

Public Safety Implementation of Facial Recognition

¹Pavan Kumar P, ²Mohammad Shaham, ³Mohammad Sahal, ⁴Anilkumar Ambore

⁴Professor, ^{1,2,3,4}School of C&IT, Reva University, Bangalore, India
¹pavan.r834@gmail.com, ²mohd.shaham7@gmail.com, ³sahal694@gmail.com
⁴anilambore@reva.edu.in

Article Info

Volume 83

Page Number: 4925-4929

Publication Issue:

May - June 2020

Abstract

The objective of this project is to make it easy for users who have lost their people and trying to find, as the process of finding missing ones gets easier by using the web application as the user just has to upload the picture of the person who is lost and if the details given by the user matches with our database then the details will be shared such as the whereabouts. The main idea is to help people make finding their lost ones easier. It is really necessary because there are so many missing cases across the world which are increasing drastically and the chances of finding the missing person is nearly impossible. As our Web Application make use of Facial Recognition to help find the missing ones as our web application makes it easier and it's easily accessible. All the web application needs is the picture of the lost person to be uploaded and any user can upload a real time picture of the person to be found which is to be compared to the existing pictures in the database. And if a match is found, then the user who uploaded the picture will get the given details of the missing person. Making this process easier and faster makes whole dynamics of finding a missing person way more accessible and easier compared to the pre-existing methods.

Article History

Article Received: 19 November 2019

Revised: 27 January 2020

Accepted: 24 February 2020

Publication: 16 May 2020

Keywords: Facial recognition, database, pre-existing models.

1. Introduction

The technology has helped humans in a lot of ways and there are many ways yet to discovered. Retrieving information from the internet has become a very easy task as it's a click away for the user. One of the technologies, we are using is facial recognition. A facial recognition system is a technology which helps in identifying and verifying a person from a image or any other kind of source. There are many methods in which facial recognition systems work, but firstly the general, they compare the picture which lies in the database by checking the facial features. Facial recognition is used pretty much at every place and it has a wide range of usage and there's a lot of scope for this particular field. It's used for causes like security, theft, comparing, verifying etc. The technology used to compare the faces which is the facial features such as width of eyes and width of eyes & pupil and come up with a suitable

answer. The group has been trying to implement Deep metric learning as well for more accuracy in comparing the pictures. For ex, if a person is lost when he/she is 10years old and now he/she is 20years old, it'll be difficult to match the faces. That's where deep metric learning becomes useful as we compare not just one, we compare two or three pictures together for accurate results. In our project, the group talks more about the missing persons as we know that the regular and mainstream method to find the missing person is to report to police or stick the posters on the walls and through communication. As this is happening, the reports of the missing persons have been increasing drastically and finding them isn't increasing. 174 youngsters disappear in India ordinary (MHA - 2016) Only a large portion of the kids who disappear each year can be followed (MHA - 2016) One in each 4 missing kids in India are from urban communities (MHA - 2016) More than 1/third of the missing kids in the nation are amassed in only 3 states –

West Bengal, Delhi and MP (MHA - 2016) Kidnapping and Abduction (K&A) of kids is the biggest wrongdoing carried out against kids and records for 51% of all violations against kids (NCRB 2016). These stats of missing persons is only what is acknowledged till now and there might be way more than this.

This is where our web application comes to the play as the idea is to help people find the ones they're searching for. All the person need is the picture and few details of the missing person if he/she is searching for someone. It's the same for vice-versa, if the user is trying to help the missing person and uploads the picture in the database.

The user is given options to upload an image of a lost person or to upload the image of a found person. Another option is to modify the status of the pre-uploaded data. If the person is found, user can mark the person as safe which is an action to be chosen. Or he can update the data to add more information or to remove information.

