

Child Erotic Image Detection System

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Abstract— Child Pornography violates the most basic rights of young children. Methods currently employed to strive against it may be considered simple and inefficient. This paper come up with the child erotic image detection system that distinguishes human skin tones in digital images, performs age classification based on facial image and take out features to detect erotic images. Here, we propose a server-based detection system. If the detected face shows an age below expected, then the image will be processed under sexual category. If any obscene is found in particular image, then the image itself gets blocked from updating it to the server.

Keywords — Child Pornography, Skin detection, Image Processing.

I. INTRODUCTION

Child pornography is a kind of child carnal abuse that contains sexually explicit materials (image, video, etc.,) of children which is designed to produce a sexual foster to consumers. Child carnal abuse affects many children and young teens every year. The borderless nature of Internet has shown a global increase in child pornography. It is a neglected problem in the society due to its delicate issue. But this cannot be ignored as it is always a violation of young person's right. So it is time to make a change, time to bring this child pornography to an end.

This paper finds a maximum solution to child pornography. It aims not only on parental control on children but also protect this 'tiny ones' from people doing such despicable crimes. Since demonstration on real child erotic images is against the law, performance of the offered technique is estimated only on explicit-like child images. Detection of nudity and children in images are vital for detecting child pornography. Motivated by previous work in these zones, this paper put forward a method for identifying child erotic images automatically which is created to detect obscene images and child faces. These two things are then pooled to identify images with children exposing broad part of their skin. We expect that such a system will detect child erotic images to some extent.

The next section deals with the literature review. Section III, provides specifics of the proposed system

showing various processes and a small sketch of architectural diagram of the proposed system.

II. LITERATURE REVIEW

This section gives detailed study on various methods for detecting child pornography. There are numerous methods for detecting human skin which helps to treat the image with porn content and age classification which helps to distinguish between a child and an adult. Here we have a relative study on different skin detection methods.

The proposed system brought by Sam V Varghese et al. [1] uses the technology expanded by Martin Stuetz, Martina Lindorfer [2]. Skin detection approach is the main technique used here. Analysing the image is done first. Further, the image is checked for any immoral scene. Here openCV and skin sheriff method [2] is used for the same. If exposed skin is identified that matches to human body then it is restricted to display the image.

Karthik et al.[3] uses a pixel based skin detection method with the help of a lookup table (LUT). They have gone through 21 colour spaces for such experiment. These colour spaces were represented in different ways. The paper reveals that for ordinary solution Nbr colour space was the best. In other cases, 1-D colour space is the best. Bayesian LUT showed the best results in skin detection.

P Satheesh et al. [4] uses HSV colour model in his paper for skin detection since it was able to remove all lighting problems that image could have. This colour model showed bet results on experimentation. Comparing to the other colour models, this showed more visible skin tones and gives 98.7% skin pixel as output.

Sotiris Karavarsamis et al. [5] uses AIIA-POD (AIIA porn detector) for detecting child pornographic images. With the help of a RF classifier, the images are classified into various streams namely skin/non skin or porn/bikini. These methods offer better performance and is much faster compared to other methods used for the same in the paper.

III. PROPOSED SYSTEM

Our proposed system is a child erotic image detection system with Image Processing as the domain. The main intention of this system is to detect child explicit images. First, we analyse the image for any obscene found in it. If so, we check whether it is a child or not by using facial classification. If the detected face is that of a child, then the image will be blocked from updating it to the server. So the entire system deals with three main things namely exposed skin detection, child face detection and blocking from updating into the server. Accuracy and speed are the two important factors in detecting child erotic image detection system. In our proposed system we have used skin tone filter for this purpose and is different from the existing filters. Detection of skin regions are done more accurately and efficiently. A dataset containing more than 5K images of human skin colours (under different illuminations) were created for this purpose. We have also used an improved version of current algorithms available for face detection. To identify whether the given image is that of a child or an adult we have classification based on eyes, nose and mouth regions. Age classification system showed an accuracy around 85%.

