International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 6, Issue 12, ISSN No. 2455-2143, Pages 185-188
Published Online March 2022 in IJEAST (http://www.ijeast.com)

REAL-TIME EXPLICIT IMAGE FILTERING USING CONVOLUTIONAL NEURAL NETWORKS

Akashkumar Gupta, Anubha Gajargaonkar, Krutika Rajput, Prof.Vidya Bharde
Department of Computer Engineering
Mahatma Gandhi Mission College of Engineering and Technology,
Kamothe, Navi Mumbai, Maharashtra, India

***Abstract*— Image classification is a critical and significant research problem in computer vision applications such as facial expression classification, satellite image classification, and plant classification based on images. This project proposes the image classification model applied for identifying the display of daunting pictures on the internet. The proposed model uses Convolutional Neural Network (CNN) to identify these images and filter them through different blocks of the network so that they can be classified accurately. The model works on Tensor Flow a user-friendly platform, which provides different high leveled APIs (in Keras) which are used to build any basic model. It also permits us to add our libraries. The input data for the model are images we collected online through various resources. Our model will work as an extension to the web browser and will work on all websites when activated. The output of the proposed model is blurring the images and deactivating the links. This means that it will scan the entire web page and find all the daunting images present on that page. Then we will blur those images before they are loaded and the children could see them. Apart from it, we will also disable any clickable links present. This ensures protection from disturbing images and links to the children.**

***Keywords*— CNN, Tensor Flow, Keras, Flask server, Extension.**

I. INTRODUCTION

We are living in the world of the Internet where Social Media and Browsing has become an important part of our life. Not only adults but even kids spend most of their time on their mobiles browsing for information and/or entertainment on different websites and social media platforms. As the use of the Internet is growing tremendously, it has also become a very important medium for the advertisements of the product. It may happen that while browsing, children may come across advertisements containing nude images. This exposure through the advertisements is not appropriate for them. Skin color detection has been used in numerous computer vision applications like face detection, nudity recognition, hand gesture detection, and person identification. Skin color detection is often used as a preliminary step in these applications. Color is the most robust and useful clue for skin detection and also allows fast processing of skin patterns. Other cues like shape and geometry can be used to buildaccurate face detection systems. Skin color detection is a challenging task as the skin color in an image is sensitive to various factors like illumination, camera characteristics, ethnicity, individual characteristics such as age, sex, and body parts, and other factors like makeup, hairstyle, and glasses. All these factors affect the appearance of skin color. Another problem is that there is a significant overlap between the skin and non-skin pixels. Most of the skin detection techniques discussed in the literature are used as a preprocessor for face detection and tracking systems. However, when these techniques are used in real-time, it is crucial to follow time deadlines and memory constraints. Sometimes, accuracy may need to be sacrificed when the skin detection strategy is used only as a pre-processing step to face detection, particularly in real-time applications. So in our model, we are using classification using the CNN which uses curves, edges, and other features to identify and classify an image. We are training our model on both nude and non-nude images. In this study, we have focused on the problem of developing an accurate and robust model for nude images.

II. RELATED SYSTEM

It is found that the existing system of VGG19 is some existing Nudity Detection Methods that use skin filters based on color space combined with other features such as color histogram, texture analysis, and shape measures. The system attained 60% of precision on a test set composed of 138 nude images and 1401 assorted control images. The Old proposed method obtains a precision of 79.3% on a test set composed of 1,200 nude images and 1,200 assorted non-nude images .some of the non-nude sample are images of people with no nudity. n comparison with the traditional methods, this combination canachieve 78.9% of accuracy on

International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 6, Issue 12, ISSN No. 2455-2143, Pages 185-188
Published Online March 2022 in IJEAST (http://www.ijeast.com)

a test set of 400 nude images and 400 assorted images.

