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Identifying the Missing People using Deep Learning Method

Saravanan Alagarsamy
Department of Computer Science and Engineering.
Kalasalingam Academy of Research and Education,
Anand Nagar, Krishnankoil,
Tamilnadu, India
senthilsar@gmail.com

K. V. Sudheer Kumar
Department of Computer Science and Engineering.
Kalasalingam Academy of Research and Education,
Anand Nagar, Krishnankoil,
Tamilnadu, India
sudheerkumarkatam257@gmail.com

Polineni vamsi
Department of Computer Science and Engineering.
Kalasalingam Academy of Research and Education,
Anand Nagar, Krishnankoil,
Tamilnadu, India
vamsipolineni456@gmail.com

Devisetty Bhargava
Department of Computer Science and Engineering.
Kalasalingam Academy of Research and Education,
Anand Nagar, Krishnankoil,
Tamilnadu, India
devisettybhargava@gmail.com

B. Durga Hemanth
Department of Computer Science and Engineering.
Kalasalingam Academy of Research and Education,
Anand Nagar, Krishnankoil,
Tamilnadu, India
hemanthsunny868@gmail.com

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***Abstract*— Finding the face of objects is one of the major challenging tasks in many applications especially finding the thief. Every day, plenty of news comes related to the above-mentioned issue to identify the face of a particular person in terms of doing the suspicious activity. Image classification is used to find similar images matches and discover the properties of the image based on the predefined pattern. Segmenting the specific region of an image and matching the portion of the image with the already present image. The similarity portion of the image is found using the pixels clustering based on the threshold value. The intention of the work is to find the missed people by applying the deep learning technique to provide the optimal solution. The process is performed by using matching the segmented image with the predefined image present in the database. The suggested technique act as a better solution for finding the missing people involved in various illegal activities.**

Keywords*— *Face detection, Feature matching, Deep learning, Region of interest

I. INTRODUCTION

The department of crime facing lot of hurdles to grip the information captured through public camera. Even though many crime activities are recorded on the camera, the finding the accurate person involved the activities is the quite thought-provoking also the data are handled in the manual way for processing [1]. The automated method is required to identify the objects in the better manner without any manual aid in the process of finding. The suggested technique captures the image, the suspicious region is segmented separately based on the region of interest and feature set is used to find the similarity of image with the actual image and predicted image [3]. Also, the label of the image is also displayed for better identification purposes. The video is splitted into the different sequence of image and it is used to match the image present in the database [6].

II. RELATED WORKS

Vareldzhan et al. [2] purported that the automated recognition of characters in the video based on finding the region of interest has been applied in many applications. The challenging issue, the same object appears in various sequences. Sometimes the recognition of object performance is degraded due to the noise occurred in the scenes. This process leads to becoming more complicated in terms of identifying the object. The matching face is based on global information that is used to track the face of the person in the image. The suggested techniques perform efficiently in identifying the face in the image without complex structure. The limitation of the recommended technique is to recognize the face of the person having a complex structure. First, the image is converted into grayscale, and based on the edge point present in the image and threshold value, the pixels present in the image are segmented, and the final clustering process is applied for grouping the similar values.

Köstinger et al. [4] used the graph matching method to find the association between the predicted image and the input image. The character present in the film is identified based on the feature extracted from the image. After segmenting the particular image, the label of the particular image is displayed and matched with the existing one. Features extracted from the input image are performed using the temporal pattern information. The edge of the image is measured using the pixel found in the image and based on the graph-based method, the edges will be connected to get the final sequence of the image. A similar sequence of the image is found using the graph-based technique and face track distance is measured between the edges of the image. Based on the above steps, the similarity of the face is identified and matched with the predicted image. The calculation of track distance is a challenging task in feature-length videos.

Marshall et al. [5] recommended the automated technique to discover both the face and name of the object in the image. The timestamp protocol is used to understand the features of the image then the temporal relationships among the faces in the image or in the video are identified through the process. The process of identification is performed in a two-stage process. In the first step, a fast algorithm is applied to identify the relationship between the normal and hidden scene structure. In the second step, the learning parameter used for developing the model will be analyzed.