A. Exposed Skin detection

Skin detection is the foremost thing in our proposed system. It can be achieved by several steps. The image of the skin captured by the camera can have problems due to illumination, lightning, different angles etc. To solve this problem we are using a method called White balance adjustment method [6] in which the images are pre-processed to decrease sensitivity to lighting variations. Then the given pixel is transformed into a suitable colour space. This gives a precise and solid modelling of skin-colour distribution. Now, skin tone filter may also contain objects that are similar in skin colour which is not a part of human body since things like these are common in nature. So to have further checking, we have used a method called region growing method. So that it will remove noise that the image contains. In the final phase, we combine those features taken out from the skin tone filter through a SVM (Support Vector Machine) [2]. This is done to separate explicit images from non-explicit images.

B. Child face detection

Child face detection process verifies whether the image contains any faces of child. Child face detection is a two-step process. First we use face detection algorithm to detect all possible faces in the image. Then we classify those images into child or adult faces. But the problem with the face detection algorithm is that it may also detect some non-face objects. So in this case we erase all detected face objects that have no eyes or that do not have skin colour pixels. For this purpose we have used skin colour filter and openCV

eye detection methods. For child face classification, we deploy the technique described by Xiaoxi Sun [7] in his paper which includes eye localization, face rotation, mouth detection, nose detection, feature extraction and finally classification.

C. Blocking the image

Once the child erotic image is detected, then the next step is to block the image from updating it to the server.

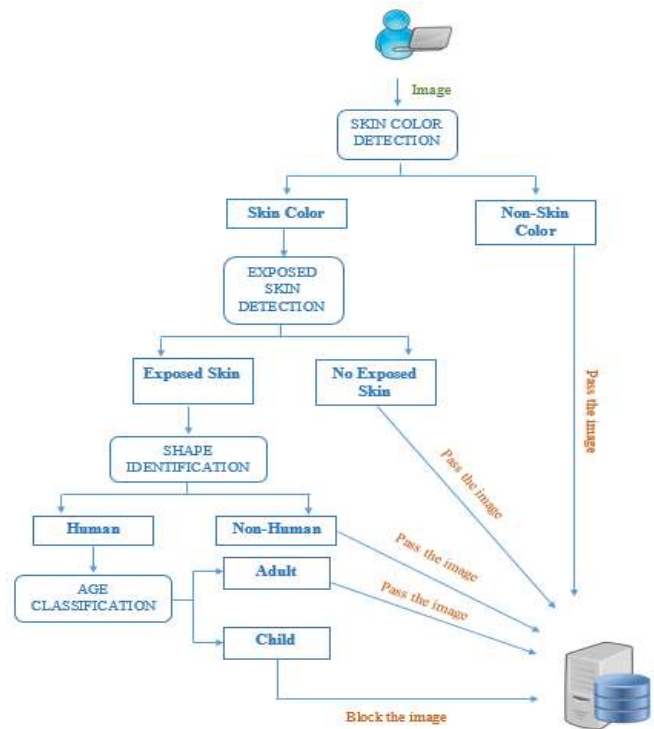


Figure 1 Architectural diagram of proposed system

The figure 1 shows the architectural diagram of the proposed system. Here the user uploads an image to the server. Then the image undergoes many processes like skin colour detection, exposed skin detection, shape identification and finally age classification.

The skin colour detection process detects whether there is an element of skin in the image. If so, then the image undergoes a process called exposed skin detection method. This process detects whether there is exposed skin shown in the image. If exposed skin detection is identified in the image then it verifies whether it is a picture of human or not by undergoing shape identification process. In the final stage, age classification is done based on the image. If the detected face shows an age below expected, that is of a child, then the image itself gets blocked from updating it to the server. Otherwise, the image can be uploaded to the server.

IV. CONCLUSIONS

The proposed system is designed to overcome all the drawbacks of the present system and to provide a better solution to prevent child pornography. The preliminary experiments showed that our proposed system will be able to detect erotic images of children. Here we have used the best performing skin detection methods after having a detailed study on various methods. It is our hope that the project will do just what its title suggests and protect our nation's children from those who would commit such despicable crimes.

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