



LOST PERSON IDENTIFICATION SYSTEM USING DEEP LEARNING

BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH, CHENNAI, TAMILNADU

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

AUTHORS OF THIS PROJECT

N.Anithaa
Assistant^p
1

Professor,
Department of Computer
Science and Engineering,
Bharath Institute of Higher
Education and Research,
Chennai 600073, Tamil
Nadu, India.

P. Sainath Reddy^{p2}
Department of Computer
Science and
Engineering,
Bharath Institute of
Higher Education and
Research,
Chennai 600073, Tamil
Nadu, India.

R.Sai Kumar^{p3}
Department of Computer
Science and Engineering,
Bharath Institute of
Higher Education and
Research,
Chennai 600073, Tamil
Nadu, India.

P Kiran Kumar^{p4}
Department of Computer
Science and Engineering,
Bharath Institute of Higher
Education and Research,
Chennai 600073, Tamil
Nadu, India.

P.Sairam^{p5}
Department of Computer
Science and
Engineering,
Bharath Institute of
Higher Education and
Research,
Chennai 600073, Tamil Nadu,
India

Abstract - This paper tells a pair of novel use of deep learning methodology which is employed for identifying the reported missing children from the images of multiple youngsters available, with the assistance of face recognition. The ultimate public can upload their images of suspicious children into an everyday portal with landmarks and remarks. The photos are automatically compared with the registered photos of the missing child from the repository. Cataloging of the input child photo is performed and photos with best match are designated from the database of missing children. For this, a deep learning model is trained to properly identify the missing child from the missing child image database provided, using the facial image uploaded by the final user. The Convolutional Neural Network (CNN), an incredibly effective deep learning technique for image-based applications, is adopted here for face recognition. Face descriptors are extracted from the images employing a pre-trained CNN model VGG-Face deep architecture. Compared with normal deep learning applications, our algorithm uses convolution network only as a high-level feature extractor and thus the kid recognition is completed by the trained SVM classifier. Choosing the foremost effective performing CNN model for face recognition, VGG-Face and proper training of it finally ends up during a very deep learning model invariant to noise, contrast, image pose and also the age of the children and earlier methods in face recognition-based missing child identification.

Keywords - Face recognition; Image processing ; Numpy; SVM ; CNN features ; Search photos ; Matplotlib Introduction

I. INTRODUCTION

The main purpose of this design is to spot Missing Child Identification System using Deep Learning and Multiclass SVM. In India, a large number of youngsters are reported missing. Among the missing child cases, an oversized chance of youngsters remains untraced. The general public can upload photos of suspicious child into a standard gate with milestones and reflections. The photos are automatically compared with the registered photos of the missing child from the depository. The Convolutional Neural Network (CNN), a largely effective deep learning fashion for image-grounded operations, is espoused then for face recognition. The bracket performance achieved for child identification system is 99.41%. It had been estimated on 43 child cases.

Children are the topmost asset of every nation. The longer term of any country depends upon the correct parenting of its children. India is that the alternate vibrant country within the world and youngsters represent a big chance of total population. But unfortunately, an oversized number of youngsters go missing when in India because of colorful reasons including hijacking, run-away children, traded children and lost children. The kids who are missing could also be exploited and abused for colorful purposes. As per the National Crime Records Bureau (NCRB) report which was cited by the Ministry of Home Affairs (MHA) within the Parliament (LS Qno. 3928, 20-03-2018), further than one lakh children (in factual figures) were reported to be missing till 2016, and of them remained untraced till the top of the time.

Numerous NGOs claim that estimates of missing children are much advanced than reported. Mostly missing child cases are reported to the police. The kid missing from one region could also be found in another region or another state, for colorful reasons. So indeed, if a toddler is found, it's delicate to spot him/her from the reported missing cases. A frame and methodology for developing an assistive tool for tracing missing child is described during this paper. A concept for maintaining a virtual space is proposed, similar that the recent photos of kids given by parents at the time of reporting missing cases is saved in a very depository. The general public is given provision to freely take photos of kids in suspected situations and upload them in this gate. Automatic searching of this print among the missing child case images is going to be handed within the operation. This supports the law enforcement officials to detect the kid anywhere in India. When a baby is found, the photo that point is matched against the pictures uploaded by the Police/guardian at the time of missing. Occasionally the kid has been missing for an extended time.

