ISSN: 2395-7852

International Journal of Advanced Research in Arts, Science, Engineering & Management

Volume 10, Issue 3, May 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 6.551

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International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

| ISSN: 2395-7852 | www.ijarasem.com | Impact Factor: 6.551 |Bimonthly, Peer Reviewed & Referred Journal|

| Volume 10, Issue 3, May 2023 |

Missing Person Detection Using Deep Learning

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ABSTRACT: In India a innumerous quantity of kids is mentioned lacking each time. Among the lacking infant instances, a huge threat of kids continues to be untraced. This paper provides a brand-new use of deep literacy method for touching on the mentioned lacking infant from the prints of multitude of kids available, with the assist of face popularity. The public can add pics of suspicious infant right into a not unusual place gate with milestones and reflections. The print may be mechanically in comparison with the registered prints of the lacking infant from the depository. For this, a deep literacy version is skilled to rightly discover the lacking infant from the lacking infant photo database handed, the use of the facial photo uploaded through the public. The Convolutional Neural Network (CNN), a in large part powerful deep literacy style for photo grounded operations is espoused then for face popularity. Face descriptors are uprooted from the photographs the use of apre-skilled CNN version VGG- Face deep armature. Compared with regular deep literacy operations, our set of rules makes use of trouble community handiest as a excessive role factor extractor and the kid popularity is completed through the skilled SVM classifier. Choosing the fashionable appearing CNN version for face popularity, VGG- Face and right schooling of its outcomes in a deep literacy version regular to noise, illumination, discrepancy, occlusion, image pose and age of the kid and it outperforms earlier than patterns in face popularity grounded lacking infant identity. The bracket overall performance executed for infant identity device is99.41. It became anticipated on forty-three Child instances.

KEYWORDS: CNN, VGG, SVM.

I.INTRODUCTION

Children are the best asset of every nation. The destiny of any u.s. relies upon upon the proper upbringing of its youngsters. India is the second one populous u .s . withinside the international and youngsters constitute a extensive percent of overall population. But alas a massive quantity of youngsters cross lacking each 12 months in India because of numerous motives consisting of abduction or kidnapping, run-away youngsters, trafficked youngsters and misplaced youngsters. A deeply stressful reality approximately India`s lacking youngsters is that even as on a mean 174 youngsters cross lacking each day, 1/2 of of them continue to be untraced. Children who cross lacking can be exploited and abused for numerous purposes. As according to the National Crime Records Bureau (NCRB) file which become stated through the Ministry of Home Affairs (MHA) withinside the Parliament (LS Q no. 3928, 20-03- 2018), multiple lakh youngsters (1,11,569 in real numbers) have been mentioned to have long past lacking until 2016, and 55,625 of them remained untraced until the cease of the 12 months. Many NGOs declare that estimates of lacking youngsters are tons better than mentioned. Mostly lacking toddler instances are mentioned to the police. The toddler lacking from one area can be discovered in any other area or any other state, for numerous motives. So even supposing a toddler is discovered, it's miles tough to pick out him/her from the mentioned lacking instances. A framework and technique for growing an assistive device for tracing lacking toddler is defined on this paper. An concept for keeping a digital area is proposed, such that the latest pictures of youngsters given through mother and father on the time of reporting lacking instances is stored in a repository. The public is given provision to voluntarily take pictures of youngsters in suspected conditions and uploaded in that portal. Automatic looking of this image a number of the lacking toddler case photos may be supplied withinside the application. This helps the police officers to find the kid everywhere in India. When a toddler is discovered, the photo at that point is matched towards the photos uploaded through the Police/parent on the time of lacking. Sometimes the kid has been lacking for a protracted time. This

age hole displays withinside the photos considering that getting older influences the form of the face and texture of the skin. The characteristic discriminator invariant to getting older results must be derived. This is the task in lacking toddler identity in comparison to the alternative face popularity systems. Also facial look of toddler can range because of adjustments in pose, orientation, illumination, occlusions, noise in history etc. The picturegraph taken through public won't be of proper quality, as a number of them can be captured from a distance with out the expertise of the kid. A deep learning [1] structure thinking about a majority of these constrain is designed here. The proposed device is relatively an easy, less expensive and dependable approach in comparison to different biometrics like finger print and iris popularity systems.

