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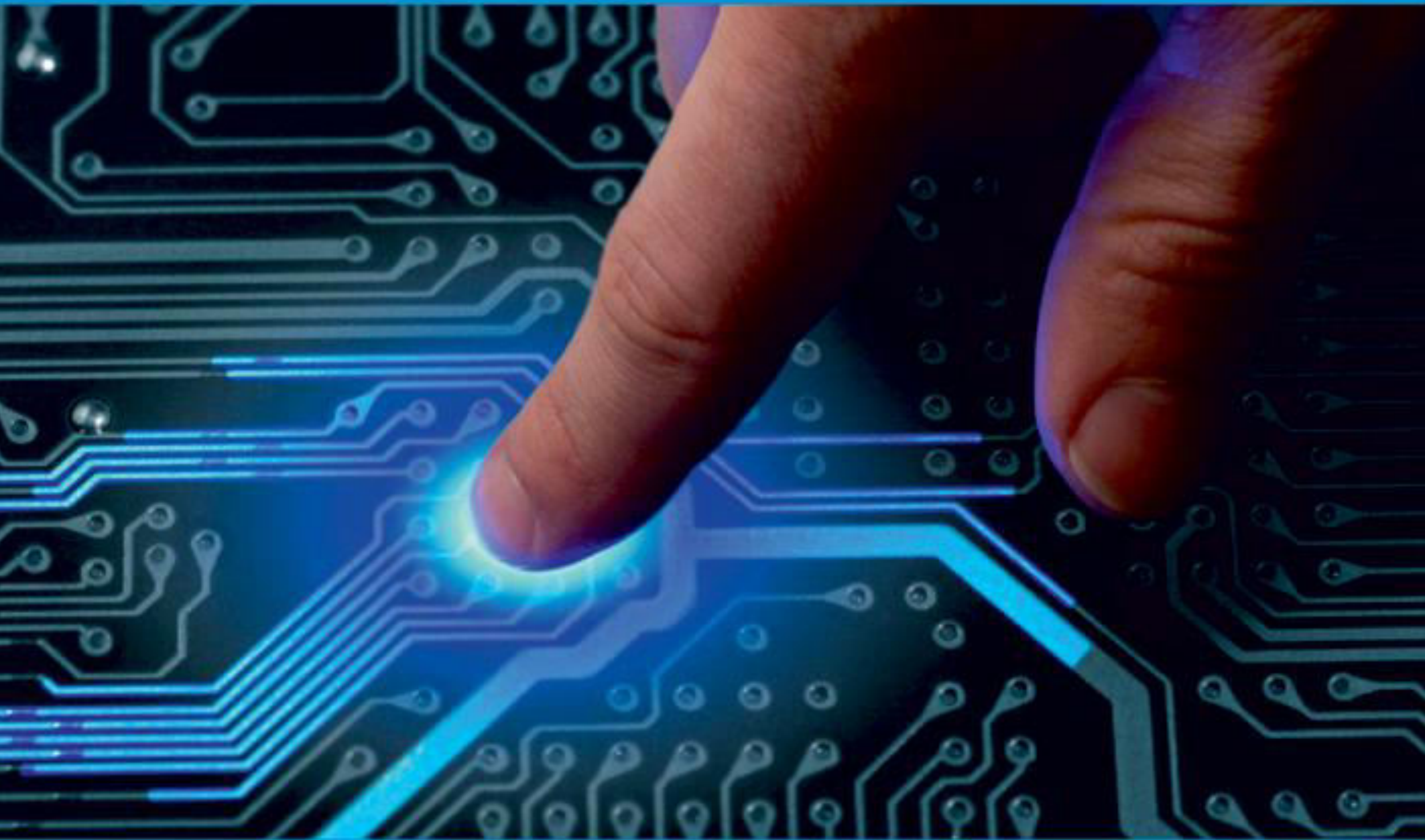

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Face Perception Network for Video Surveillance Based on Machine Learning