II. LITERATURE SURVEY

2.1 Y. LeCun, Y. Bengio, and G. Hinton, "Deep knowledge", Nature, 521 (7553) 436 – 444, 2015.

Deep knowledge allows computational models that are composed of multiple processing layers to search out representations of knowledge with multiple situations of abstraction. These styles have dramatically bettered the state-of-the-art in speech recognition, visual beholding, object discovery and cornucopia of other disciplines like drug discovery and genomics. Deep knowledge discovers intricate structure in large data sets by using the backpropagation algorithm to point how a machine should change its internal parameters that are accustomed cipher the representation in each caste from the representation within the former caste. Deep convolutional nets have led to advancements in

processing images, video, speech and audio, whereas intermittent nets have shone light on successive data like text and speech.

2.2 O. Deniz, G. Bueno, J. Salido, and F.D. la Torre, "histograms of acquainted slants are used for Face recognition", *Pattern Recognition Letters*, 32 (12) 1598 – 1603, 2011.

Still-to- video face recognition (FR) plays a awfully important part in video surveillance, allowing to admit individualities of interest over a network of video cameras. Watch-list netting may possibly be a challenging video surveillance operation, because faces captured during enrollment (with still camera) may differ significantly from those captured during operations (with surveillance cameras) under hysterical internee conditions (with variations in, e.g., disguise, scale, illumination, occlusion, and blur). Also, the facial models used for identical are generally designed a priori with a limited number of reference stills. during this paper, a multi-classifier system is proposed that exploits sphere adaptation and multiple representations of face captures. A specific ensemble of exemplar-SVM (eSVM) classifiers is supposed to model the only real reference still of every target existent, where different arbitrary subspaces, patches, and face descriptors are employed to return up with a various pool of classifiers. to boost soundness of faceSVMs are trained using the limited number of labeled faces in reference stills from the enrollment sphere, and an cornucopia of unlabeled faces in estimation vids from the functional sphere. The proposed approach has been associated to exposure systems for still-to-video FR on vids from the COX-S2V dataset. Results indicate that ensemble of SVMs designed using estimation vids for sphere adaptation and dynamic ensemble selection yields a high position of FR delicacy and computational effectiveness.

2.3 C. Geng and X. Jiang, " Face identity using sift features", *IEEE International Conference on Image Processing (ICIP)*, 2009. Scale Steady Point Transform (SIFT) has shown to be a strong fashion for general object recognition/ discovery. during this paper, we propose two new ways Volume-SIFT (VSIFT) and Partial-DescriptorSIFT (PDSIFT) for face recognition supported the first SIFT algorithm. We compare holistic approaches Fisherface (FLDA), the set approach (NLDA) and Eigenfeature Regularization and Birth (ERE) with point predicated approaches SIFT and PDSIFT. Trials on the ORL and AR databases show that the act of PDSIFT is significantly better than the original SIFT way. Also, PDSIFT are suitable to do analogous performance because the foremost successful holistic approach ERE and significantly outperforms FLDA and NLDA.

III. EXISTING SYSTEM

The Existing system tells about the face recognition by the computer vision features like LPB, HOG etc... The features which was extracted using convolutional neural network (ConvNet) gives us better facial expressions in an face recognition when compared to other methods. Each and every face photo corresponds to a child and the child face recognition is considered as an photo category classification issue.

3.1 Disadvantages of Existing System

The main disadvantages in missing child identification system in existing system , daily nearby 100+ children are missing some child are found and a few child aren't found. And there isn't any any system available to spot the facial expressions of kid in an different environment like noises, lightning conditions with different facial attitudes and with different children.