Sadura et al. [7] used character-based recognition for the identification of the objects in the video. Many of the existing approaches work based on the video summary approach. The suggested method recognizes the high and low-level features of the image. The image sequence is captured from the video and a label is used to identify the objects present in the image. The content of the image is analyzed through the discovery of the scene. Character analysis is one of the effective methods of labeling the objects of the image. The difference in the sequence of the image is very much difficult to identify.

Guo et al. [8] analyzed the problem of labeling the character of the image on the television. This particular process has been a challenging task due to the various sequence and appearances of the structure of the image. The suggested technique produces better accuracy for the data collected from various sources. The automated structure of the sequence is generated from the predicted image and then maps the value with the existing one. Finally, the classifier is applied to classify whether the predicted data is correct or false depending upon the prediction process is applied. Face and cloth matching is also applied in addition to the normal prediction process. In order to strengthen the process, the text annotation is also added to make the prediction in an accurate way.

TABLE 1 DRAWBACKS OF EXISTING APPROACHES

S. No	Author's detail	Methods used for enactment	Drawback
1	Vareldzhan et al [2]	Character localization	The limitation of the recommended technique is to recognize the face of the person having a complex structure.
2	Köstinger et al [4]	Graph-based method	The calculation of track distance is a challenging task in feature-length videos.
3	Marshall et al [5]	Time stamp technique	The limitation of the method is not able to perform the identification in multi sequence image.
4	Sadura et al [7]	Face name matching	The temporal relationships among the faces in the image is very difficult to identify.
5	Guo et al [8]	Character-based recognition	Difference in the sequence of the image is very much difficult to segment.

III. PROPOSED METHODOLOGY

The deep learning method is one of the efficient method for tracking and finding the object with predefined set of features [9]. The deep learning is trained with the predefined input images. Based on the training, the deep learning model will provide the optimal solution [10]. The label is assigned to all the objects in the image and prediction of visibility mark in the image. Region of interest is calculated between the input image and predicted image [11]. The flow diagram of the proposed techniques is depicted in the fig.1.

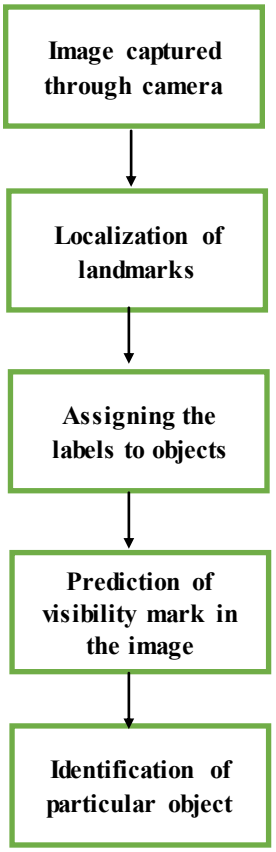

Fig.1. Flow diagram of the proposed techniques

Step 1: Detection of Face

The region of interest is generated for the face of the image using deep neural networks [12]. The region of interest in the range of (0.5) will be only considered. The region mapped with the negative value is ignored [13]. The training model for the detection of the face is performed using the equation (1).

$$lo_{de} = -(1-i).\log(1-r) - i.\log(r) \quad (1)$$

In equation (1), the r indicates the probability of finding the overlapped region of object. $(1-r)$ is the previous localization value for detection of face [14].

Step 2: Localization of landmarks

The portion of the image is embodied as $\{c, d, x, y\}$ c, d indicates the centre coordinates and x, y denotes the height and width of the portion [15].

$(p_a, q_b)=(\frac{c_a-c,}{x}\frac{d_a-d}{y})$ (2)

In equation (2) p_a, q_b indicates the training label for calculating the euclidean distance.(c_a, d_a) represents the actual ground truth value [16].