Ms. M.K.Kute[1], Sahil Babar[2], Atharva Joshi[2] , Omkar Belhekar l[2], Sakshi Chaudhari [2]

Professor, Department Computer Technology, Pimpri Chinchwad Polytechnic College, Pune, Maharashtra, India[1]

Student, Department Computer Technology, Pimpri Chinchwad Polytechnic College, Pune, Maharashtra, India[2]

ABSTRACT: This System strives for the detection of real-world anomalies such as burglaries and assaults in surveillance videos too difficult task. Although anomalies are generally local, as they happen in a limited portion of the frame, none of the previous works on the subject has ever studied the contribution of locality. Identification is the act of identifying a person. It means determination of individuality of a person. In many countries the amount of crime incidents that is reported per day is increasing dramatically. Concerning about different city, the department of Police is the major organization of preventing crimes Sparse coding-based anomaly detection has shown promising performance, of which the keys are feature learning, spars ere presentation, and dictionary learning. In this work, we propose a new neural network for anomaly detection (termed Anomaly Net) by deeply achieving feature learning, sparse representation and dictionary learning in three joint neural processing blocks. Specifically, to learn better features, we design a motion fusion block accompanied by a feature transfer block to enjoy the advantages of eliminating noisy background, capturing motion and alleviating data deficiency. Furthermore, to address some disadvantages (e.g., nonadaptive updating) of existing sparse coding optimizers and embrace the merits of neural network (e.g., parallel computing), we design a novel recurrent neural network to learn sparse representation and dictionary by proposing an adaptive iterative hard-thresholding algorithm(adaptive ISTA) and reformulating the adaptive ISTA as a new long short term memory (LSTM). To the best of our knowledge, this could be one of first works to bridge the `1-solver and LSTM and may provide novel insight in understanding LSTM and model-based optimization (or named differentiable programming), as well as sparse coding-based anomaly detection. Extensive experiments show the state-of-the-art performance of our method in the abnormal events detection task

KEYWORDS: CNN, RNN, IMAGE PROCESSING, FACE TRACKING , FACE RECOGNITION

I. INTRODUCTION

Surveillance cameras are increasingly being used in public places e.g. streets, intersections, banks, shopping malls, etc. to increase public safety and it only store records or CCTV footages. However, the monitoring capability of law enforcement agencies has not kept pace. The result is that there is a glaring deficiency in the utilization of surveillance cameras and an unworkable ratio of cameras to human monitors. One critical task in video surveillance is detecting anomalous events such as traffic accidents, crimes or illegal activities. with the increasing demand for security, surveillance cameras have been widely deployed as the infrastructure for video analysis. One major challenge faced by surveillance video analysis is detecting abnormal events (see Figure 1 for an intuitive illustration), which requires exhausting human efforts. Fortunately, such a labourintensive task can be recast as an anomaly detection problem, which aims to identify unexpected events or patterns.
Anomaly detection differs from the traditional classification problem in the following aspects:

1.It is very difficult to list all possible negative (anomaly) samples.
2. It is a daunting task to collect sufficient negative samples due to the rarity.

To achieve anomaly detection, one of the most popular methods is using the videos of normal events as training data to learn a model, and then detecting the abnormal events which would do not conform the learned model. Following the aforementioned strategy, sparse coding has successfully applied to anomaly detection, which consists of dictionary learning and sparse representation. To be specific, sparse coding-based anomaly detection (SCAD) first learns a dictionary from a training data set that only consists of normal events and then discovers the abnormal events that cannot be exactly reconstructed by a few of atoms of the learned dictionary. In other words, SCAS assumes that an abnormal event always leads to a large reconstruction error since it does not appear in the training data. Furthermore, extensive studies have proved that wellestablished features could remarkably improve the performance of anomaly detection, namely, feature learning and sparse coding have lay onto the heart of SCAD.