II.LITERATURE REVIEW

In computer vision, face identification has been an ongoing challenge. An effective descriptor for object and face identification has recently been found in the form of Histograms Oriented Gradients (HOGs)(**O. Deniz, G. Bueno, J. Salido, and F. D. la Torre,2020**). In this research, we look at a basic but effective method for robustly utilizing HOG features for facial identification in software. The following are the work's primary contributions: To begin, we propose that HOG descriptors be extracted from a regular grid in order to compensate for errors in face feature detection caused by occlusions, poses, and variations in illumination. Face recognition can be improved by combining descriptors from multiple scales of HOG.

Automatic detection and clustering of human faces presented in videos (**Ji Tao and Yap-Peng Tan,2019**), A novel approach to automatic detection and clustering of human faces presented in videos. In each video shot, continuously appearing human faces are firstly associated to form face sequences. Instead of matching the face sequences directly, we partition them into subsequences consisting of similar poses for the ease of comparison. Face subsequences can then be clustered by graph partitioning with the computed affinity matrix. Prior to that, however, a set of constraints need to be formulated so as to incorporate domain knowledge into the graph. Moreover, we propose a constraint propagation algorithm to fully exploit the space level implications of these constraints.

Criminals and missing children can be identified by the face recognition from an image or video frame (**S. Ayyappan and S. Matilda,2019**) which is captured by the cameras which are installed in various locations and compare them with images available in existing dataset. If the match is found for the input face, then the details associated with the related image will be displayed. Here they have used Haar cascade classifiers for the identification of missing children and criminals.

Using a large-scale image recognition dataset, we study the impact of convolutional network depth on accuracy (**K. Simonyan and A. Zisserman,2020**). Using an architecture with very small (3 3) convolution filters, we evaluated networks of increasing depth and found that raising the depth to 16–19 weight layers yielded considerable improvements over prior-art arrangements. In the ImageNet Challenge 2014, our team won first and second place in the classification and localization tracks, respectively, based on these findings in addition, we demonstrate that our representations generalize well to Missing Child Identification Department of CSE, NHCE 5 different datasets, where they produce the best outcomes. With the goal of fostering additional study into the application of deep visual representations in computer vision, we've made our two topper forming ConvNet models available to the public.

Paper:"Sift characteristics are used to recognize faces"
AUTHORS: C. Geng and X. Jiang
Year:2019
In this study, Object recognition and detection using the Scale Invariant Feature Transform (SIFT) has proven to be highly effective. For face identification, we provide two new methods based on the original SIFT algorithm: Volume-SIFT (VSIFT) and Partial-Descriptor-SIFT (PDSIFT). Fisher face (FLDA), the null space method (NLDA), and Eigenfeature Regularization and Extraction (ERE) are compared to feature-based algorithms such as SIFT and PDSIFT. PDSIFT outperforms the original SIFT technique in tests conducted on the ORL and AR databases. The most successful holistic technique, ERE, is comparable to PDSIFT in terms of performance, but it greatly beats FLDA and NLDA in terms of performanceSIFTbased face recognition techniques found in the literature rely heavily on the so-called key point detector, which locates interest points in the given image that are ultimately used to compute the SIFT descriptors

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Relevance to current Research