2. Literature Survey

Everyday thousands of children are reported missing, many are never found. In India no exact figures are accessible, be that as it may, as indicated by an article in an English day by day, the quantity of runaways is 10 lakhs for each annum, for example, at regular intervals a kid flees from home.. On the off chance that you include the number of missing, lost and kidnapped kids the quantity of missing kids is phenomenal.[1]

797,500 youngsters (more youthful than 18) were accounted for missing in a one-year timeframe studied resulting in a normal of 2,185 kids being accounted for missing each day.[2] 203,900 kids were the survivors of family kidnappings. [2] 58,200 kids were the survivors of non-family abductions.[2]. 115 kids were the survivors of "cliché" capturing. These bad behaviors incorporate someone the child doesn't have the foggiest thought or someone of slight partner, who holds the child until further notice, transports the kid 50 miles or more, slaughters the youth, demands liberate, or plans to keep the child permanently. [2]

Weidong Min et al. [3] proposed a framework for Real-time Face Recognition dependent on Pre-recognizable proof and Multi-scale Classification. They built up a framework in which countenances can be heartily recognized in muddled situations, for example, heads moving every now and again or with enormous edges. To precisely perceive little scope faces, the Multi-scale and Multichannel Shallow Convolution arrange (MMSCN) was proposed which consolidates a multi-scale system on the element map with a multichannel convolution organize for continuous face acknowledgment.

Shreyak Sawhney proposed a structure for Real-Time Smart Attendance System utilizing Face Recognition Techniques. A framework was produced for actualizing a mechanized participation the executives framework for understudies of a class by utilizing face

acknowledgment system, by utilizing Eigenface values, Principle Component Analysis (PCA) and Convolutional Neural Network (CNN). To mark the participation, the perceived countenances ought to be contrasted and the database containing understudy's appearances.

Ni Kadek, Ayu Wirdiani proposed a model for ongoing face acknowledgment with eigenface technique. The proposed framework had two significant procedures, specifically the preparation procedure and the recognizable proof procedure. The face enrollment process utilizes face identification utilizing the OpenCV library. The element extraction procedure and prologue to the acknowledgment framework utilize the Eigenface strategy.

Weihua Sheng proposed a savvy security framework with face acknowledgment. A strong security dependent on face acknowledgment framework (SoF) was formed to give access into a home for confirmed users. By utilizing a profound learning structure - TensorFlow, it will be easy to reuse the framework to get with various devices and applications. In the `aws_compare_faces.py` file, I have set three parameters to be parsed to the aws server. The aws cli enables us to use a simple three argument passing philosophy. Before the easy step, we have to set all parameters previously. These parameters include the s3 bucket zone parameter, the buckets permissions, the uploaded images permissions, the IAM user permissions, the access id key, the secret access key, the default region type of cli and the cli output format. After stating the users account, we access the bucket by declaring the buckets name. (rekognition.(2018). Retrieved from [amazon:https://docs.aws.amazon.com/rekognition/latest/dg/what-is.html](https://docs.aws.amazon.com/rekognition/latest/dg/what-is.html))

IoT based facial recognition security system- any changes in the appearance would lead to the malfunction of the technology, providing no other option than to take the picture again. [IoT based facial recognition security system – Prashant Balraj Balla, K.T. Jadhao- 2018 IEEE conference paper]

Krishna Kumar .N et al. built a model for Modern Face Recognition with Deep Learning by coding in python to recognise faces in all conditions. Deep learning techniques were used for face measurement. They developed a system that could take in measurements form a new test image and tell which person was the closest match to it.

3. Proposed Methodology

Our web app is built with React JS Framework supported by Html, NodeJs, JQuery, The Amazon Rekognition service and S3 buckets. The basic working of the application is once the picture of the missing person is uploaded The Amazon Rekognition process the image and JSON representation of stats is given by the reference photo and is stored in the S3 bucket and once the picture is uploaded for search JSON representation of that image is compared to features of images in the reference collection.