IV. PROPOSED SYSTEM

This article presents a novel utility of deep learning methodology to pick out a lacking child from snap shots of multiple kids the use of facial reputation. The public can upload pictures of toddler suspects to a shared portal with terms and situations. The photographs may be automatically compared with the recorded pix of the lacking infant from the refuge. A picture of the kid is entered and the most appropriate photograph is chosen from the database of children's numbers. To do that, a deep getting to know version is formed to properly discover a lacking baby from a database of lacking youngsters the use of snap shots uploaded by way of the general public sector.

4.1 Advantages of Proposed System

Here, a deep getting to know architecture is evolved that considers a lot of these obstacles.

The proposed gadget is exceptionally simple, flexible, and compatible with other biometric systems including fingerprint and iris popularity systems.

4.2 Architecture Diagram

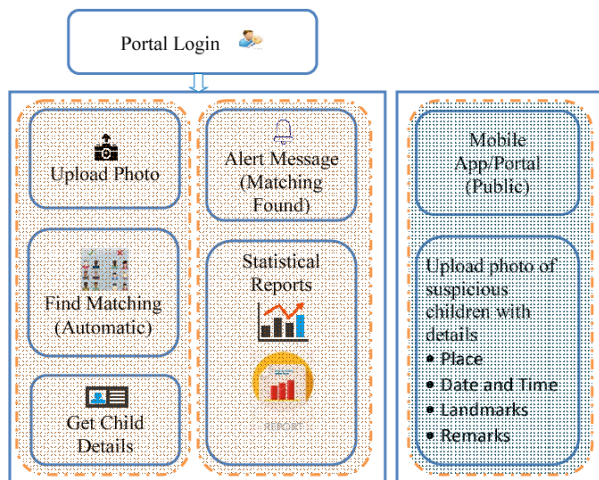


Fig.1 Block Diagram

4.3 UML Diagrams

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in object-oriented software engineering. The standard is managed and was created by the Object Management Group. The unified modeling language allows the software engineer to express an analysis model using the modeling notation governed by a set of syntax, semantic and pragmatic rules.

4.3.1 Class Diagram

A Class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, and the relationships between the classes.

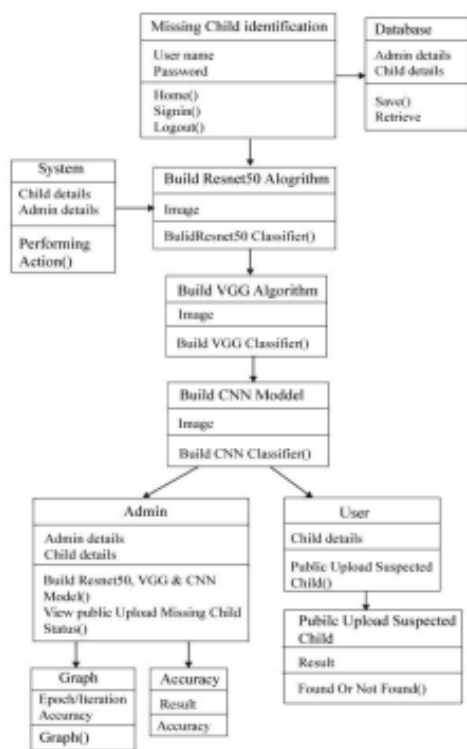


Fig. 2 Class diagram for overall project

4.3.2 Sequence Diagram

A Sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. Sequence diagrams are sometimes called Event-trace diagrams, event scenarios, and

timing diagrams.

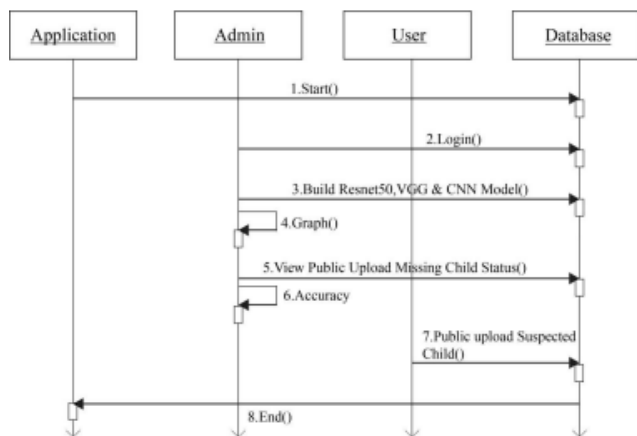


Fig. 3 Sequence diagram for overall project

V. SYSTEM DESIGN

5.1. System Requirements

User constraints

User Constraints for the project are analyzed in this phase, and the business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis, the feasibility study of the proposed system is to be carried out.

