iJRASET
International Journal For Research in Applied Science and Engineering Technology

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 11 **Issue:** VI **Month of publication:** June 2023

**DOI:** https://doi.org/10.22214/ijraset.2023.53470

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538*
*Volume 11 Issue VI Jun 2023- Available at www.ijraset.com*

# Missing Child Identification using Convolutional Neural Network

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***Abstract:*** ***The goal of this study is to locate missing children from a big dataset of child photographs using a novel application of deep learning algorithms.***
***The method makes use of facial recognition to precisely identify a missing child from a dataset of missing child photographs and trains a deep learning model to do so. Convolutional Neural Network (CNN), a potent approach for image-based applications, is the method used.***
***By training the CNN model, it is possible to identify missing children by extracting high-level features from photos. The deep learning model becomes resistant to many elements such as noise, lighting, occlusion, image pose, and child age by choosing the best CNN model and undergoing appropriate training. This method performs better than earlier ones for identifying missing children based on facial recognition.***
***Keywords: Convolutional Neural Network, Facial recognition, Image based, Deep learning.***

## I. INTRODUCTION

It is regrettable that many children in India disappear each year for a variety of reasons, which includes kidnapping, abduction, running away, human trafficking, or becoming lost.
The fact that half of the 174 children who disappear on average every day were never located is troubling. These children are at risk of being used and abused in many ways because of the current circumstances.
Over one lakh children—more specifically, 1,11,569—were reported missing, and by the end of the year, 55,625 of them were still unaccounted for, according to the NCRB report, which was mentioned in Parliament by the Ministry of Home Affairs (LS Q no. 3928, 20-03-2018).

## II. RELATED WORK

*1) Missing Child Identification using Face Recognition System*
Authors: Rohit Satle, Vishnu prasad Poojary, John Abraham and Shilpa Wakode
The study provides a straightforward method for face recognition that requires little computation time and has good detection accuracy.
The test outcomes reveal that the algorithm handles the majority of difficulties, such as changing backgrounds, lighting issues, changing poses, and the quantity of faces in the database, quite well. Future research on high-quality facial recognition systems that are prediction-based is possible.

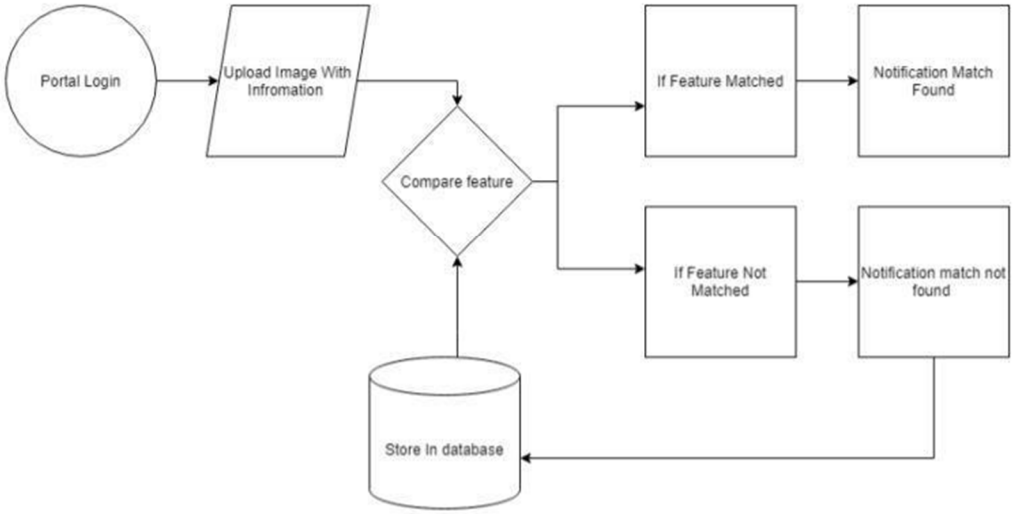
*2) Face Recognition using Histograms of Oriented Gradients*
Authors: O. Deniz, G. Bueno, J. Salido, and F. D. la Torre
This study investigates the application of HOG attributes to face recognition.