For basic understanding we will have two types of users: the one who uploads a picture of the lost person the first time into the system lets call this person "friend" and that we additionally will have a another person who transfers a picture of the individual the subsequent time we should call this individual "Helper". When the friend uploads a picture to the system the image is stored in the S3 bucket (JSON representation) along with the details of the person in the picture given by the friend. Now the helper is an anonymous user who uploaded a picture of a person who seems lost this image will also be converted into JSON representation and compared with the data in our S3 Bucket thus finding a match this person will be able access the details given by the friend thus helping him to contact the friend and report the friend about the missing person.

When a user uploads a picture Create collection function is used to create a collection of vectors created by indexfaces, indexfaces is a detection algorithm that first recognizes the faces in the image given initially. For each face, the algorithm converts the facial features into a feature vector, and stores it in S3 database. The "compare_image()" function is what gets called when the helper clicks the upload image button. image data will be sent to the /compare endpoint. This endpoint will return either an error in case of failure to find the data in S3 bucket, or else a JSON structure containing the id (name) and details of the found face is returned, as well as the percentage confidence, only the image with 80% or more similarity is returned. In case of a successful face match, the function will then move ahead and send the name and details (entered by the friend user) of the matched face to the /speech endpoint. This endpoint calls the Amazon Polly service function to convert the custom message/details to an MP3 file that can be played back to the user. The front end will be developed using react js and designed using FIGMA for maximum user friendly experience making it super easy for any user to access and use the application. Polly service will be utilized to give a better user interface by providing vocal information as well. The front end will have two parts for two types of users one will be from the friend type and the other will be for the helper type user, both users will be able to upload pictures into the data set through a user friendly interface. The users will have to provide access to their photo gallery for this function to work but the permission will be a one time operation of the upload of the image, this means with each upload the user will have to renew the permission this will ensure data privacy.

3.1 User Login

- By making use of React.js to build the user interface and using node.js as backend development collecting information from Mongo DB stored in AWS Server.

- The user is first directed to the user login page where the user enters the details or logs in by using facebook or google.
- Data entered by the user is cross checked with the pre-existing data in the Database to match the details.

3.2 User Account

- The user is given options to upload an image of a lost person or to upload the image of a found person.
- Another option is to modify the status of the pre-uploaded data.
- If the person is found, user can mark the person as safe which is an action to be chosen.
- Or he/she can update the data to add more information or to remove information.
- Or he/she can update the recent found location of the user which helps the process of finding the person easier.
- When the user tries to add a missing person, the user has to fill up the details such as the full name, nick name, height, gender, native, last seen details of the missing person and the contact details of the person uploading the details.
- After filling the details, the user gets the OTP to verify and can save the record.

3.3 Deep Metric Learning

Rather, of attempting to output a single, the output is instead real-valued feature vector. Here we offer 3 pictures to the network: Two of those pictures are unit example faces of identical person. The third image may be a random face from our dataset and isn't identical person because the alternative 2 pictures. Amazon Rekognition gives quick and precise face search, permitting you to distinguish an individual in a photograph or video utilizing your private repository of face pictures.

3.4 Detect Analyze and Compare

Amazon Rekognition gives quick and exact face search, permitting you to recognize an individual in a photograph or video utilizing your private vault of face pictures. You can likewise confirm character by dissecting a face picture against pictures you have put away for correlation.

Rather than taking the troublesome course, you can utilize Amazon Rekognition, which can identify faces in a picture or video, discover facial spots, for example, the situation of eyes, and identify feelings, for example, upbeat or pitiful in close to constant or in bunches without the executives of foundation or demonstrating.

