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Lost + Found: The Lost Angel Investigator

Presented by

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Problem Statement

Problem Definition:

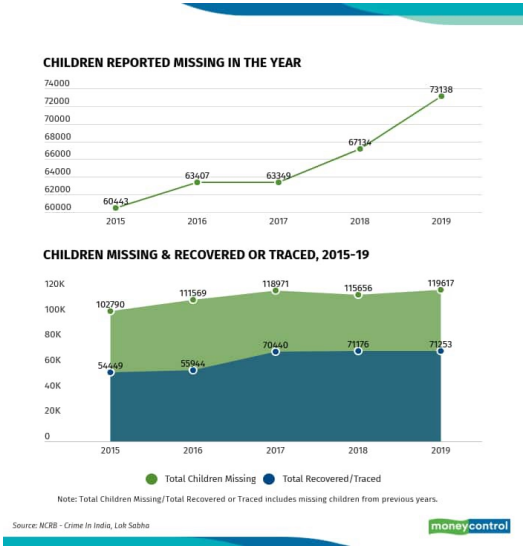
- To develop a Web App that uses Face Verification to locate missing children.

Project Objectives:

- To make it easier to locate lost children.
- Using Face Verification Technology for a Social Good.
- To raise community awareness.
- A way for responsible citizens to assist lost children in finding their way home.

Problem Analysis

- As per survey, an average of 174 children go missing every day, half of them remain untraced.
- A framework and methodology for developing an assistive tool(App) for tracing missing child is discussed here.
- The public is given provision to voluntarily take photographs of children in suspected situations and can uploaded it to the portal.
- The image taken by public may not be of good quality and some other challenges

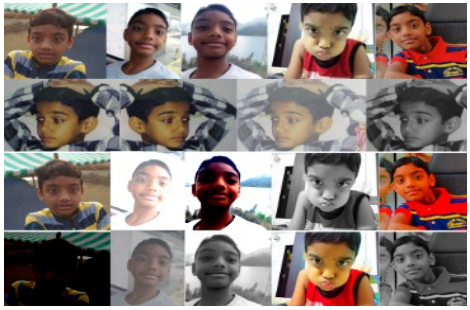


Technologies Used

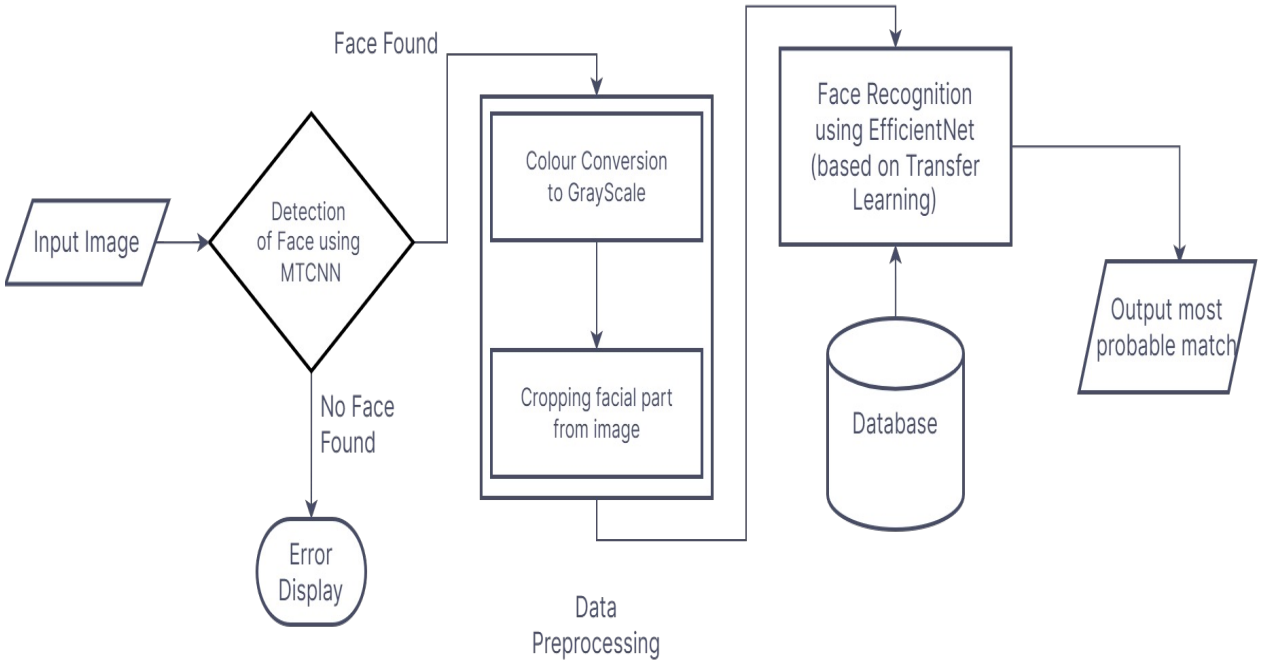
- Children Dataset
- Machine Learning Models –
  - MTCNN Face Detector for Face Detection
  - EfficientNetB0 for Face verification
- Database – SQLite3
- Frontend: JavaScript, HTML, CSS
- Programming Language- Python
- Backend Framework- Django
- IDE- Jupyter Notebook, VS Code
- Other Technologies: Keras, Tensorflow, EfficientNet, Transfer Learning, etc.

