HIGH LEVEL DESIGN DOCUMENT

DETECTION OF CYBER BULLYING IN IMAGES

UE17CS490A – Capstone Project Phase – 1

Submitted by:

Madineni Sruthi	**PES1201700051**
Meghana Nayak	**PES1201701339**
Rachana H S	**PES1201701726**

Under the guidance of

Prof. Aruna S
Assistant Professor
PES University

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
FACULTY OF ENGINEERING
PES UNIVERSITY
(Established under Karnataka Act No. 16 of 2013)
100ft Ring Road, Bengaluru – 560 085, Karnataka, India

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1. Introduction

The high level design for our project includes the following-

1)Preprocessing of the bullied and non-bullied images(Specifically resizing).

2)Augmentation of the images.

3)Training a CNN model to do the classification.

4)Building UI to show the above classification implemented.

2. Current System

A large portion of the current examinations have regular AI models and most of the created models in these investigations are versatile to a solitary informal community at once. Profound learning based models have discovered their way in the identification of digital harassing episodes, asserting that they can defeat the confinements of the traditional models, and improve the discovery execution. However, numerous old school models are accessible to control the incident, the need to viably arrange the tormenting is as yet weak. To successfully screen the harassing in the virtual space and to stop the dangerous consequence with the execution of Machine learning and Language handling. The parameters required are muddled to adjust and can be sometimes difficult to understand when bullied confusingly.

Literature survey on the topic was carried out and it was observed that most of them are text classification. Various ML algorithms where used to classify the same and a good accuracy has been achieved. In recent years there have been many researchers who are interested in cyberbullying detection on images. Here few works have been done using available feature extraction techniques and classification is done using ML and DL algorithms.

3. Design Considerations

3.1. Design Goals

A system is proposed to give a double characterization of cyberbullying. Our technique utilizes an inventive idea of CNN for content examination. Anyway the current strategies utilize a guileless way to deal with furnish the arrangement with less precision. A current dataset is utilized for experimentation and our system is proposed with other existing methods and is found to give better precision and grouping.

3.2. Architecture Choices

An alternate choice of feature extraction was considered but we feel our approach is better of because-

a) Selection of the type of feature extraction is very important and selected feature extracter may not work well with the all the images.

b) We need to do various trial and error method to get a good feature extractor to get a better accuracy. This might also involve combining different feature extraction technique and varifying the result.

3.3. Constraints, Assumptions and Dependencies

System Constraints-

Requires a high GPU memory since a lot of images have to be trained to have a better classification model.A high GPU memory affects the easy run on the local system and requires dependency on platforms like Google Colab.

Software Dependencies-

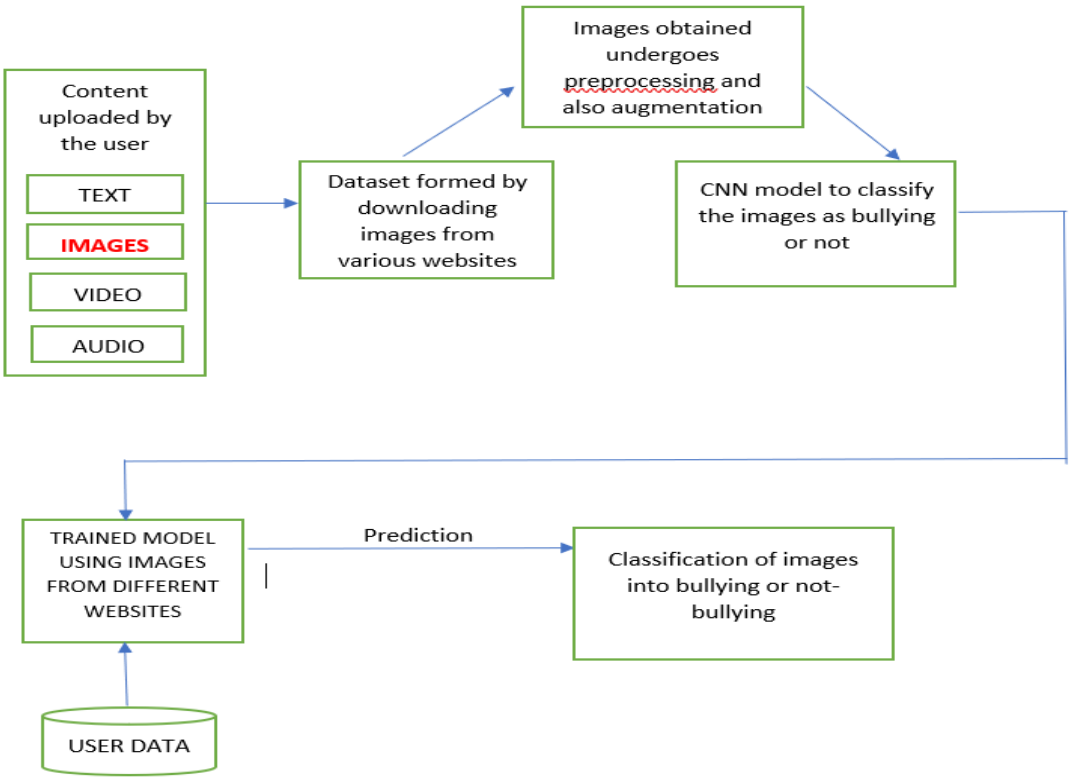
- Technologies: Python ,TensorFlow, scikit learn
- Tools: GPU by Google Colab , Anaconda Navigator
- Google Drive , Google Colab
- Web Development: HTML, JavaScript