III. PROPOSED SYSTEM

Convolution Neural Network (CNN) is one of the most popular and effective technology for image recognition and image classification. The CNN classifier takes an image as an input, processes it, and classifies it under certain categories. Our main aim is to disable the view of daunting images and get the link inactivated so that children do not get redirected to some irrelevant content that they are not ready to get exposed to at such an early age. We will first be training the CNN model (VGG16/VGG19) on bare-skinned images as well as advertisements of any other type. During the prediction process, the bare images will be giving an output of one, while all other types of images will have a value assigned to them greater than one. Once the model is trained with good accuracy of prediction and filtering, a chrome extension will be created for the same, which will capture all the images on the websites and if it comes across any such image, the image will be blurred, also automatically disabling any redirectable links. Hence this model would work as excellent child-proof surfing on the internet without us monitoring their usage 24*7.

IV. METHODOLOGY

A. System Architecture

Our technology is built on different APIs which help us detect nude pictures on the web pages. There is an API for face detection and different APIs for nude body detection. Apart from this our model mainly uses Convolutional Neural Network (CNN) for classifying the images correctly. Images containing nudity should be separated from all other images to disable them. All this code is written in Colab, a platform that allows importing python libraries and uploading data from our computer or any other source. We have also used Open CV- Python which makes use of Numpy, which is a highly optimized library for numerical operations. It is an open-sourcecomputer vision and machine learning software library built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception. We are also using NVIDIA a graphics processing unit for the gaming and professional markets, as well as the system. It is a chip unit for the mobile computing and automotive market. We are using this NVIDIA embedded chip computer for our training purpose. Our model consists of 13612 training mages. Normal computers without a graphic card cannot handle this amount of training data. For this reason, the NVIDIA system isan important aspect of our project.

Fig.1: Basic CNN Architecture

B. System Architecture

The first step is the collection of the dataset of both kinds of nude and non-nude images. Images will be scrapped from the internet using the Fatkun batch download image chrome extension. Approximately 16000 images will be used in the dataset for more accurate results. The next step is the classification of images, done by using a Convolution neural network. The training of CNN would be done on two kinds of images positive and negative; positive being the nude images and negative being the images of any other type. Testing will be done for the same so that we come to know how accurate the prediction is. Testing will also consist of both kinds of images that is nude images and the images of advertisements. The extension will be created just like any other Google extension, which will blur and disable the images on the website visited. The user just needs to download this Chrome extension and enable it, after that all the work will be taken care of by the extension itself without any kind of parental control.

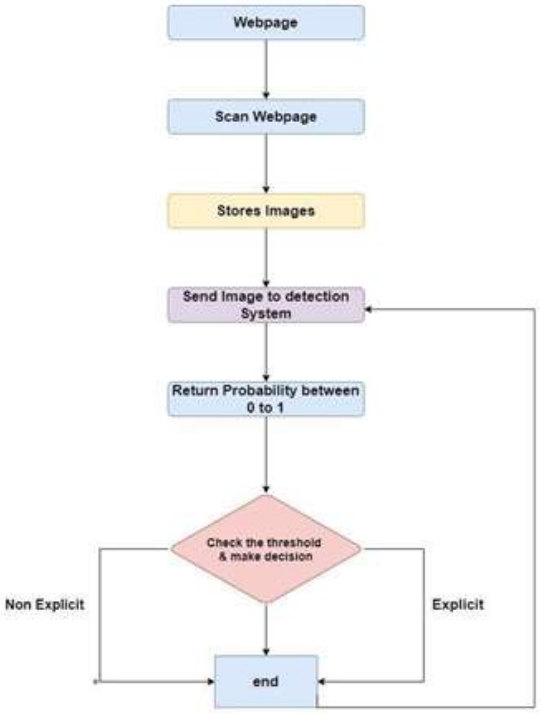

Fig.2.1: Activity Diagram

International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 6, Issue 12, ISSN No. 2455-2143, Pages 185-188
Published Online March 2022 in IJEAST (http://www.ijeast.com)