a) Hardware Requirements

Processor : i3 or higher

Speed : 2.9 GHz

RAM : 4 GB (min)

Hard Disk : 160 GB

b) Software Requirements

Operating system : Windows 7 Ultimate Coding

Language: Python Back-End : Django-ORM

Designing : Html, CSS, javascript

Data Base : MySQL (WAMP Server)

5.2 System Design

System design involves the architectural and detailed design of the system. Architectural design involves identifying software components, decomposing them into processing modules and conceptual data structures, and specifying the interconnections among components. Detailed design is concerned with how to package processing modules and implement the processing algorithms, data structures and interconnections of standard algorithms, the invention of new algorithms, and the design of data representations and packaging software products. Two kinds of approaches are available:

- Top-down approach
- Bottom-up approach

5.3 System Architecture

Python

Python is our major programming language. It turned into used to create our neural community version. It provides diverse tools and libraries to constantly build our version.

OpenCV

OpenCV is another library of many programming capabilities designed for actual pc vision. We used this library to method pix in actual time, get admission to the digicam and display the human result. Matplotlib.

Matplotlib. Pyplot is a set of functions that make matplotlib paintings like MATLAB. Each pyplot function makes positive modifications to the shape: as an example, it creates a form, creates a place plot in the form, plots numerous lines within the region, decorates the plot with labels.

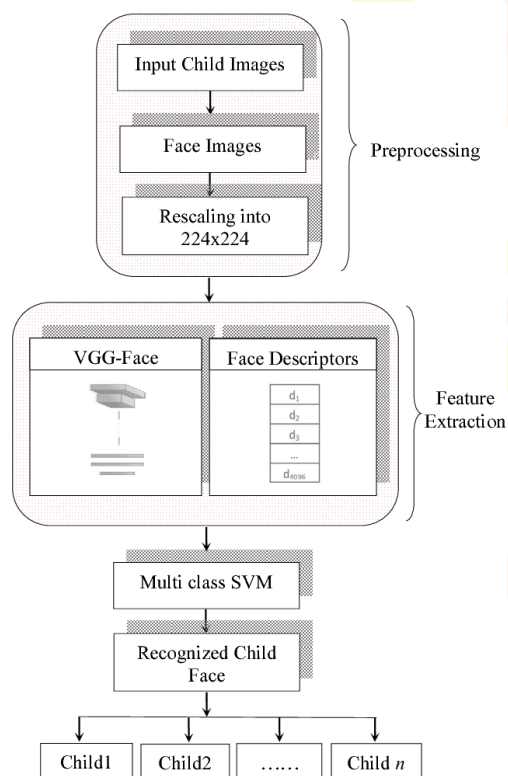


Fig.4 System Architecture

Haarcascade classifier

The Haar Cascade is a system learning item detection set of rules used to become aware of objects in a picture or video and is primarily based on the characteristic idea proposed through Paul Viola and Michael Jones within the 2001 paper "Fast Object Detection Using Boosted Simple Feature Cascade" in 2001. E. LBPH Binary Location pattern (LBP) set of rules is a simple however effective texture operator that labels pixels in a photograph around every pixel community and treats the result as a binary quantity. It changed into first described in 1994 (LBP) and has considering been located to be the maximum powerful feature for texture type.

Modules

Preprocessing

- Preprocessing of uncooked input images inside the context of face identification includes acquiring face location and trendy pics in a layout well suited with the array structure used.
- Everyone has a terrific range of games. Photographs of the lacking infant are taken with the aid of a portable digicam or car and split into individual frames to create a facial recognition system database.