The three contributions are as follows:
*a)* We propose uniformly sampling the HOG features to make facial feature detection more robust,
*b)* We propose using dimensionality reduction in the HOG representation to reduce data redundancy, increase computational efficiency, and prevent overfitting, and
*c)* We demonstrate a decision-level combination of results utilising HOG attributes extracted from various different sized image patches.

## III. METHODOLOGY

### A. Proposed Architecture




### B. Proposed System

In this study, a novel method for using deep learning techniques to locate a missing child using facial recognition from a collection of numerous children's images is presented. A public site allows users to post images of a suspicious child along with comments and pertinent landmarks. A comparison is then made automatically between the uploaded photo and the pictures of missing children listed in a repository. The image of the input child is categorised, and the picture from the missing children dataset that matches the input child the closest is chosen. To do this, a facial image supplied by the public is used to train a deep learning network to accurately find the missing child from the child image dataset. The project's accuracy is evaluated using a variety of algorithms, including CNN,, RESNET 50, and VGG 16, and the optimal value is chosen as the best after comparison.

*1) Advantages*

*a)* A deep learning framework has been developed in this project, taking into account all of these limitations.

*b)* Compared to other biometric systems such as fingerprint and iris recognition, the proposed system is an easier, more cost-effective, and dependable method.

### C. Proposed Algorithm

*1) Convolutional Neural Network:* To illustrate the construction of a convolutional neural network (CNN) for categorisation of images, we will create a compact 6-layer network capable of distinguishing one specific image from others. This network is designed to be suitable for running on a CPU and serves as an example of a real-world CNN.

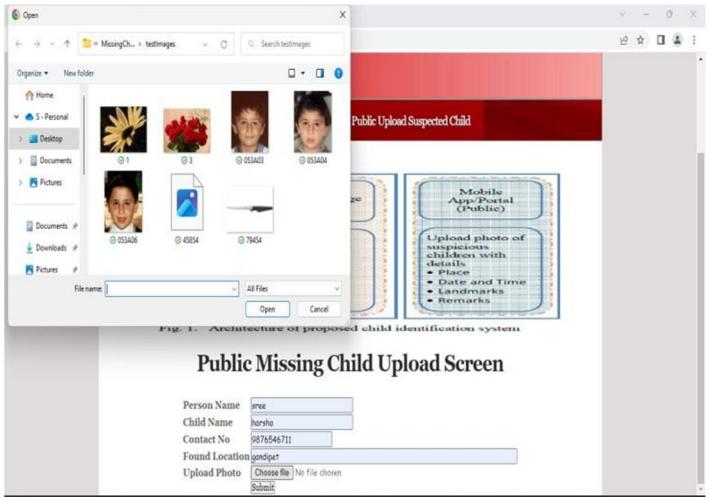
*2) VGG -16 Architecture:* The VGG16 model is a well-known convolutional neural network architecture introduced which achieved impressive results on the ImageNet dataset, with a test accuracy of 92.7%. ImageNet consists of a vast collection of over million images categorized into 1000 classes. VGG16 was a notable submission to the ILSVRC-2014 competition.

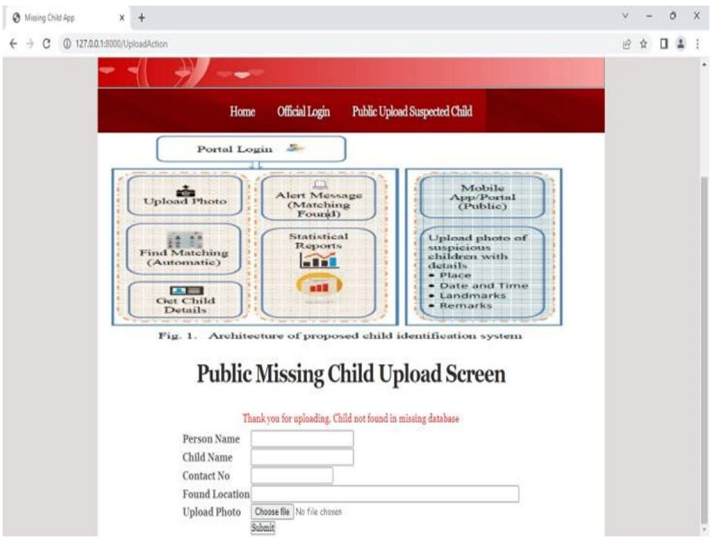
*3) RESNET-50:* The Residual neural networks, including the ResNet-50 model, are convolutional neural networks (CNNs) with a deep architecture consisting of 50 layers. Residual neural networks utilize a unique approach by incorporating residual blocks, which are stacked sequentially to form the network structure.

