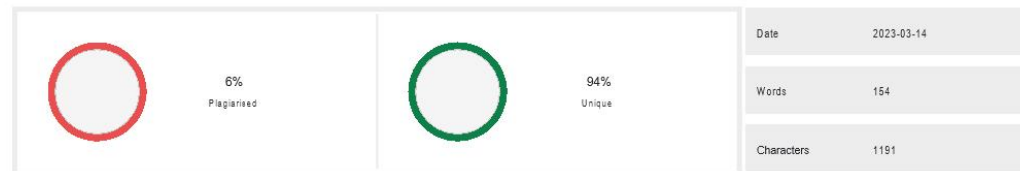
# CONCLUSION

- It focused how image from given dataset (trained dataset) in field and past data set used predict the pattern of different gesture using NN model. This brings some of the following different live sign prediction.
- We applied NN where the accuracy and loss of the neural network makes better classification and the .h5 file is taken from there and that is deployed in real time.
- The .h5 model is used to detect the hand gesture and the gesture is used to control the VLC media player.

# PLAGIARISM REPORT



## PLAGIARISM SCAN REPORT



## Content Checked For Plagiarism

Hand gesture recognition systems received great attention in the recent few years because of their manifoldness applications and the ability to interact with machines efficiently through human-computer interaction.

Due to the effect of lighting and complex background, most visual hand gesture recognition systems work only under restricted environment.

With the rapid development of computer vision, the demand for interaction between human and machine is becoming more and more extensive. Since hand gestures are able to express enriched information, the hand gesture recognition is widely used in robot control, intelligent furniture and other aspects. One of the technical possibilities to implement hand gesture detection systems is to use the vision-based approach. The dataset uses all the required gestures. With all the features, an OpenCV and keras a hand gesture prediction model is built. The validation results indicate the precision and accuracy of the proposed model. The model is then used for controlling the VLC media player.

249 words English (India) Accessibility: Investigate



Search



ENG  
IN







## REFERENCES(as per IEEE format only)

- Perimal, M.; Basah, S.N.; Safar, M.J.A.; Yazid, H. Hand-Gesture Recognition-Algorithm based on Finger Counting. J. Telecommun. Electron. Comput. Eng. 2023, 10, 19–24.
- Chen, Q.; Georganas, N.D.; Petriu, E.M. Real-time vision-based hand gesture recognition using haar-likefeatures. In Proceedings of the 2007 IEEE instrumentation & measurement technology conference IMTC2022, Warsaw, Poland, 1–3 May 2022; pp. 1–6.
- Kulkarni, V.S.; Lokhande, S.D. Appearance based recognition of american sign language using gesturesegmentation. Int. J. Comput. Sci. Eng. 2022, 2, 560–565.51.
- Fang, Y.; Wang, K.; Cheng, J.; Lu, H. A real-time hand gesture recognition method. In Proceedings of the 2021 IEEE International Conference on Multimedia and Expo, Beijing, China, 2–5 July 2021; pp. 995–998.



## REFERENCES(as per IEEE format only)

- Han, D.; Liu, Q.; Fan, W. A new image classification method using CNN transfer learning and web data augmentation. ExpertSyst. Appl. 2020, 95, 43–56. [CrossRef].
- Akcay, S.; Kundegorski, M.E.; Willcocks, C.G.; Breckon, T.P. Using Deep Convolutional Neural Network Architectures for ObjectClassification and Detection Within X-Ray Baggage Security Imagery. IEEE Trans. Inf. Forensics Secur. 2020, 13, 2203–2215.[CrossRef]
- Fang, L.; Liang, N.; Kang, W.; Wang, Z.; Feng, D.D. Real-time hand posture recognition using hand geometric features and fishervector. Signal Process. Image Commun. 2020, 82, 115729. [CrossRef]
- Barbhuiya, A.A.; Karsh, R.K.; Jain, R. CNN based feature extraction and classification for sign language. Multimed. Tools Appl.2021, 80, 3051–3069. [CrossRef]