Step 3: Assigning the labels to objects

The predicting the identification mark of objects is performed using the equation (3). First the label is assigned to all the objects present in the image [17].

$$lo_l = \frac{1}{2M}\sum_{i=1}^{M} u_i((c_a - p_a)^2 + (d_a - q_b)^2) \quad (3)$$

In equation (3), the M- denoted the number of identification points extracted in the image. After finding the region of interest, the number of points matched with the predicted and original image is compared [18]. The points predicted as identification mark is processed through the deep learning method.

Step 4: Prediction of visibility mark in the image

The visibility mark present in the image is predicted using the equation (4). The euclidean distance of the predicted point and previous one is to find the optimized position [19]. This process is repeated to find the optimized results in the search process [20].

$$lo_v = \frac{((V_1 - V)^2 - (V_2 - V)^2 - (V_3 - V)^2)}{3} \quad (4)$$

Step 5: Recognition of the gender

Based on the appearance and structure of image, gender can be identified. The probability of identifying the gender is performed using the equation (5)

$$lo_{ge} = -(1 - s).\log(1 - p_s) - i.\log(p_s) \quad (5)$$

In equation (6), the two possibility of value is considered {0,1}. The probability of predicted value is zero means, the gender is male otherwise it will be predicted as female. This process helps to minimize the time of search time based on the prediction of gender [21].

Step 6: Mapping the identification mark with coordinates of image

The actual region of interest portion is mapped with the original image. The coordinate of image is shifted to the original position [22].

$$(c_{a,}d_a) = (\,(c_{a,}\, y + (c_{a,}d_a\, x + d_a) \quad (6)$$

Based on the above process, the visible region identified and map with the actual image present in the database [23].

IV. RESULTS AND DISCUSSION

The AFW dataset is used for testing the efficiency of proposed algorithm with difference sequence [5]. First the same image is collected in the different sequence and stored in the database [24]. First the image is segmented and classified using the deep learning method then the same image is map with the images in the database.

The fig.1 depicts the different sequence of input images. The various sequence is used at the time of matching the predicted image with the image in the database. Because all the images are collected in various structure with different position [25].

Fig.2 Training the model with different sequence of image collected from database

The fig.3 depicts the object identification using deep learning method. In the fig.2, the object name Akshay Kumar is identified based on the structure trained by the model [26]. First the model is trained with different samples. Because based on the training the efficiency of the method will get vary. The identification mark is used for mapping the actual image with the predicted image [27].

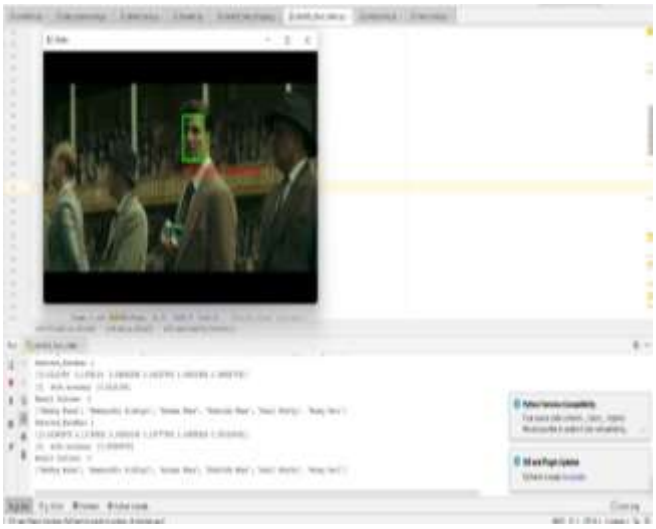

Fig.3.Finding the object with structure learned using deep learning method

The fig.4 depicts the procedure of finding the various sequence of image. Gender of image is matched based on the structure and face of the image [28]. The visibility mark of image is collected when different sequence of images fetched in the database. Based on the similar feature, the particular object is identified [29].

The images are collected from the AFW dataset and used for testing the performance of the proposed algorithm with the conventional methods used for finding the missing objects [30].

Fig.4.Recognizing the different image using deep learning method

The fig.5 depicts the tracking the particular object using the label. Identification of label illustrates the correct object tracking or image is predicted using the deep learning methods [31].