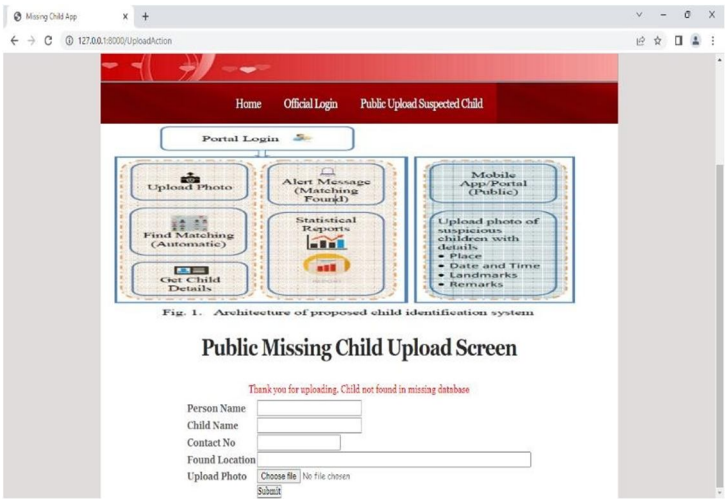
The problem of disappearing gradients that can occur during the training of deep neural networks was addressed by ResNets.. The residual blocks within ResNets allow for the direct flow of information from earlier layers to subsequent layers, bypassing intermediate layers. This enables more efficient gradient propagation and helps alleviate the degradation problem associated with training very deep networks. By incorporating residual connections, ResNets enable the training of significantly deeper models while maintaining better optimization and accuracy.

## IV. RESULTS

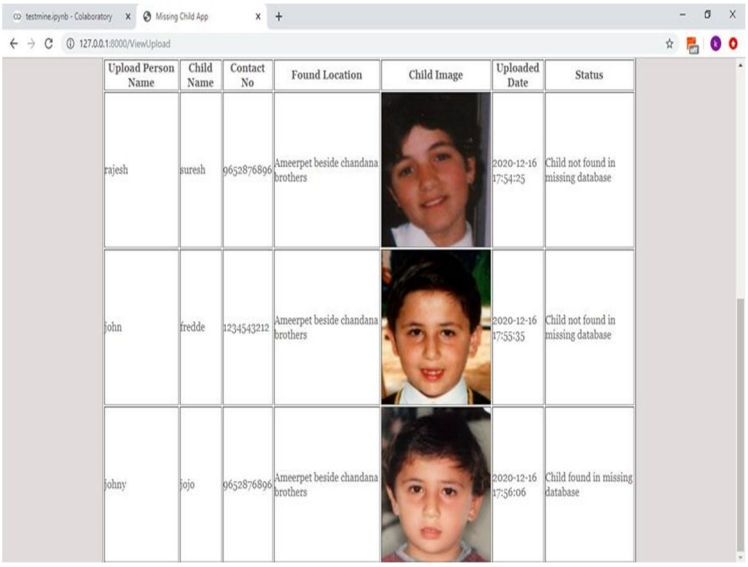
### A. Output Screens


Missing Child App
127.0.0.1:8000/UploadAction
Home
Official Login
Public Upload Suspected Child
Portal Login
Upload Photo
Find Matching (Automatic)
Get Child Details
Alert Message (Matching Found)
Statistical Reports
Mobile App/Portal (Public)
Upload photo of suspicious children with details
• Place
• Date and Time
• Landmarks
• Remarks
Fig. 1. Architecture of proposed child identification system
Public Missing Child Upload Screen
Thank you for uploading. Child not found in missing database
Person Name
Child Name
Contact No
Found Location
Upload Photo
Choose file
No file chosen
Submit