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II. LITERATURE SURVEY

Many of the techniques of digital image processing, or digital picture processing as it often was called, were developed in the 1960s at the Jet Propulsion Laboratory, Massachusetts Institute of Technology, Bell Laboratories, University of Maryland. A few researches such as application to satellite images, wire-photo standards conversion, medical imaging, videophone, character recognition, and photograph enhancement were also carried out.

Suezou Nakadateet al discussed the use of digital image processing techniques for electronic speckle pattern interferometry. A digital TV-image processing system with a large frame memory allows them to perform precise and flexible operations such as subtraction, summation, and level slicing. Digital image processing techniques made it easy compared with analog techniques to generate high contrast fringes. Satoshi Kawataet al discussed the characteristics of the iterative image-restoration method modified by the reblurring procedure through an analysis in frequency space. An iterative method for solving simultaneous linear equations for image restoration has an inherent problem of convergence. The introduction of the procedure called “reblur” solved this convergence problem. This reblurring procedure also served to suppress noise amplification. Twodimensional simulations using this method indicated that a noisy image degraded by linear motion can be well restored without noticeable noise amplification. 61 William H highlighted the progress in the image processing and analysis of digital images during the past ten years. The topics included digitization and coding, filtering, enhancement, and restoration, reconstruction from projections, hardware and software, feature detection, matching, segmentation, texture and shape analysis, and pattern recognition and scene analysis. David W. Robinson presented the application of a general-purpose image-processing computer system to automatic fringe analysis. Three areas of application were examined where the use of a system based on a random-access frame store has enabled a processing algorithm to be developed to suit a specific problem.

Furthermore, it enabled automatic analysis to be performed with complex and noisy data. The applications considered were strain measurement by speckle interferometry, position location in three axes, and fault detection in holographic non-destructive testing. A brief description of each problem is presented, followed by a description of the processing algorithm, results, and timings.

2.1 PROCESS OF IMAGE PROCESSING

Face recognition can be traced back to the sixties and seventies of the last century, and after decades of twists and turns of development has matured. The traditional face detection method relies mainly on the structural features of the face and the colour characteristics of the face. Some traditional face recognition algorithms identify facial features by extracting landmarks, or features, from an image of the subject's face. For example, an algorithm may analyze the relative position, size, and/or shape of the eyes, nose, cheekbones, and jaw. These features are then used to search for other images with matching features. These kinds of algorithms can be complicated, require lots of compute power, hence could be slow in performance. And they can also be inaccurate when the faces show clear emotional expressions, since the size and position of the landmarks can be altered significantly in such circumstance past decades, a variety of features have been widely used in SCAD. For example, histogram of oriented gradients

3D spatiotemporal gradient and the histogram of oriented flows (HOF) have been extensively used in. The major disadvantage of these works is that the used features are handcrafted while datadriven ones are nonevaporable since the latter could lead to better performance. To enjoy the representative capacity of neural networks, some recent works tried to marriage deep learning and anomaly detection. For example, proposed a neural network which consists of our current neural network (RNN) accompanied with convolutional filters. Their methods could adaptively learn long range contextual dynamics so that the motion and the appearance are implicitly encoded. Although these methods have shown promising performance, they have suffered from following two limitations. On the one hand, motions and appearances are encoded by the RNN and the convolutional filters separately, which implies that the spatial-temporal relations between motions and appearances are broken. As a result, inferior performance may be achieved. On the other hand, the features are typically learned from scratch without considering the well-established pre-trained model from relevant related tasks. Numerous studies have shown that transferable models could remarkably improve the performance of methods. To address the above limitations, we propose a new feature learning network which consists of motion fusion block and feature transfer block. Specifically, the motion fusion block compresses video clips into a single image while suppressing the irrelevant background. As a result, the motion and appearance can be simultaneously fused into a single image By feeding the compressed images into the feature transfer block, the spatialtemporal (i.e., appearance and motion) features are extracted based on a transferable model. In other words, we utilize knowledge from other related tasks/domains to boost the performance of feature learning.

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III. PROPOSED SYSTEM

Face detection:

For the constrained conditions, many face detection methods for static image are not directly suitable to the task in video. We classified current approaches into groups, and summarized their pros and cons.