Fig.5.Object tracking with label using deep learning method

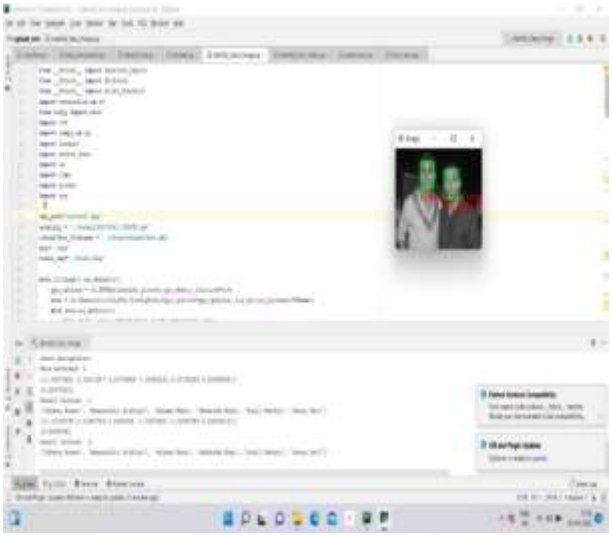

Fig.6.Object tracking of different image using deep learning method.

The Fig.6 represents the object tracking of different images.once the label of image is mapped then the particular label is displayed in the footer side [32]. After assigning the label to object then prediction of visible object is identified [33].Finall the model gives the prediction result based on the segmentation and classifiying the right and in correct image [34].

Table II Performance evaluation of Deep learning technique

S.No	Technique	Accuracy
1	Deep learning	98.12
2	ANet	97.59
3	Face tracker	96.89
4	Hyperface	96.45
5	Panda	95.68

The table II illustartes the deep learning method performance.Remaining competitive techniques perform better in small cases.The suggested techniques outreachs the good result in all the sequence of image.

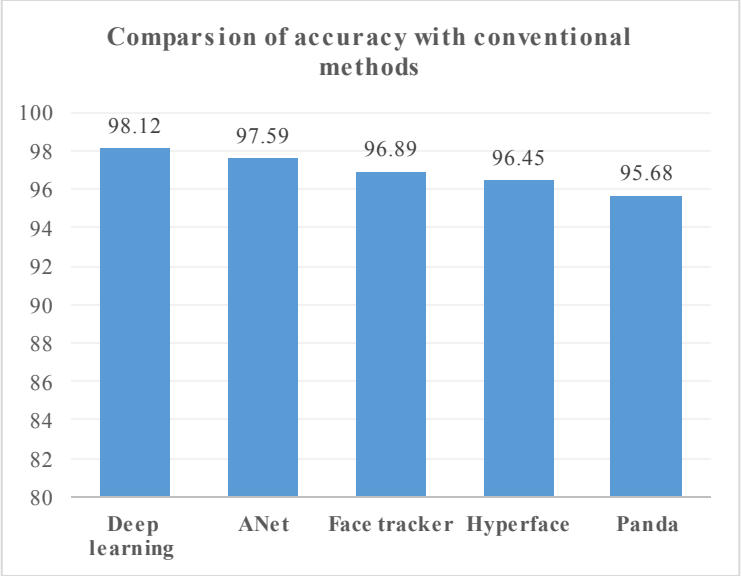

Fig.7 Performance comparison with conventional methods.

Fig. 7 depicts the performance comparison of deep learning methods. The assigning the label and object tracking process help to improve the performance in finding the objects with labels [35]. The suggested techniques deliberate 98.12% accuracy in a different sequence of images.

CONCLUSION

Many incidents are happening due to improper evidence and even the images are captured through the camera. Proper identification of face is the challenging task, the suggested deep learning method is used as efficient method for object tracking and labelling the object based on training of the model. first the landmark of objects is captured and the label is assigned to all the objects in the database. The identification marks are captured based on finding the region of interest between the two objects. The suggested method aim as better tool in terms of finding the persons

involving in the suspicious activity. This process is also used in the video capturing method, the different scenes are captured in the video, then matching the image is performed. The suggested method delivers better result in various sequence of image.

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