No.	Paper Title	Author Name	Key Points	Remark
1	Face recognition using histograms of oriented gradients	O. Deniz, G. Bueno, J. Salido, and F. D. la Torre,2020	Propose the HOG descriptors that are extracted from regular grid in order to compensate for errors in face detection caused by occlusions, poses and variations in illumination, [1]	An effective descriptor for object and face identification found in form of histogram of oriented gradients. It is robust for utilizing HOG features for facial identification in software.
2	Automatic detection and clustering of human faces presented in videos	Ji Tao and Yap-Peng Tan,2019	Novel approach to automatic detection & clustering of human faces presented in videos, by using graph partitioning with computed affinity matrix. [2].	It helps in ease of comparison & continuously appearing human faces are associated to form sequences, hence face recognition is easy.
3	Criminals and missing children identification using face recognition and web scrapping	S. Ayyappan and S. Matilda,2019	Haar cascade classifiers are used for best face recognition.The signature features of image are extracted, information is sampled with feature information of the pupil, eyelid, facial features & facial expression of face. [3].	Criminal & missing children can be identified by face recognition from an image or video frame which is captured by camera installed in various locations.
4	Very deep convolutional networks for large-scale image recognition	K Simonyan, Karen and Andrew Zisserman,2020	Using a large-scale image recognition dataset, we study the impact of convolutional network depth on accuracy.New face image quality assessment is used by using visual quality & mismatch between training & test face images. [4].	Convolutional network models use a very high accuracy to identify face using computer vision techniques.It aims to realize a robust & reliable face recognition system
5	Face recognition using sift features	C. Geng and X. Jiang,2019	Face recognition using scale invariant feature transform (SIFT) algorithm, volume sift (VSIFT) & partial description sift (PDSIFT), the null space method (NLDA) & eigen feature regularization & extraction (ERE). [5].	Object recognition & detection using SIFT has proven to be highly effective. It is the most successful holistic technique by this it points out local interest points in the given image.

In summary, the work presented in this paper is built on previous research to detect missing people. While earlier work focused on face recognition, we focus on various local features using SIFT Algorithm and the technique of Eigen face methods which is then compared with various related images that is between training and test face images, that aims to realize a robust and reliable face recognition system.

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III.METHODOLOGY OF PROPOSED SURVEY

Technology

Python:
Python is our major programming language. It is used for creating our Neural Network model. It provides various tools and libraries that help in consistently creating our model.

OpenCV:
OpenCV is another library of several programming functions that aims at real-time computer vision. We used this library to process images in real-time and access a camera and display the outcome to the person.

Matplotlib:
Matplotlib. pyplot is a collection of functions that make matplotlib work like MATLAB. Each pyplot function makes some change to a figure: e.g., creates a figure, creates a plotting area in a figure, plots some lines in a plotting area, decorates the plot with labels.

Haarcascade classifier:
Haar Cascade is a machine learning object detection algorithm used to identify objects in an image or video and based on the concept of features proposed by Paul Viola and Michael Jones in their paper "Rapid Object Detection using a Boosted Cascade of Simple Features".

LBPH Algorithm:
Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighbourhood of each pixel and considers the result as a binary number. It was first described in 1994 (LBP) and has since been found to be a powerful feature for texture classification.

Working Model:

A. Generating a Dataset:

The faces of specific child's can be captured by using this classifier and stored in the database with particular identity. More the number of captures will make the model more effective. This database can be used to train the model and to recognize the face in the final phase. Our own dataset is created in this phase. Each required child is being captured and stored using the specific ID which is asked as input.Thus, it will become easy to identify the details of the recognized child.

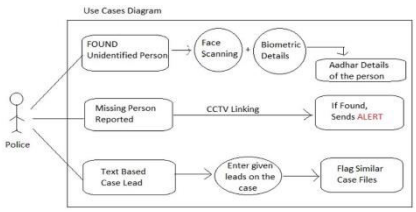

Figure 1. Workflow

Haar Cascade classifiers are an effective way for object detection. ... Haar Cascade is a machine learning-based approach where a lot of positive and negative images are used to train the classifier. Positive images – These images contain the images which we want our classifier to identify.