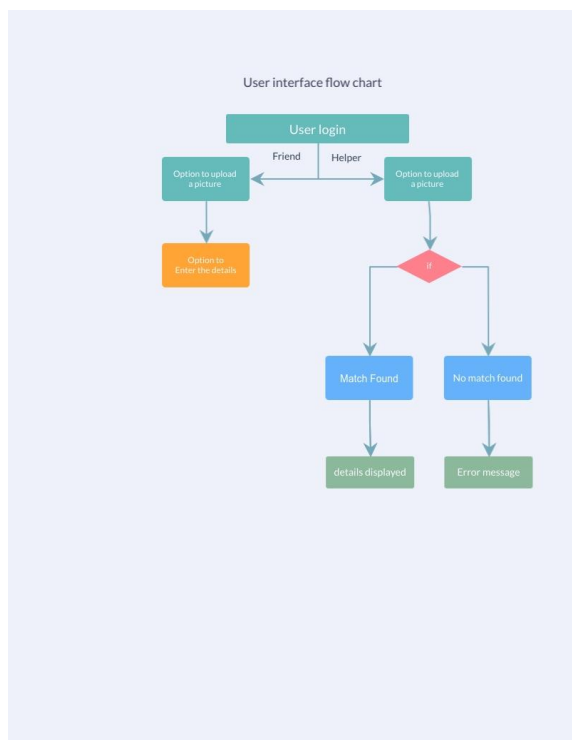


Figure 1: The User interface flow chart.

4. Results

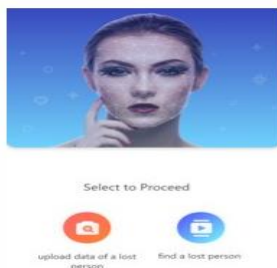


Figure 2: After User Login the user is given two options.



Figure 2.1: After choosing a certain user is given to click a picture and upload



Figure2.2: If the details match with our missing database, details are shared.

- The user is first directed to the login page when the web application is opened. The user will have two options after the logging in.(as shown in Figure 2.0)

First option is to upload a picture of the missing person which is trying to find a person and uploads the image and enters the appropriate details.

Second option is help others find a person, where the user uploads a picture to the database and the picture gets cross checked with the current photos.

If it's a match, then the details will be shared to the person who uploaded the picture.(As shown in Figure 2.2)

If it's not a match, then picture will be stored in the database for future reference.

5. Conclusion

The objective of this project is to find the missing ones and make the search process easier for people as it's not easy nowadays to find someone if they're lost. With proper funding and future enhancement this web application can be used worldwide to find not only the missing victims but also criminals which in turn helps in making the world a better place. With future enhancement, the app can also be used to find the real time location of a person by using the last updated status of the person.

References

- [1] National center of missing children Report by the United States Congress in Septemeber 2013
- [2] The U.S department of justice report by Cathy Giroud in July 2001 at the office of Juvenile Justice and Delinquency Prevention.
- [3] Face recognition with OpenCV, Python, and deep learning by Adrian Rosebrock on June 18,2018
- [4] Deep Metric Learning: A Survey by Mahmut kaya and hasan sakir in Symmetry 11(9): 1066. August 2019

- [5] Huaizu Jiang and Erik Learned-Miller. Face detection with the faster r-cnn. arXiv preprint arXiv:1606.03473, 2017.
- [6] Shengcai Liao, Anil K Jain, and Stan Z Li. A fast and accurate unconstrained face detector. *IEEE transactions on pattern analysis and machine intelligence*, 38(2):211–223, 2017.
- [7] Omkar M Parkhi, Andrea Vedaldi, and Andrew Zisserman. Deep face recognition. In *British Machine Vision Conference*, volume 1, page 6, 2017.
- [8] Xialoin Wu, Xi Zhang Automated inference criminality on Face Images. arXiv:1611.04135v2 [cs.CV] 21 Nov 2018.
- [9] Y. Wang, H. Liao, Y. Feng, X. Xu, and J. Luo. Do they all look the same? Deciphering chinese, japanese and koreans by fine-grained deep learning. arXiv preprint arXiv:1610.01854, 2016.
- [10] J. THIES and O. ZOLLH. M., stamminger, m., theobalt, c., and niessner, m. 2016. face 2 face: Real-time face capture and reenactment of rgb videos. *Proc. Computer Vision and Pattern Recognition (CVPR)*, IEEE.