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Missing Person Identification

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Abstract: *At present the Computer automated Face recognition systems are used for personal identification, but the Age variations of an individual poses a serious problem for it. Designing an appropriate feature representation and an effective matching framework for age invariant face recognition remains an open problem. To classify person age using faces author using combination of two CNN where one CNN will extract face features which can help in identify changes in face over time and second CNN helps in predicting/ classifying age. Face aging causes intra-subject variations (such as geometric changes during childhood & adolescence, wrinkles and saggy skin in old age) which negatively affects the accuracy of face recognition systems. Therefore, this paper proposes a unified, multi-task framework to jointly handle these two tasks, termed MTLFace, which can learn age-invariant identity-related representation while achieving pleasing face synthesis. Specifically, we first decompose the mixed face features into two uncorrelated components—identity- and age-related features—through an attention mechanism, and then decorrelate these two components using multi-task training and continuous domain adaption. d. This system will decrease the crimes and ensure the security in our society.*

Keywords: Face recognition systems.

I. INTRODUCTION

Face recognition has been a hot research topic in computer vision for many years. The traditional wisdom is to utilize the margin-based metrics to increase the intra-class compactness and train the models with a massive amount of data to improve face recognition performance. Face recognition is affected negatively by synthetic makeup and research has shown that synthetic makeup is one of the reasons why celebrities have trouble with face recognition system. Some researchers use unique face images from subjects who volunteer to have their face image used for age-invariant face recognition research. In some applications, data augmentation is used to separate subject-specific facial features that are stable from variations in other facial features caused by aging. This leads to the generation of age invariant face recognition systems that are robust to variations in facial features caused by aging. Data augmentation has been used to adapt face images for applications on mobile devices and cloud environments that operate in real-time.

The augmented face images are often used as data input to several deep learning models like the convolutional neural networks to create robust age-invariant face recognition systems. This leads to the generation of age invariant face recognition systems that are robust to variations in facial features caused by aging. Data augmentation is done in various ways. In this work improving the accuracy of an age invariant face recognition (AIFR) system using data augmentation technique on a classical pre-trained convolution neural network is the focus of this study.

II. LITERATURE SURVEY

T. F. Cootes, A. Lanitis. et al We explain how the effects of aging on facial look can be explicated using learned age alterations and present experimental results to show that reasonably accurate estimates of age can be made for unseen images. We can improve our results by taking into account the fact that different individuals age in different ways and by considering the effect of daily life.

MING Ju-wang exposes a 3D approach for choosing faces by simulating based on 2D images. It can also detect multiple faces dynamically with varying situations. [6]

Teddy Mantoro reviews eigenface methods to create a face vector or face print by using cascade classifiers and uses Principal Component Analysis (PCA) for training. [4]

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Ashutosh Chandra Bhensle, Rohit Raja, "An Efficient Face Recognition using PCA and Euclidean Distance Classification", IJCSMC, 2014. The present system has additional calculation because of higher dimensional and no more effectual still.

III. PROPOSED WORKS

- This section describes the proposed research method for the improved age invariant face recognition using data augmentation.
- This network was designed to improve the recognition of the intra-class subject at different ages using data augmentation.
- The general procedure comprised of the same traditional steps: image acquisition, pre-processing, feature extraction, classifica ation and system evaluation.
- In this work, the image pre-processing steps taken using data augmentation technique improved the performance of the system greatly. Four basic pre-processing steps were utilized.
- Feature extraction is the process of capturing the preferred trait descriptors but using the CNN instead of a handcrafted method. In this model, a pre-trained was adopted. Classification is necessary to recognize the identity of the subject.
- This model utilized the Softmax classifier, which was used for multiclass classification. The system performance was evaluated for its testing accuracy, testing loss, mean squared error and mean absolute error.
- Considering that the entire face with the structural complexity easily changes over time in terms of color, texture and structure. That is why full face modeling for age invariance is difficult.