Missing Child App
127.0.0.1:8000/Login.html
Home
Official Login
Public Upload Suspected Child
Portal Login
Upload Photo
Find Matching (Automatic)
Get Child Details
Alert Message (Matching Found)
Statistical Reports
Mobile App/Portal (Public)
Upload photo of suspicious children with details
• Place
• Date and Time
• Landmarks
• Remarks
Fig. 1. Architecture of proposed child identification system
Official Login Screen
Username
Password
Login


testmine.ipynb - Colaboratory
Missing Child App
127.0.0.1:8000/ViewUpload
Upload Person Name
Child Name
Contact No
Found Location
Child Image
Uploaded Date
Status
rajesh
suresh
9652876896
Ameerpet beside chandana brothers
2020-12-16 17:54:25
Child not found in missing database
john
fredde
1234543212
Ameerpet beside chandana brothers
2020-12-16 17:55:35
Child not found in missing database
johny
jojo
9652876896
Ameerpet beside chandana brothers
2020-12-16 17:56:06
Child found in missing database

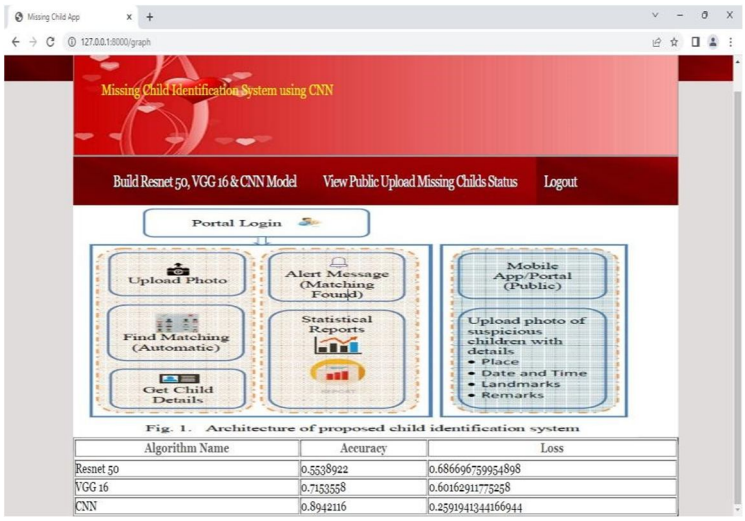
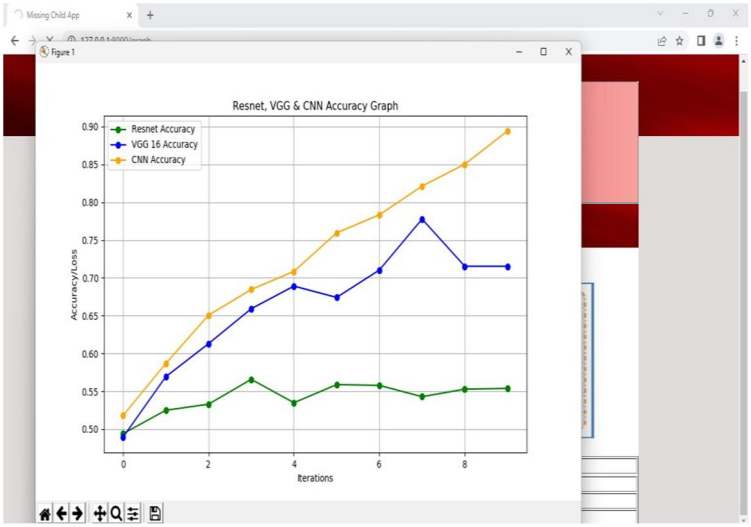



Fig. 1. Architecture of proposed child identification system

| Algorithm Name | Accuracy | Loss |
|---|---|---|
| Resnet 50 | 0.5538922 | 0.6866967599954898 |
| VGG 16 | 0.7153558 | 0.6016291177525 8 |
| CNN | 0.8942116 | 0.2591941344166944 |




## V. CONCLUSION

In the study, a method for identifying missing children is suggested that combines a support vector machine classifier for sorting different children into groups with a CNN-based deep learning approach for feature extraction. To test the system, a deep learning model is trained using feature representations of children's faces. The objective of this review is to determine how effectively the system locates missing children.

