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Mature Extension Using Deep Learning

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Abstract
A variety of computer vision applications use skin color detection, such as detecting faces, recognizing nudity, detecting hand gestures, and identifying people. This project proposes an image classification model for detecting daunting images on the internet. An image is identified and classified accurately using a convolution neural network (CNN). The proposed model is based on TensorFlow, a free and open-source software library for machine learning and AI that offers various APIs (in Keras) that allow us to build our models. It also enables us to add libraries. The model's input data is comprised of images gathered online from various sources. When enabled, our model will be implemented as a web browser extension and will run on all websites. The model's output is blurring the images and deactivating the links. The extension's job is to scan entire web pages and detect any frightening images that may be present. The intimidating images will be blurred before the images on the webpage load.

Keywords: *Extension, Blur images, CNN, Deep learning, Image recognition*

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I. INTRODUCTION

Social media and online browsing are now integral parts of our lives. Even children spend the majority of their mobile time browsing information or finding entertainment on various social media platforms and websites, with adults spending the majority of their time on mobile. The increased use of technology has an impact on our social interactions and mental health, both positively and negatively. It keeps us in touch with friends and family, but it can also cause feelings of loneliness and addiction. The Internet has become a most important medium for advertisements of the product as it is growing enormously. While browsing it is possible that one can come across advertisements that contain daunting images or links. And this advertisement is not an appropriate knowledge exposure, especially for children.

Skin detection is an interesting image-processing challenge and a key pre-processing step for subsequent methods (e.g. objectionable image detection, face detection, etc). Skin color recognition serves as the first step in this model. The most effective and reliable indicator of skin is color. Skin pattern processing is made quick by using skin detection. A precise face detection system can be created using additional cues like size, shape, and geometry. The range of skin colors caused by different ethnicities, variations in lighting, differences in photos taken using a variety of cameras with their characteristics, and other variations make skin detection very difficult. Another problem is that human skin and non-human skin share a lot of similarities The majority of the time, the literature's mention of skin detection techniques is used as a pre-processing step before face tracking and detection systems are applied. Accuracy may need to be sacrificed when the skin detection technique is only used as a pre-processing step in face detection, especially in real-time applications. To identify and analyze the image, the proposed model uses classification based on CNN, which uses curves, edges, and other features. Both non-bare and bare images are used to train our model. The system will enable child-safe internet browsing without parental involvement. so that parents won't have to worry about their kids encountering bare images at such a young age and not understanding what they mean. In other words, it will keep an eye on every page, filter out all the images, hide their details from kids, and prevent them from activating with a single click.

II. RELATED SYSTEM

According to this study, VGG19 is an existing system that uses the skin filter based on color space to detect nakedness, along with additional qualities such as color histograms, texture analysis, shape measurements, and color histograms. The system had a precision of 60% in a test set of 1401 different control images and 138 nude images. Based on comparisons with traditional methods, the old system is superior to the other. With the

current method, the precision is 79.3%. With 400 nude images and 400 mixed images, the accuracy of the algorithm was 78.9%.

III. PROPOSED SYSTEM

Convolutional neural networks (CNNs) are used widely for image classification and recognition. An image is an input to the CNN classifier, which interprets it and categorizes it accordingly. The primary goal is to disable the link and disable the appearance of obscene images so that children won't be directed there and exposed to offensive material at such a young age. The CNN model (VGG16/VGG19) will initially be trained on bare-skinned images and advertisements of various types. All other kinds of images will generate an outcome greater than one in the prediction phase, while bare images will produce an output of one. We will develop a Chrome extension for the model once it has been trained with a good prediction and filtering accuracy, which will capture all images on the website and blur them if it finds one, along with disabling all links that can be redirected. Consequently, this model would act as a great way to protect children from internet dangers while they are surfing the internet without constantly monitoring their activities.

