Low Level Design Document (LLDD)

Face Mask Wear Detection

Revision Number: 1.0
Last date of revision:26/06/2022
Architecture Document

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Document Version Control

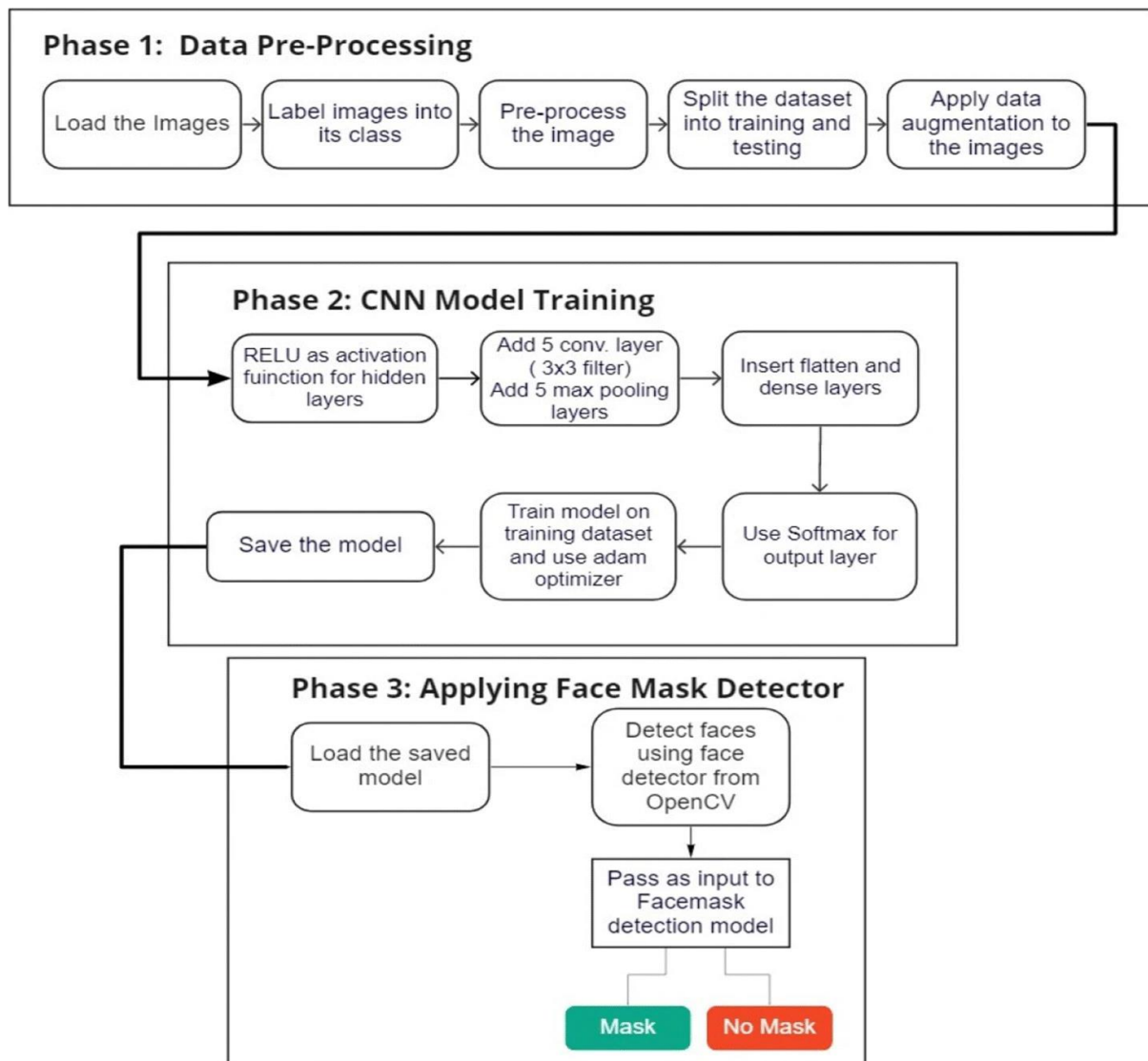| Date Issued	version	Description	Programmed By
26/06/2022	1	Initial HLD-V1.0	Shashank Singh

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1 Introduction

1.1 What is Low-Level design document?

The goal of LLD or a low-level design document (LLDD) is to give the internal logical design of the actual program code for Food Recommendation System. LLD describes the class diagrams with themethods and relations between classes and program specs. It describes the modules so that the programmer can directly code the program from the document.

1.2 Scope

Low-level design (LLD) is a component-level design process that follows a step-by-step refinement process. This process can be used for designing data structures, required softwarearchitecture, source code and ultimately, performance algorithms. Overall, the data organization may be defined during requirement analysis and then refined during data design work

2. Architecture

Phase 1: Data Pre-Processing

Load the Images → Label images into its class → Pre-process the image → Split the dataset into training and testing → Apply data augmentation to the images

Phase 2: CNN Model Training

RELU as activation fuinction for hidden layers → Add 5 conv. layer (3x3 filter) Add 5 max pooling layers → Insert flatten and dense layers

Save the model ← Train model on training dataset and use adam optimizer ← Use Softmax for output layer

Phase 3: Applying Face Mask Detector

Load the saved model → Detect faces using face detector from OpenCV → Pass as input to Facemask detection model

Mask | No Mask

3. Architecture Description

3.1 Data Description

Dataset are in form of image (human face) The image contains is separated in two mask or without mask image. This dataset contains 30 images.

3.2 Web Scrapping

In order to create a better software, we need retrain by collection more image which is less than 200 we will need some more datasets which is human face with or without mask.

3.3 Data Transformation

In the Transformation Process, we will convert our original dataset png or any other img format into jpg format and include with dataset

3.4 Data Insertion

Run Streamlit application using terminal to start connection in local host .

3.5 Export Data

Data Export from local device - The data is upload to be used forData Pre-processing and Model Training.

3.6 Data Pre-processing

Data Pre-processing steps we could use are Null value handling, stop words removal, punctuation removal, Tokenization, Lemmatization, TFIDF, Imbalanced data set handling, Handling columns withstandard deviation zero or below a threshold, etc.

3.7 Data Visualization
Data visualization is the process of transforming abstract data to meaningful representations using knowledge communication and insight discovery through encodings. It is helpful to study a particular pattern in the dataset [7].The total number of images in the dataset is visualized in both categories – 'with mask' and 'without mask'.

3.8 Conversion of rgb image to gray image

Modern descriptor-based image recognition systems regularly work on grayscale images, without elaborating the method used to convert from color-to-grayscale. This is because the color-to-grayscale method is of little consequence when using robust descriptors. Introducing nonessential information could increase the size of training data required to achieve good performance.

3.9 Data from User

Here we will collect data like Image with or without mask

3.10. Data Validation

Here Data Validation will be done, given by the user

3.11 User Data Inserting

After selecting option from panel for 1. Image needs to upload image to process image for detection whether person wear a mask or not, 2. Web cam detecting face in real time.