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B. Training the images in dataset:

We use Local Binary Pattern Histogram for storing histogram values of each image. After the image capturing by webcam the image is applied on the face Recognizer, then it stores the histogram values of each image. The detailed explanation of the LBPH algorithm can be in the detection phase. The images with the given Id will be trained and shown with their Id's that they have successfully trained.

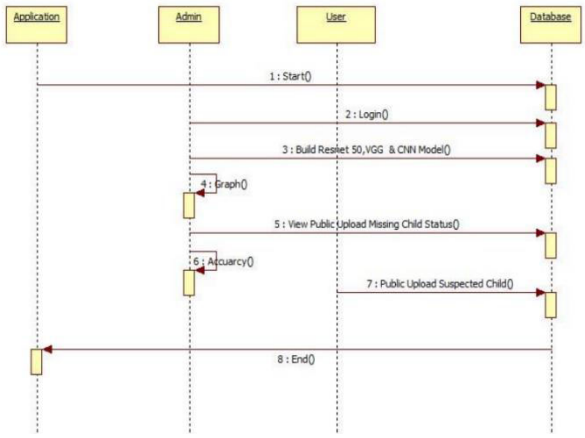


Figure 2. Sequence diagram

C.Missing Child Recognition:

The ultimate task is to recognize the face. The Haar Cascade classifier and training recognizer is used for face recognition. The classifier will compare the input image with the stored images. If the input image is matched with the database images, then the result of recognition will be displayed on the camera screen.

IV.RESULTS AND DISCUSSION

In this project, we are able to detect and recognize faces of the child in an image and in a video, stream obtained from a camera in real time. We have used Haar feature-based cascade classifiers in OpenCV approach for face detection. It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images. It is then used to detect objects in other images. Also, we have used Local Binary Patterns Histograms (LBPH) for face recognition. This model can be able to recognize multiple faces in a single frame or video. For Example, if we want to identify a Missing Child who is passing through the area which is under surveillance, in this case if we trained the model with that child face,