Search

- When addicts positioned a finger on a baby suspect, the system generates a profile vector of the face from the uploaded picture.
- However, the machine presentations the maximum engaged seal and sends a message of purpose to insert the child to the proper officer or telegraph if the in shape is in garage.
- The carrier can also check the compliance with the objectives of the database the use of the machine at any time.

Algorithms

CONVOLUTIONAL NEURAL NETWORK

Convolutional Neural Network is one of the essential classes for image class and picture recognition in neural networks. Scene layout, object detection, face recognition, etc. Are some of the international locations wherein convolutional impartial networks are broadly used.

Rhino takes a photo as input, which is assessed and processed in step with a particular class, inclusive of canine, cat, lion, tiger, and so on. A computer sees a picture as prepared in pixels and depends at the decision of the image. Depending on the decision of the photo, it will look like $h * w * d$, in which h = peak, w = width, and d = length. For example, an RGB picture is organized in a $6*6*3$ matrix, and a grayscale picture is organized in a $4 * 4 * 1$ matrix.

In CNN, each enter photograph will go through a sequence of convolutional layers with collates, layers, and filters (also referred to as kernels). After this, we observe the gentle-max feature to make the item more likely to document the values 0 and 1.

Conductor layers integrate similar traces into one with the aid of downsampling to a appropriate size. The important idea at the back of mere layering is that the location relative to another object is extra important than the precise vicinity of any item. This reduces the dimensions of function maps and network parameters.

The final table, a completely connected layer, outputs the variety of instructions it known as. There are several fully related layers that convert 2D feature maps into 1D feature vectors for in addition representation of capabilities.

Support Vector Machine

The cause of the assist vector device set of rules is to find a hyperplane in an N dimensional area (N range of strains) that surely represents the facts factors.

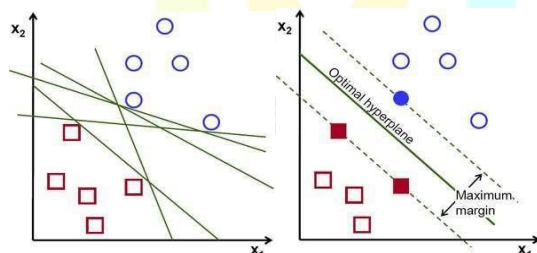


Fig.5 Possible hyperplanes

To separate two sorts of information points, a set of feasible hyperplanes can be chosen. The goal is to find the aircraft with the biggest margin, that is, the most important distance between the given points of each sort. Increasing the gap method affords a few benefits in order that future records points may be described greater precisely. Hyperplanes and

Support Vectors Hyperplanes are selection limitations that help classify statistics factors. Data points that fall on either side of the hyperplane can be assigned to differing types. The length of the hyperplane depends on the range of traces. If the number of enter lines is two, the hyperplane is best a line. If the quantity of enter lines is 3, the hyperplane turns into it.

VI. RESULTS AND DISCUSSION

6.1. Sample screens

As requested added the below modifications shown on the screens.



