LOW LEVEL DESIGN AND IMPLEMENTATION DOCUMENT

DETECTION OF CYBER BULLYING IN IMAGES

UE17CS490B – Capstone Project Phase – 2

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January - May 2021

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1.Introduction

1.1. Overview

Low Level Design in short LLD is like detailing HLD means it refers to component-level design process. It describes detailed description of each and every module means it includes actual logic for every system component and it goes deep into each modules specification.Our model is Cyber bullying Image classification model and in our model we have used mobilenetV2 as our pre-trained model for our dataset and tuned it accordingly for our classification model.

1.2. Purpose

It provides the details and definitions for the actual logic for every system component. It is based on HLD but digs deeper, going into the separate modules and features for every program in order to document their specifications.

2. Design Constraints, Assumptions, and Dependencies

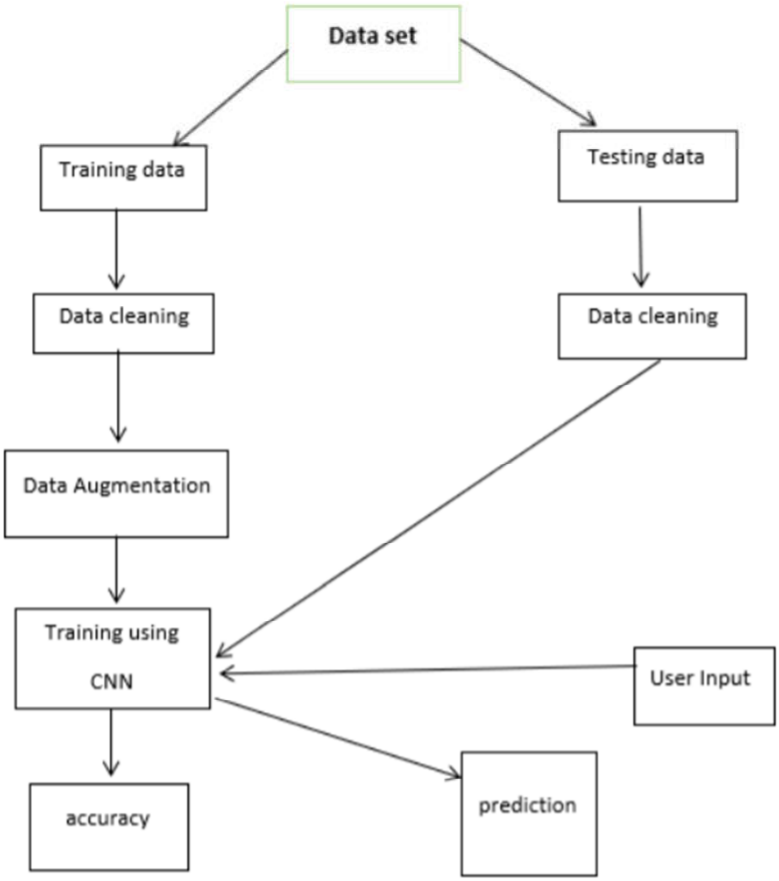
Dependencies:

- Tensorflow
- Keras
- Layers from tensorflow.keras
- Preprocessing.image from tensorflow.keras
- ImageDataGenerator from keras
- MobilenetV2 pre-trained network

3. Design Description

Firstly we import all the modules mentioned above in the dependencies section,and since we require different kinds of image to train our model image data augmentation which is a technique that can be used to artificially expand the size of a training dataset by creating modified versions of images in the dataset in order to improve the performance and ability of the model to generalize.For augmentation we have used Keras ImageDataGenerator which lets us augment images in real-time while model is still training.

3.1 Master Class Diagram



3.2 Module 1

3.2.1 Description

User Interface: CyberBullying Image Classification website uses Flask which is a web framework for Python,it provides functionality for building web applications, including managing HTTP requests and rendering templates.Here Flask is used to render templates such as index.html and classification.html

Augmentation: Image data augmentation is a technique that can be used to artificially expand the size of a training dataset by creating modified versions of

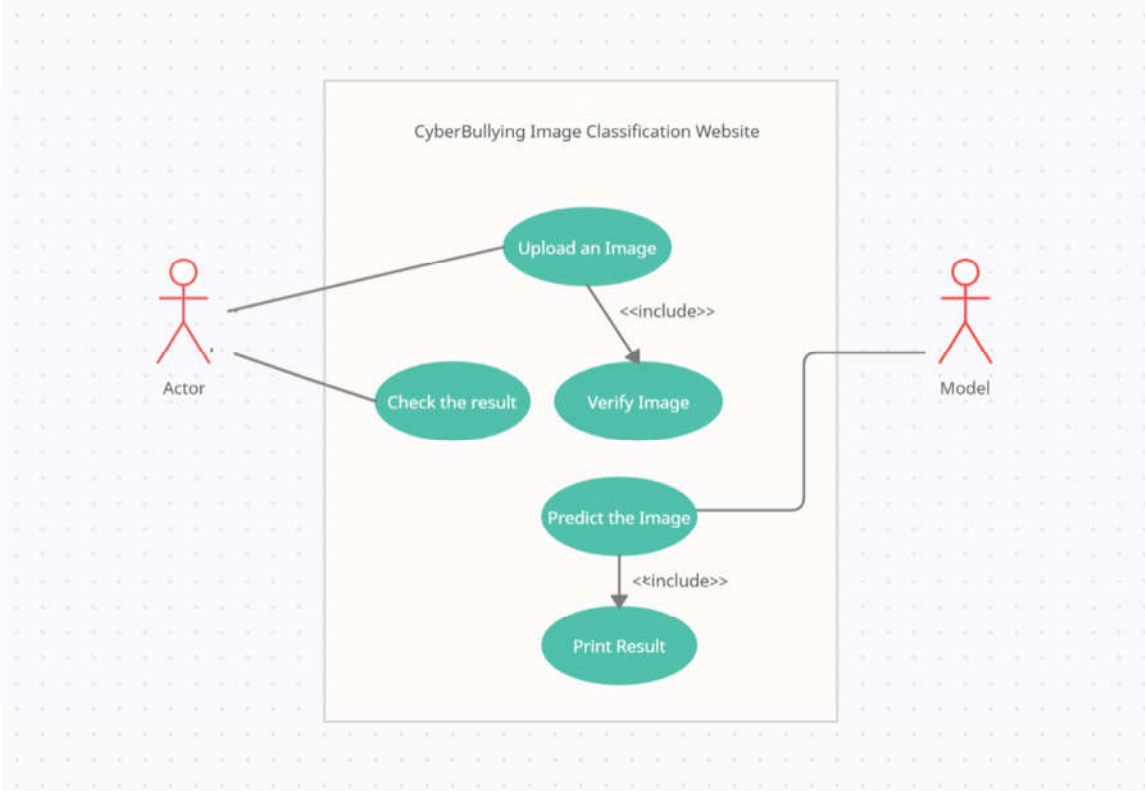
images in the dataset.Here Image data augmentation is supported in the Keras deep learning library using ImageDataGenerator class.The images that are obtained after augmentation are used for training the model.