Dataset Used

- The dataset consists of 25 classes each having 12-15 images.
- The images used were collected from relatives, friends, and family.
- These images were taken from different angles, varying the amount of light, background and capturing device to stimulate real world situations.
- These images were later used to train the deep learning model.

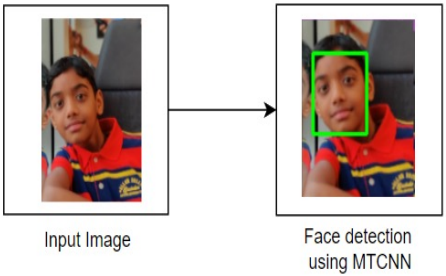


Workflow of The Lost Angel Investigator



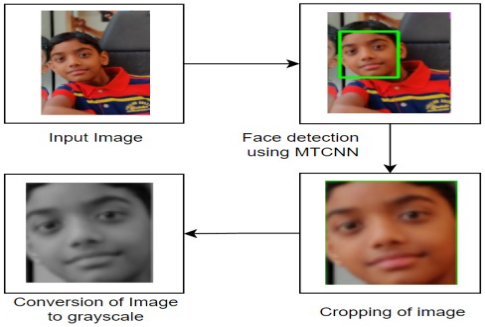
MTCNN Model

- In MTCNN model, first the image is scaled many times to detect faces of various sizes.
- The p-network (proposal) then searches pictures, conducting initial detection. It has a low detection threshold and hence identifies numerous false positives.
- The recommended areas (which contain many false positives) are sent into the second network, the R-network (refine) filters detections to produce very accurate bounding boxes.
- The O-network (output) conducts the final refining of the bounding boxes in the final step.



Data Pre-processing

- The coordinates received from the MTCNN face detector are used to get the coordinates of facial part in that specific image.
- These coordinates are further used to crop image in a rectangle shape.
- This cropped image is then converted to grayscale.
- This is done to normalize all the images with respect to the color.

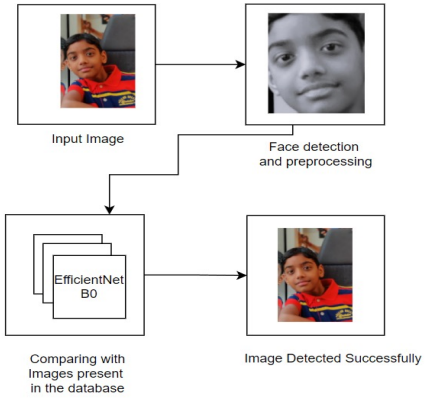


EfficientNetB0 Model

- EfficientNet-B0 is a convolutional neural network trained on millions of photos from the ImageNet database.
- The network can identify photos into 1000 different object categories, including keyboards, mice, pencils, and another animal.
- As a result, the network has learned rich feature representations for a wide range of images.
- The network has an image input size of 224-by-224.

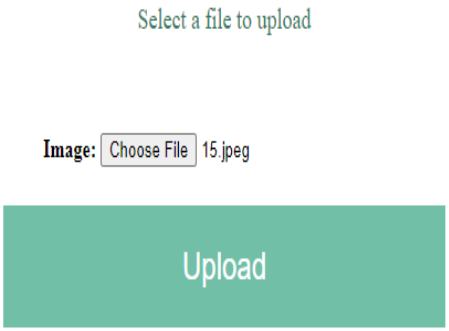
Face Recognition Architecture

- The first layer in this model has a data augmentation layer, followed by a EfficientNetB0 model with removed topmost layer, followed by a GlobalAveragePooling2D layer and a dense output layer.
- The data augmentation layer includes augmenting the images with random flipping, random rotation, random height, random width, random brightness and random contrast
- Finally, a dense layer is added to classify each image into any one of the pre-defined classes.
- Next, to fine tune this model, only the top 5 layers from the base EfficientNet-B0 model are allowed to train on our data, by lowering the learning constant.



Results


Register Yourself
bhavesh
bhavesh11@gmail.con
Password
Confirm Password
9998887775
nagpur
maharashtra
india
112233445566
SUBMIT


Select a file to upload
Image:
Choose File
15.jpeg
Upload

Results

Probable Match Found

Name: Child3

Address: Address3

Mobile No.: 9999999999

Results

- The proposed model achieved a testing accuracy of 76.81% even when trained only on 423 images.
- It was observed that model predicted wrong, when images had side face or excessive noise in the background.
- The model may be improved by training it on additional photos and eliminating as much background noise from the images as feasible.

Future Scope

- **Scope- I**
  - Deploying the application on Heroku.

- **Scope- II**
  - Same Model can be implemented for Attendance System, Finding Criminals, etc.

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Thank You
Questions ?