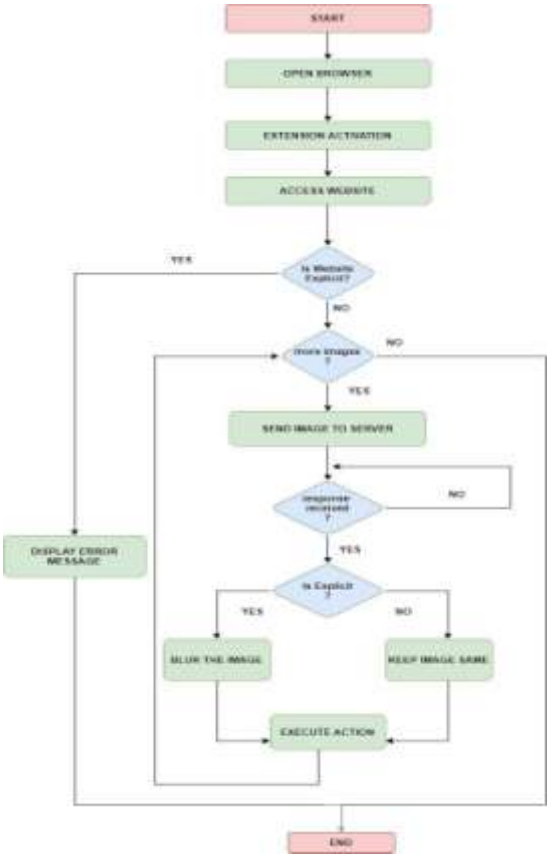

Fig.2.2: Activity Diagram

C. System Requirements:

A. Hardware Details:

8GB RAM, NVIDIA GEFORCE, DISK SPACE

B. Software Details:

- Google Colab-Collaboratory, or "Colab" for short, is a product from Google Research. Colab allows anybody to write and execute arbitrary python code through the browser and is especially well suited to machine learning,data analysis, and education.

- Keras-Keras is an open-source software library that provides a Python interface for artificial neural networks

- Javascript-JavaScript is high-level, often just-in-time compiled, and multi-paradigm.
- Tensorflow-Tensor Flow is a free and open-source software library for machine learning and artificial intelligence.
- Fatkun Batch Download Image Chrome Extension-An useful image batch download extension. Download all pictures on the page with one click. It supports all websites.
- Python 3.6+, Tensor flow 2+
- Flask server: The model has been deployed on the flask server. This server needs to be up and running for processing the extension requests.
- Chrome Web Browser: The developer mode of the chrome browser needs to be used and the 'load unpacked extension' can be used for deploying the extension.
- Postman: Postman is a collaboration platform for API development. Postman's features simplify each step of building an API