IV. METHODOLOGY

a. System Architecture

Different APIs enable us to detect nude pictures on web pages using our technology. Face detection API and naked body detection API are different. The majority of our model is based on convolutional neural networks (CNN) for automatically classifying images. The nudity of images should be separated from all the other images so that they can be disabled. Colab is used to create code and upload data from our computer or from other sources, as well as to import Python libraries. Open CV- Python also makes use of Numpy, a highly optimized library for numerical operations. It is an open-source library of machine learning and computer vision software designed to speed up the use of artificial perception and offer a standard infrastructure for applications involving computer vision. Additionally, our system uses a graphics processing unit from NVIDIA for professional use and gaming. In the automotive and mobile computing industries, it is a chip unit. This embedded computer is used by us for training purposes. 10,000 training modules make up our model. This amount of training data is too large for computers without a graphics card. As a result, our project is heavily dependent on NVIDIA.

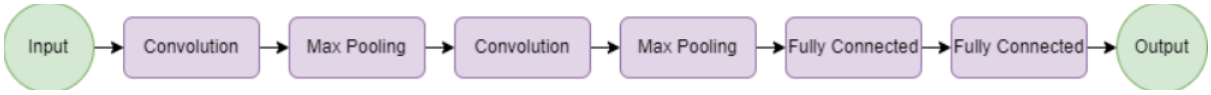

Fig 1: Basic architecture of CNN

b. System Design

In this step, both naked and non-naked images will be collected for the dataset. A Fatkun batch download extension will be used to scrape images from the internet. To obtain more accurate results, there will be approximately 10000 images in the dataset. Using a convolution neural network, the next step is to classify images. CNNs are trained on two types of data nude images are considered positive, while any other type of image is considered negative. To determine how accurate the prediction is, testing will be conducted for the same. Additionally, nude images and advertisements will be included in the testing. A similar extension will be created for Google Chrome, which distorts and disables any pictures on a website. Using this Chrome extension, users will only need to download and enable it. After that, the extension will handle all the parental controls.

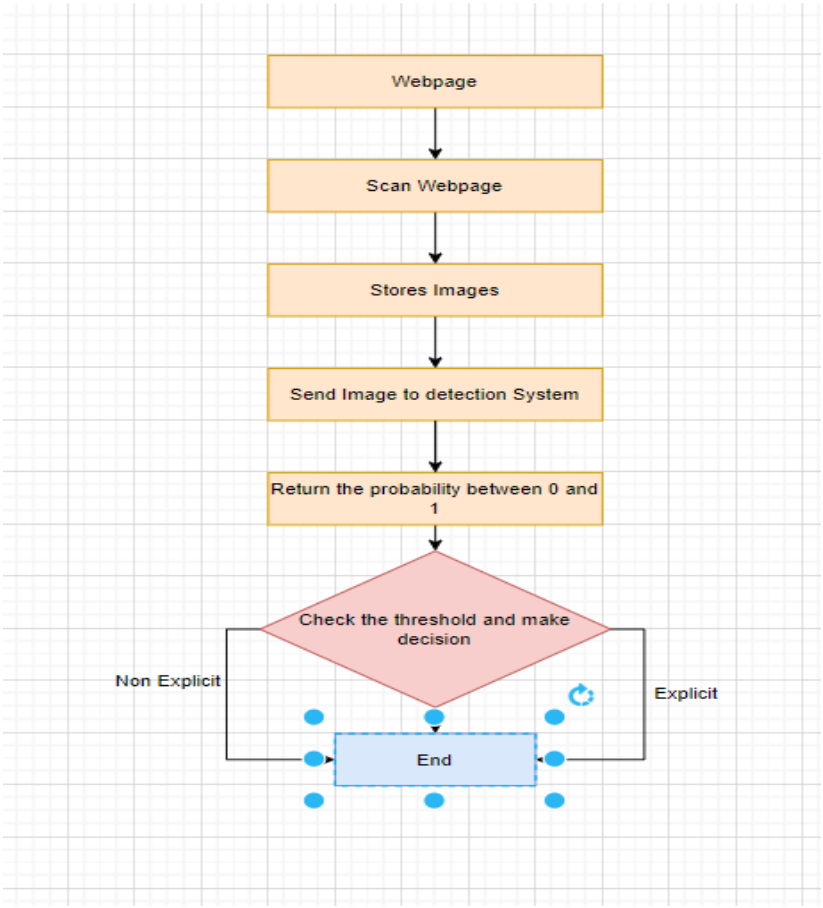

Fig.2 Activity Diagram

A proposed system for mature extension could include the following components:

1. Data ingestion: The system should be able to ingest large volumes of image data from various sources, such as social media platforms, websites, or mobile applications.
2. Pre-processing: The images should be pre-processed to standardize their format and size and to remove any unnecessary metadata or information.
3. Explicit content detection: The system should use computer vision and machine learning algorithms to detect explicit or inappropriate content in real time. This can be done using techniques such as object recognition, text detection, and facial recognition.
4. Filtering: Once explicit content is detected, the system should filter it out or flag it for further review by a human moderator.
5. Monitoring and reporting: The system should be able to monitor its performance and generate reports on the types of explicit content that are being detected, the accuracy of the system, and any potential biases or errors.
6. Scalability: The system should be able to handle large volumes of image data and scale to meet the needs of growing user bases.

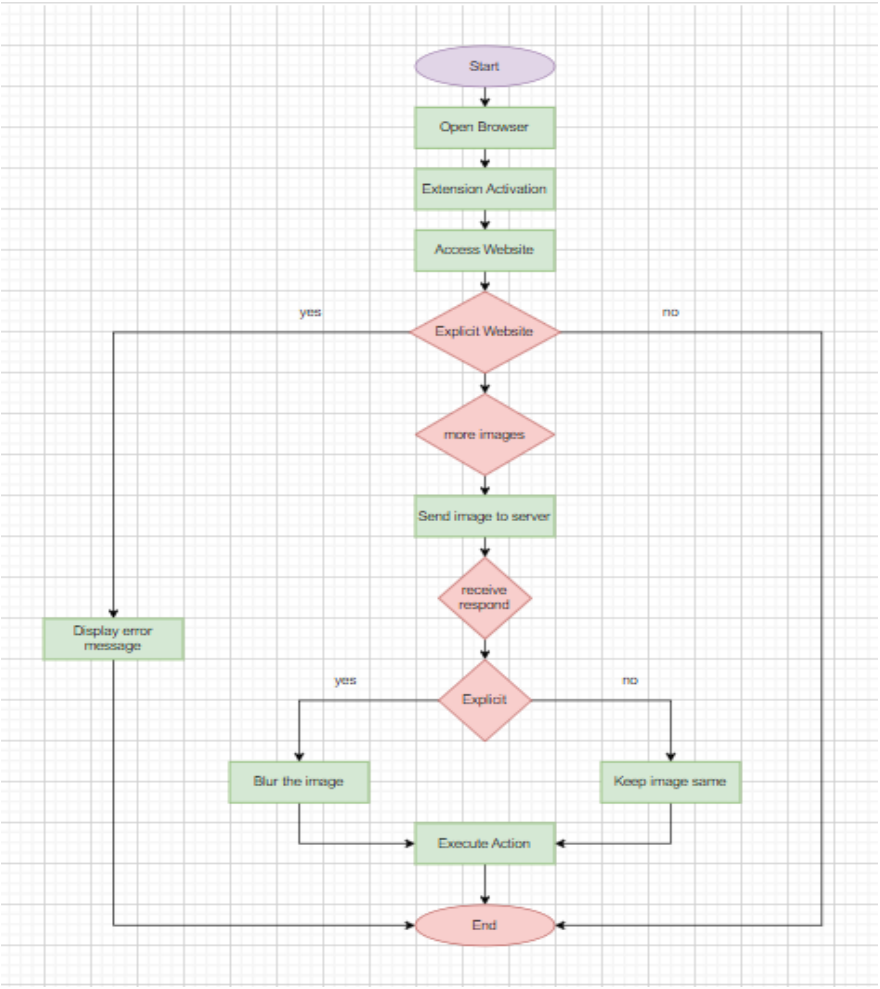

Fig 3: Activity Diagram

c. System Requirement

A. Hardware Details

NVIDIA, GeForce, 16 GB RAM, and disc space

B. Software Details

- Google Colab is a free cloud-based platform for developing and running Python code, which is designed for machine learning and data analysis. It is a Jupyter notebook environment that runs on Google Cloud infrastructure and provides access to computing resources such as CPU, GPU, and TPU.
- Keras is a powerful and user-friendly library for building deep learning models and is widely used in both academia and industry for applications ranging from speech and image recognition to recommendation systems and natural language processing.
- JavaScript is a high-level programming language that is frequently used to develop dynamic user interfaces and interactive web pages.
- TensorFlow was developed by the Google Brain team and is an open-source machine-learning library. It is designed to simplify the process of building, training, and deploying machine learning models, particularly for deep learning tasks.
- Fatkun Batch Download Image Chrome Extension is a tool that allows users to download multiple images from a webpage with just a few clicks.
- Flask is a popular web framework for building server-side applications using Python. It has been created to be lightweight, versatile, and simple to use, making it a preferred option for developing small to medium-sized web applications.
- "Load unpacked extension" is a feature in Google Chrome that allows developers to test and debug extensions they are developing.

- Postman is a popular collaboration platform for building and testing APIs. It provides a user-friendly interface that allows developers to create, test, and document APIs quickly and easily.