Fig.4 Data Set

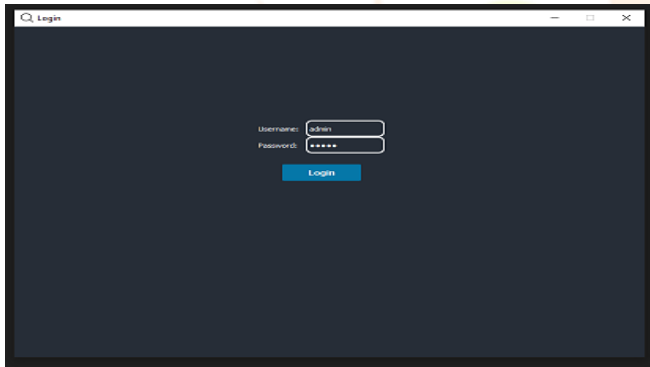


Fig.5 Login Page

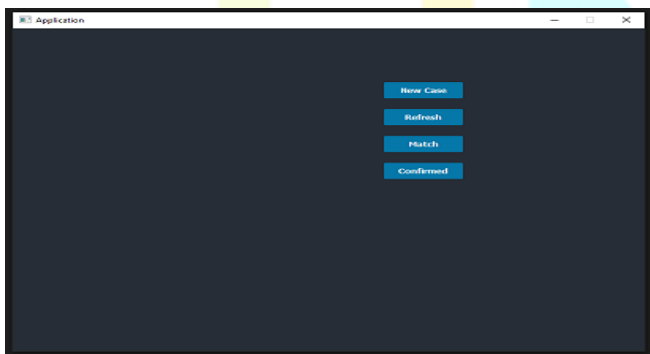


Fig.6 Search Page

In above screen public can click on ‘Public Upload Suspected Child’ link to get below page and to add missing child details

The above screen displays parent details with the adopted child's name, logout, and login as welfare.

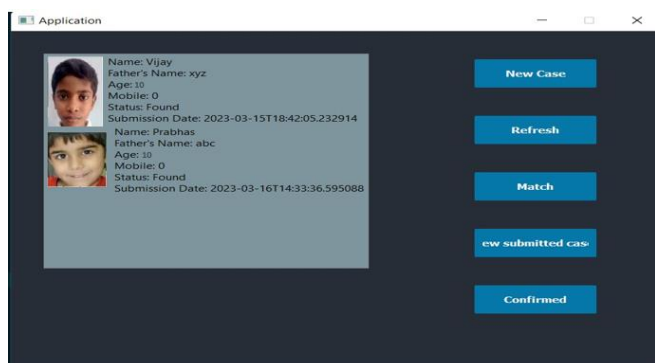


Fig.7 Result Page

VII. CONCLUSION

A missing child identification system is proposed, combining the powerful CNN-based deep learning approach for feature extraction and support vector machine classifier to classify different child categories. This system is evaluated with the deep learning model, trained with feature representations of children's faces. By discarding the softmax of the VGG-Face model and extracting CNN image features to train a multi-class SVM, it was possible to achieve superior performance. The performance of the proposed system is tested using photographs of children with different lighting conditions, noises, and images at different ages. The classification achieved a higher accuracy of 99.41%, showing that the proposed face recognition methodology could be used for the reliable identification of missing children. In the missing child project, the student was asked to implement RESNET 50 and VGG 16 and compare their accuracy with CNN

VIII.FUTURE ENHANCEMENT

A missing child identity system is proposed that combines a powerful neural community-based totally deep getting to know technique for function extraction and a help vector classifier to classify distinctive toddler categories.

This machine is evaluated with the aid of a deep studying version that learns from the children's own images of faces. By leaving the soft most VGG- Face version and extracting the range of photo capabilities for multiclass SVM education, exceptional performance was accomplished.

The implementation of the proposed machine is tested in pictures of children underneath one-of-a-kind conditions of lighting and noise, in addition to in photographs of youngsters of various a while. The class executed a high accuracy of ninety nine. Forty one%, which suggests that the proposed facial reputation methodology can be used to reliably discover lacking youngsters.

Reference Books

- Python Crash Course 2nd Edition - this is a basic-level book for beginners.
- Learning Python 5th Edition - this book is a practical learning book for basic to advanced levels.
- Python Cookbook - this book is for advanced programmers interested in learning about modern python development tools.
- Automating Boring Stuff With Python - In this book, you will learn to write programs in python.
- Head First Python - this book covered the fundamental of python.

Think python - the basics of programming concepts and cover advanced topics like data structure and object-oriented design.

Appendix-1

Url Listing

- www.google.co.in
- www.python.org
- www.w3schools.com
- www.pythontutorial.com

Appendix – 2

Glossary

- GUI: Graphical User Interface
- UML: Unified Modeling Language
- API: Application Programming Interface
- HTML: Hyper Text Markup Language
- URL: Uniform Resource Locator
- ODBC: Open Database Connectivity

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