V. RESULTS

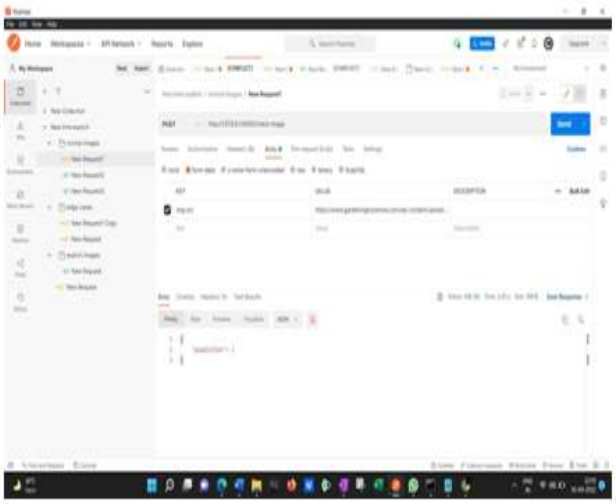

Fig.3.1:Prediction Based on Non-Explicit-1

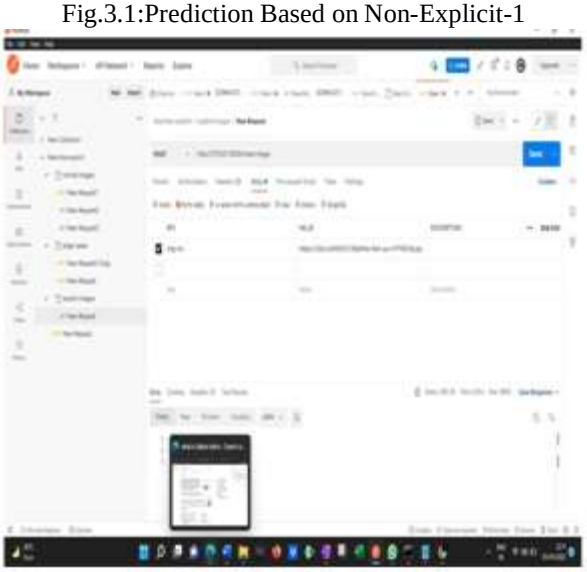

Fig.3.2: Prediction Based on Explicit-0

International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 6, Issue 12, ISSN No. 2455-2143, Pages 185-188
Published Online March 2022 in IJEAST (http://www.ijeast.com)

Fig.3.3: Explicit Image Blurred.

Fig.3.4: Site gets Blocked when Explicit content is Detected.

VI. CONCLUSION & FUTURE SCOPE

We finally implemented Chrome extensions which with the help of our trained model deployed on the flask server blurs the explicit images. Our model now has been retrained for edge cases to have better accuracy. The chrome extensions filter the images as nude and non-nude. It also blurs the nude images completely and leaves the non-nude images as it is. The extension also works on all the web pages on the internet and blurs the images labeled as nude. The extension has been tested for various hues and skin thresholds.

The project in the future can be further expanded by improving the detection accuracy & reducing load times. A few ways it could be achieved are by Improving model accuracy by adding more images to the data set, reducing the dependency on onboard hardware, Implementing the software entirely on a SaaS platform to make it more flexible, and adding more user-friendly features.

VII. REFERENCES

[1]. Animesh Srivastava, Anuj Dalvi, Cyrus Britto, Harshit Rai, Kavita Shelke. " Explicit Content Detection using Faster R- CNN and SSD MobileNet v2", International Research Journal of Engineering and Technology (IRJET),2020.

[2]. Adithye Joseph, Ajay Chacko Thomas, Jobin Jose, Divya Sunny, "Automatic Image Detection and Censoring on Web Pages" International Journal of Innovative Science and Research Technology(IJISRT),2020.

[3]. Ali Qamar Bhatti, Muhammad Umer, Syed Hasan Adil, MansoorEbrahim, Daniyal Nawaz, and Faizan Ahmed. "Explicit content detection system: An approach towards a safe and ethical environment", Hindawi Applied Computational Intelligence and Soft Computing, 2018.

[4]. A.T. Vo, H. S. Tran, and T. H. Le, "Advertisement image classification using convolutional neural network," 2017 9th International Conference on Knowledge and SystemsEngineering (KSE), 2017.

[5]. K.He, X. Zhang, S. Ren, and J. Sun, "Deep residual learningfor image recognition," in Proceedings of the 2016 IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2016, pp. 770–778, July 2016.

[6]. S.Tran, T.H. Le and T.T. Nguyen, "The Degree of Skin Bums Images Recognition using Convolutional Neural Network", Indian Journal of Science and Technology, vol. 9, no. 45, 2016.

[7]. Jorge Alberto Marcial Basilio1 , Gualberto Aguilar Torres1 , Gabriel Sánchez Pérez1 , Linda Karina Toscano Medina1 , Héctor Manuel Pérez Meana1 , Enrique Escamilla Hernadez,"Explicit content image detection",Signal & Image Processing : An International Journal(SIPIJ) Vol.1, No.2, 2010.

[8]. Xiaoyin Wang, Changzhen Hu, and Shuping Yao, "An Adult Image Recognizing Algorithm Based on Naked Body Detection", In Computing, Communication, Control, and Management, 2009. CCCM 2009. ISECS International Colloquium on, 197 – 200, 2009.