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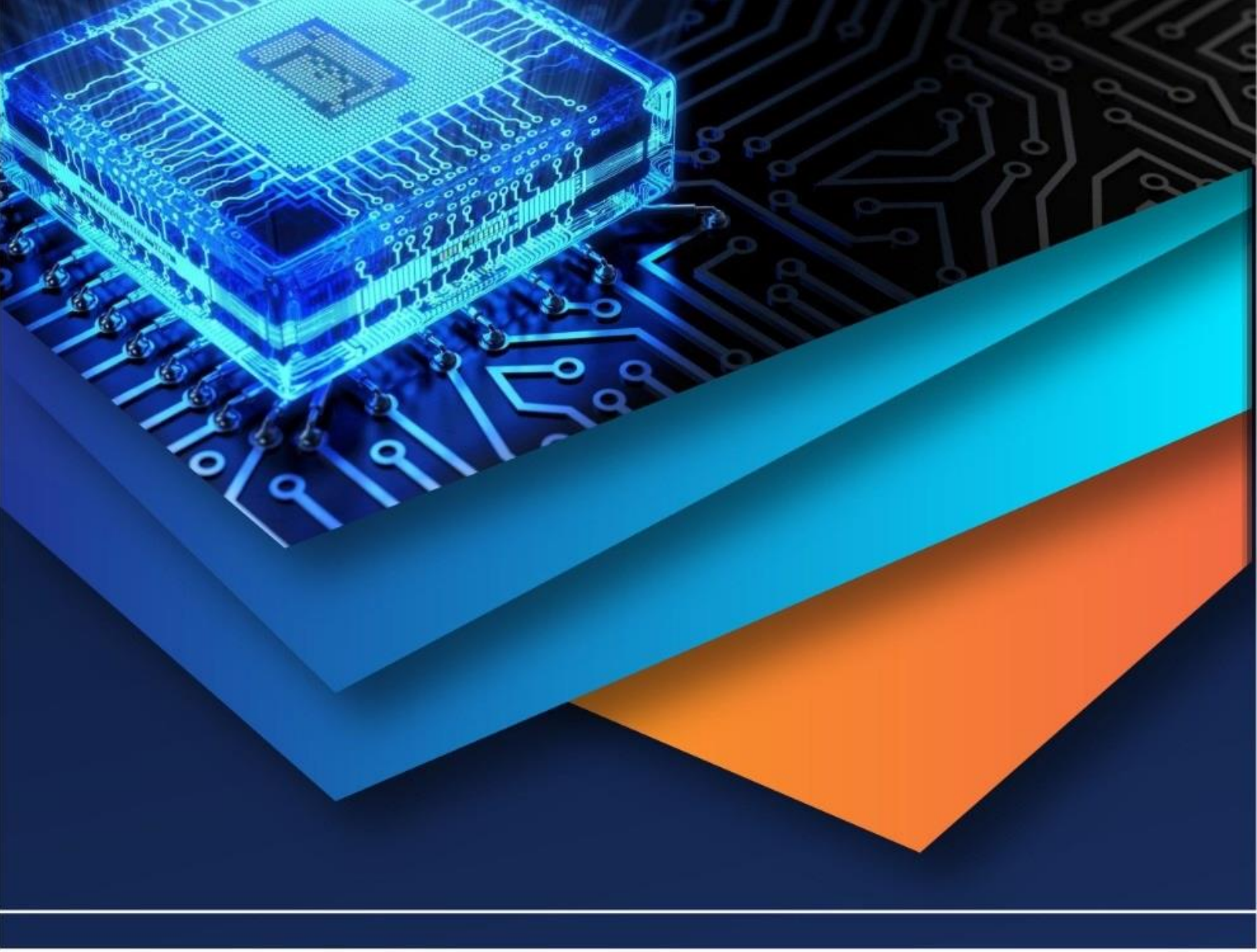

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