Classification Model:

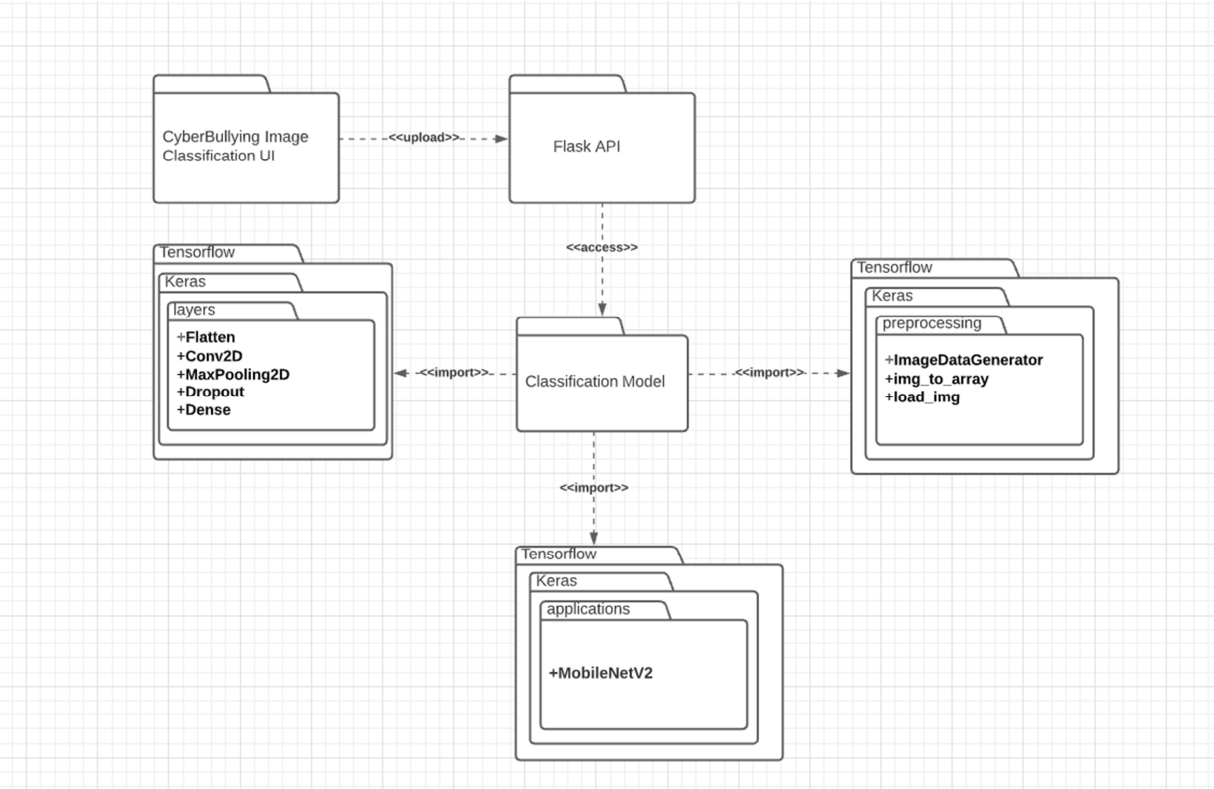
To design our model we have one of the most important library of deep learning model i.e Tensorflow. TensorFlow is a free and open-source software library for machine learning. It can be used across a range of tasks but has a particular focus on training and inference of deep neural networks. We have also used Keras, which is a high-level API that is built on top of TensorFlow. It is extremely user-friendly and easier. We have imported modules from tensorflow.keras.layers such as Flatten Conv2D,MaxPooling2D,Dropout,Denseand from tensorflow.keras preprocessing.image such as ImageDataGenerator, img_to_array , load_img.

We have used pre-trained model called as MobileNetV2,which is a CNN architecture model for Image Classification. It takes very less computation power to run or apply transfer learning to.It is also best suited for web browsers as browsers have limitation over computation,graphic processing and storage.By setting Batch size to 16 and by varying the epochs we are building a model with best accuracy to classify the image into Bullying or Non-Bullying.

3.2.2 Use Case Diagram



3.2.3 Packaging and Deployment Diagrams



Appendix A: Definitions, Acronyms and Abbreviations

CNN- Convolutional Neural Network
HLD- High Level Design
API- Application Programming Interface
UI- User Interface

Appendix B: References

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