3.1 Features of Face Recognition

- For face recognition, any unseen face image is projected on the face space and is recognized as one of the training images based on the difference between average of all the training images and each training image.
- The approach works well when a face is to be matched with images of different persons.
- In case of age invariant face recognition the training image set consists of age progressed images of the same person and the Eigen vectors should be in the direction of the variations in between the images of the same person.
- The aging effects seen on the face vary from person to person and are unique to each person.
- Thus creation of the Eigen space is carried out at the individual level.The creation of Eigen for each person is done using age separated image of the person. The cropped periocular region is used as a template to create the Eigen space.
- We can find the faces in an image and comment as to who the people are, if they are known. We can do this very well, such as when the people have aged, are wearing sunglasses, have different colored hair, are looking in different directions, and so on. We can do this so well that we find faces where there aren't any, such as in clouds

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3.2 Advantage of Face-Recognition

- Face recognition makes it easier to track down burglars, thieves and trespassers. The technology is capable of analyzing the feed private and public CCTV camera networks.
- The technology is not limited to tracking down criminals. For instance, it could also make it easier to find missing children and seniors.
- Face recognition could make security checkpoints at airports less intrusive to passengers.
- Everyone has to pass face-scanning devices to check-in for work. Paid hours begin from this moment until checkout.

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3.3 Applications of Missing person Identification

- The fact that machines can today recognize individuals, presents a slew of opportunities for the security sector, chief among them the ability to identify unauthori zed access to locations where non-authorized people should not be.
- It's a well-known fact that IP cameras today can be equipped with facial recognition software, to enable complex access control of premises, with enabling of individual perimeter and asset monitoring on whitelists and blacklists for specific locations, enabling top of threat and intrusion detection.
- Security companies also regularly equip employees with body cameras, to enable video capture and recording during sensitive interactions and potential altercation when deploying security personnel to handle security intrusions. This is especially useful if security forces are engaging or handling intrusions in an area that may not be covered by fixed CCTV cameras.
- In fact, many of the different applications of facial recognition technologies we will go through in the later points, are centered around security enhancements in application to a specific industry segment's needs.
- Chief among them is an ability to recognize and thwart border crossings from known criminals and persons of interests, through facial recognition. Border controls today, sync with information database such as INTERPOL's 'Facial Identification' method, to identify individuals against an accuracy scale. Processing facial information over the cloud also gives ample opportunities to run predictive algorithms over the footage to factor in things beyond just typical quality-of-image-enhancements, but factors like aging, plastic surgery, cosmetics and even the effects of narcotics.

IV. ARCHITECTURE

The System propose a Criminal Detection through Face Recognition. To conquer the disadvantages that were in the current framework we foster a framework that will be exceptionally valuable for any examination division. Here the program monitors pictures from various sides of countenances.

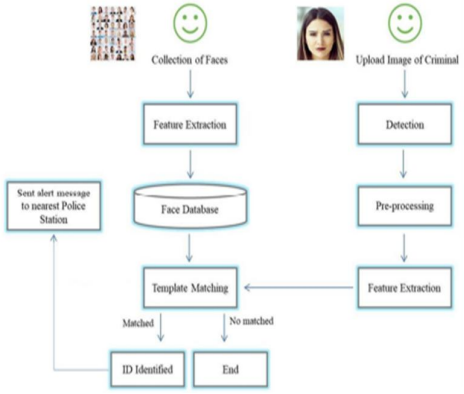

Figure 4.1: Block diagram for system Architecture

- The general procedure comprised of the same traditional steps: image acquisition, pre-processing, feature extraction, classification and system evaluation. In this work, the image pre-processing steps taken using data augmentation technique improved the performance of the system greatly.
- This model utilized the Softmax classifier, which was used for multi class classification. Changing brightening is quite possibly the most difficult issues and computational expense is the significant disadvantage of illumicountry. Different calculations have been produced for face acknowledgment to take care of these issues. Yet at the same time a few disadvantages exist in the acknowledgment cycle, for example, computational intricacy, cost and gigantic memory necessities.
- It simultaneously models face recognition and age classification tasks by sharing a same CNN model and a regularization term, so that the interaction between identity sensitive features and age sensitive features are encouraged via the regularization loss. In this paper author has not used any features selection algorithms.

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V. CONCLUSION

The approach that we have chosen concentrates on aging as a personal recognition problem. We can create an individual level Eigen space using self-PCA which considers the individuality of aging effects in a face. The approach focuses on the most complex and stable feature of the face that is the Periocular region. In this way, Machine Learning can be made of paramount importance to perpetuate the security and safety of innocent citizens. Thus, our Machine Learning model aims at resolving one of the above mentioned causes, by enabling the authorities to make an informed, statistically and analytically cogent decision, in searching of the people missing. We proposed a multi-task learning framework, termed MTLFace, to achieve AIFR and FAS simultaneously. We proposed two novel modules: AFD to decompose the features into age- and identity-related features, and ICM to achieve identity-level FAS. Extensive experiments on both cross-age and general benchmark datasets for face recognition demonstrate the superiority of our MTLFace.

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