V. RESULTS

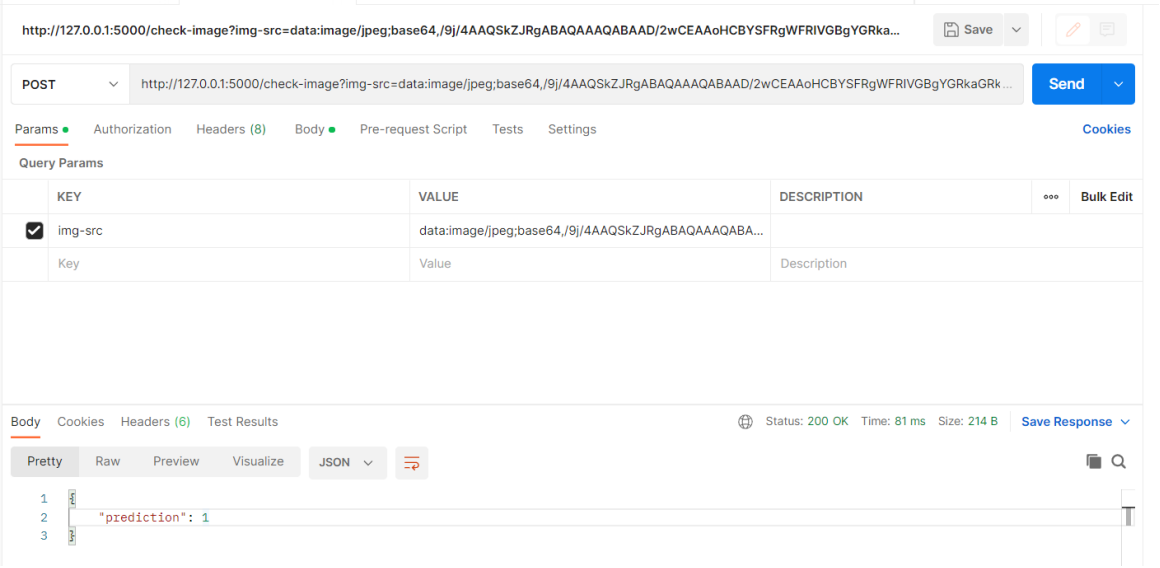

Fig 4: Prediction on bare image

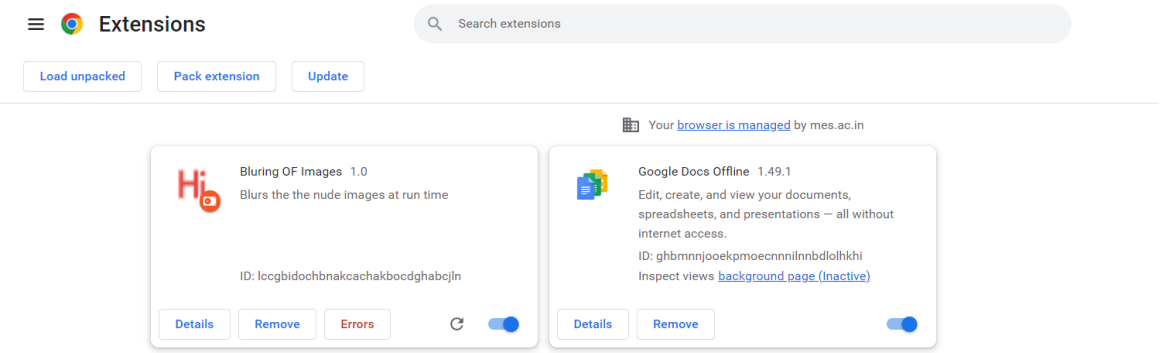

Fig 5: Enable Extension

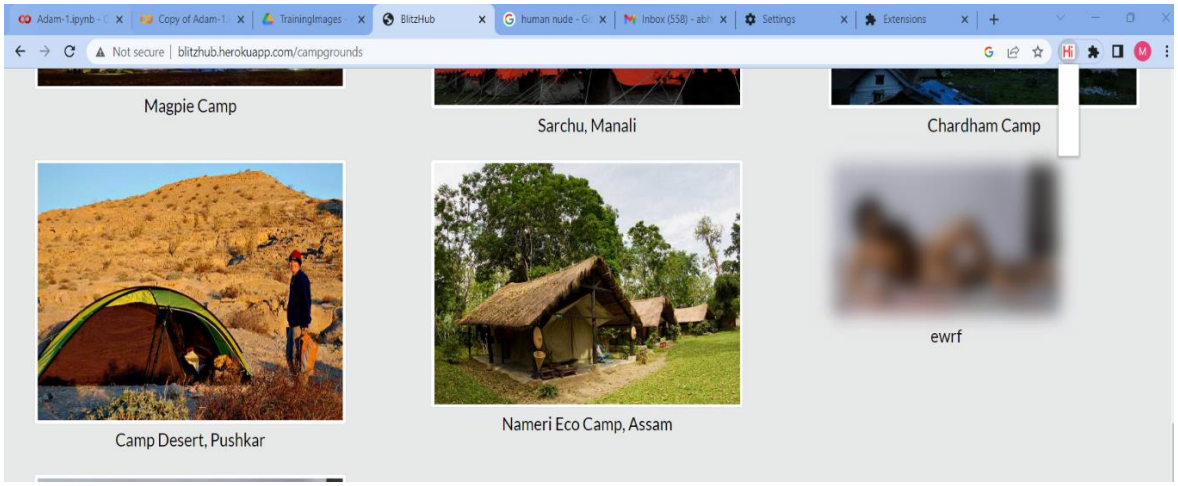

Fig 6: Blurred image on a webpage

VI. CONCLUSION AND FUTURE SCOPE

Using the Flask server and our trained model, we finally implemented a Chrome extension that blurs explicit images. A new edge case training procedure has been implemented to improve the accuracy of our model. Nude and non-nude images are filtered using chrome extensions. Also, it removes all nude images, leaving non-nude images intact. Additionally, the extension blurs images marked as nude on every web page on the internet. Various hues and skin thresholds have been tested with the extension. It is possible to improve the detection accuracy & reduce loading times in the future to further expand the project. To improve model accuracy, more images could be added to the data set, and the likelihood of false positives could be reduced.

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