Hardware Dependencies-

- Working PC
- RAM size > 8GB
- Internet connection

4. High Level System Design

The high level design for our cyberbullying detection model is given below-



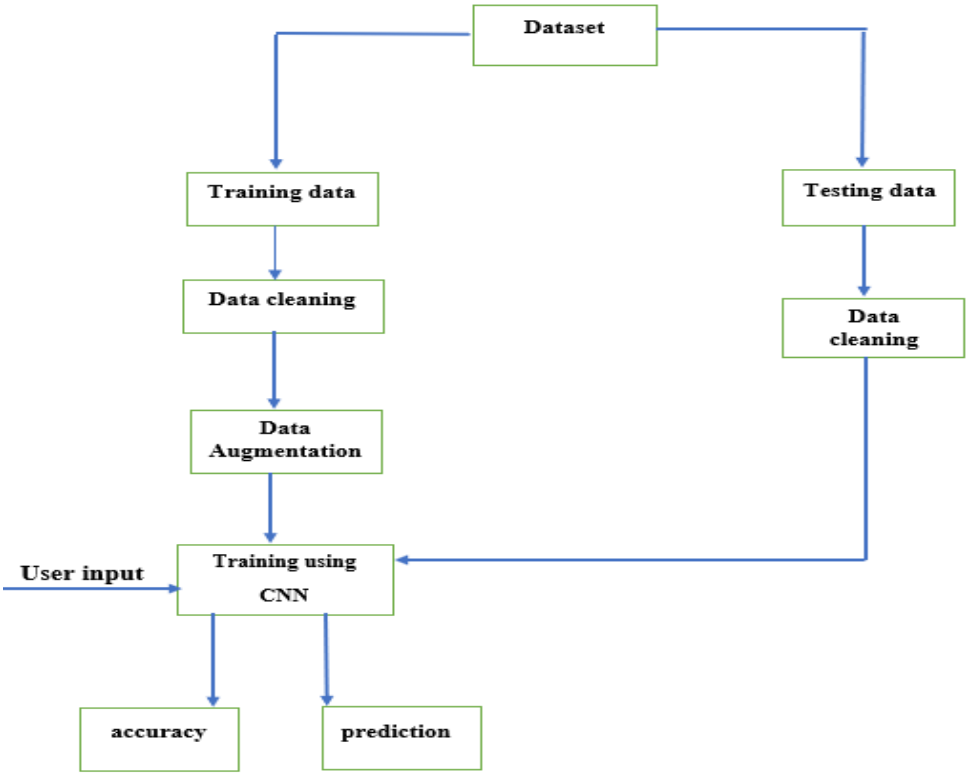
User class and its characteristics-

- On the negative side, social media increase the risk of children being confronted with threatening situations including grooming or sexually transgressive behaviour, signals of depression and suicidal thoughts, and cyberbullying. So our application can help these students by warning them the presence of such content in the sites which they are browsing.

- Our application can also be used in Schools to prevent accessing of the websites which contains bullying content.
- Crime investigation/Police department can also use our application so that they can take action in spreading of such content and affecting the daily livelihood of people specially teenagers.

5. Design Description

5.1. Master Class Diagram



5.2. Reusability Considerations

Project Components that is generated with available reusable components are :

- The dataset contains set of bullying and non-bullying images which is downloaded using chrome extension from various websites as there was no available dataset for the same.

Project Components that is built for the reuse in the project-

- A Convolution Neural Network is built from scratch for classification of the images.

6. User Interface Diagrams

UI is made which when given any image tells whether its bullying or not using the underlying CNN model.

7. External Interfaces

This model when integrated with public websites may not work well since we know that images can be present in the web in different forms and integrating the designed model wont be able to classify the images well.This might also increase the turn around time.

8. Help

A detailed literature survey helped us knowing all kinds of previous work and future works possible for this topic. Tenserflow and scikit learn documentation are also referred for the coding part.

9. Design Details

9.1. Novelty

People generally lack knowledge about how websites contain disturbing images that are proned to bullying without knowingly they continue referring the website which may gradually cause problems related to mental health. Considering all of this, our project will be an efficient system which guides the users about type of images that are classified as bullying.

9.2. Innovativeness

Most of the works done were targeting detection of cyberbullying in text evn though when they consider images they consider the caption or comments under the image for detection. Our project is unique as it completely concentrates on the content of image.It will serve the purpose of social good as it helps people(users) by not getting affected by bullying.

9.3. Performance

Our system will be capable of classifying images and warn users about the bullying in the image and helps in user not getting affected because of bullying

Appendix A: Definitions, Acronyms and Abbreviations–

CNN-Convolutional Neural Network,a deep learning model.

Appendix B: References

1)Document Embedding Generation for Cyber-Aggressive Comment Detection using Supervised Machine Learning Approach , Shylaja S S, Abhishek Narayanan , Abhijith Venugopal ,Abhishek Prasad

2)A Framework for Cyberbullying Detection in Social Network, Krishna B. Kansara and Narendra M. Shekokar

3) LLM and BOVW Models for Adult Image Classification and Filtering, Thomas Deselaers and Lexi Pimenidis and Hermann Ney

4) Image Retrieval by Bag of Visual Words and Color Information, N. Mansoori, M. Nejati, P. Razzaghi and S. Samavi

5) Image analysis of cyberbullying using machine learning techniques Hao Li(2016)

6) Introduction to the special issue on deep learning for real-time information hiding and forensics, Zhili Zhou1, Ching-Nung Yang2, Cheonshik Kim3, Stelvio Cimato4