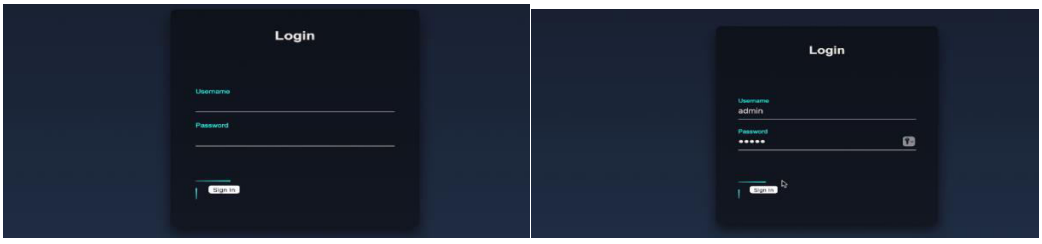


Figure3. Login Page

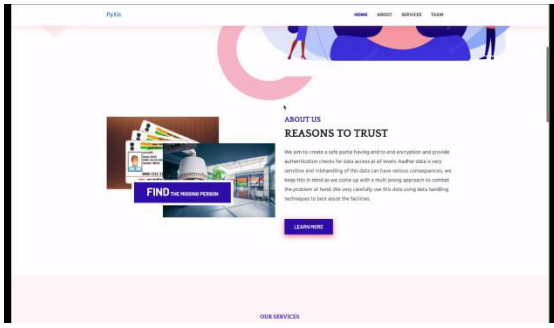


Figure4. Home Page

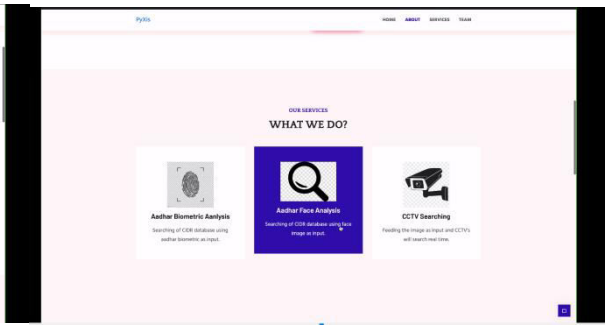
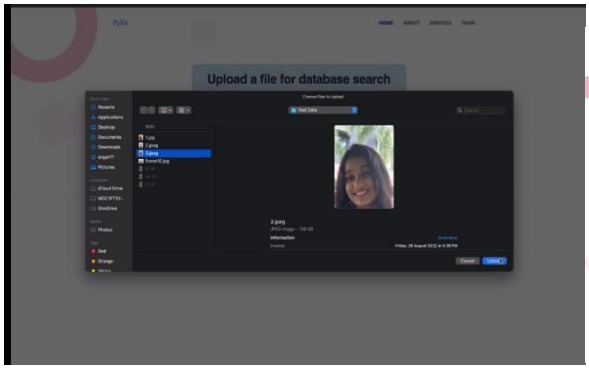


Figure 5. Our services



Name	Kashish Jain
Gender	Female
Race	Indian
Age	20
Phone Number	6398947440
Date of Birth	6-3-2002
Aadhar Number	9490 0000 0000
Address	329, Mand Marg, Agra-282001
State	Uttar pradesh

Figure6. Details fetched based on face Analysis

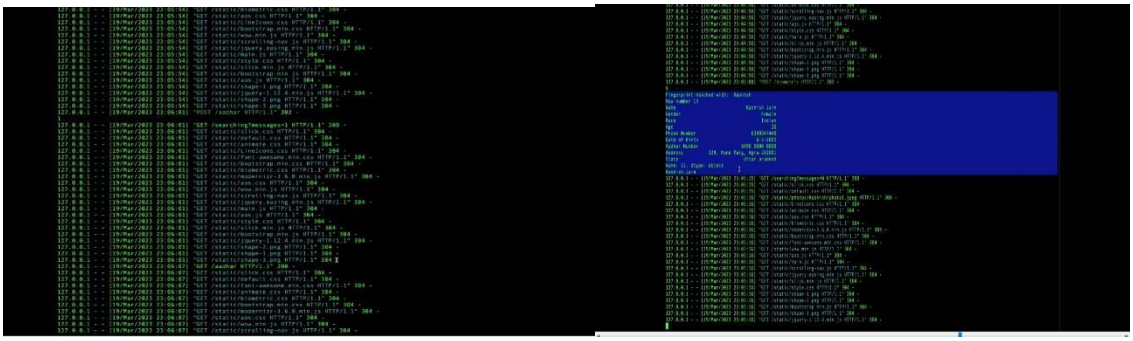


Figure7. Final location of the missed person as output

then model can identify that child within seconds. The model can be very helpful in various public areas to identify the required Missing Child. By this it detects the final location of the missed child in a shorter period of time and hence it aims as a reliable and robust recognition system.

V.CONCLUSION AND FUTURE WORK

Using the powerful CNN-based deep learning approach for feature extraction and a support vector machine classifier to classify distinct child groups, a missing child identification system is developed. With the use of a deep learning model trained on children's face features, this method is tested, it was able to improve the performance of the VGG-Face model by eliminating the software and extracting CNN image features for training a multi class SVM. The suggested system's performance is evaluated through the use of photographs of children taken under various lighting and sound settings, as well as photographs taken at various ages. Accuracy of 99.41% suggests that the proposed facial recognition technology can be used for reliable identification of missing children.Currently, the project may be using a single type of data, such as

images or textual information, for missing person detection. In the future, it could be beneficial to incorporate multiple modalities of data, such as images, textual descriptions, social media posts, or even sensor data (e.g., GPS coordinates). By fusing information from different sources, the model can gain a more comprehensive understanding of the missing person and improve detection capabilities.

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