Face tracking:

In face tracking head rotation and pose variations are measure issues. Face tracking is a significant procedure in face recognition. It usually exploits statistical model, example-based model, and skin colour information to accomplish the tracking task. In addition, for these methods it also exploits CAMSHIFT, condensation, adaptive Kalman filter algorithms.

Face recognition:

Since the spatio-temporal information plays a significant role in face recognition, how to fully exploit redundancy information in the video sequence is a key issue for video based recognition. One of the chief advantages of video over still frames is that fact accumulation over multiple frames can provide better face recognition performance.

Consequently, face recognition in video possesses more challenges to the current face recognition systems. Use of three dimensional face image models has been suggested as a way to compensate for low resolution, low dimension, poor contrast and non-frontal pose. By the way of constructing a 3D face model from multiple non-frontal frames in a video, and then generating a frontal view from the derived 3D model, and finally using a 2D face recognition algorithm to recognize the synthesized frontal view, the spatio-temporal information can be fully employed. Meantime, it will help solve the problem of occlusion, pose variance and illumination issues caused by video frame's poor quality tecting an IoT-enabled Platform for Precision Farming

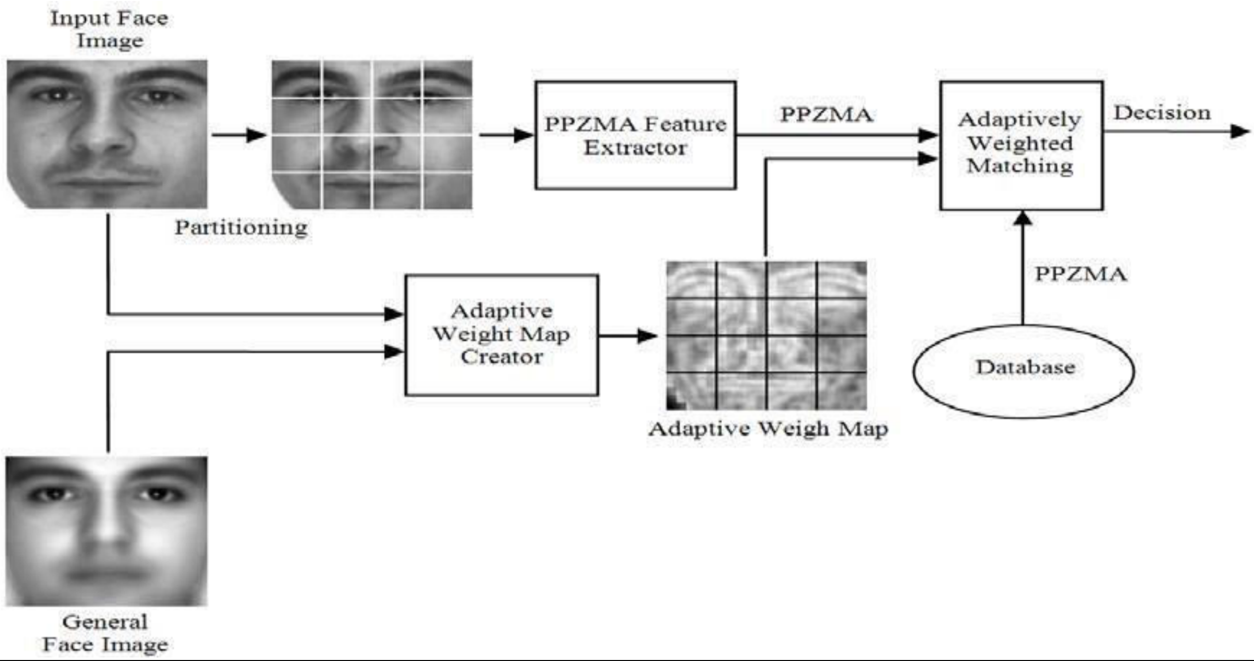

Fig1.1Face Recognition processing flow

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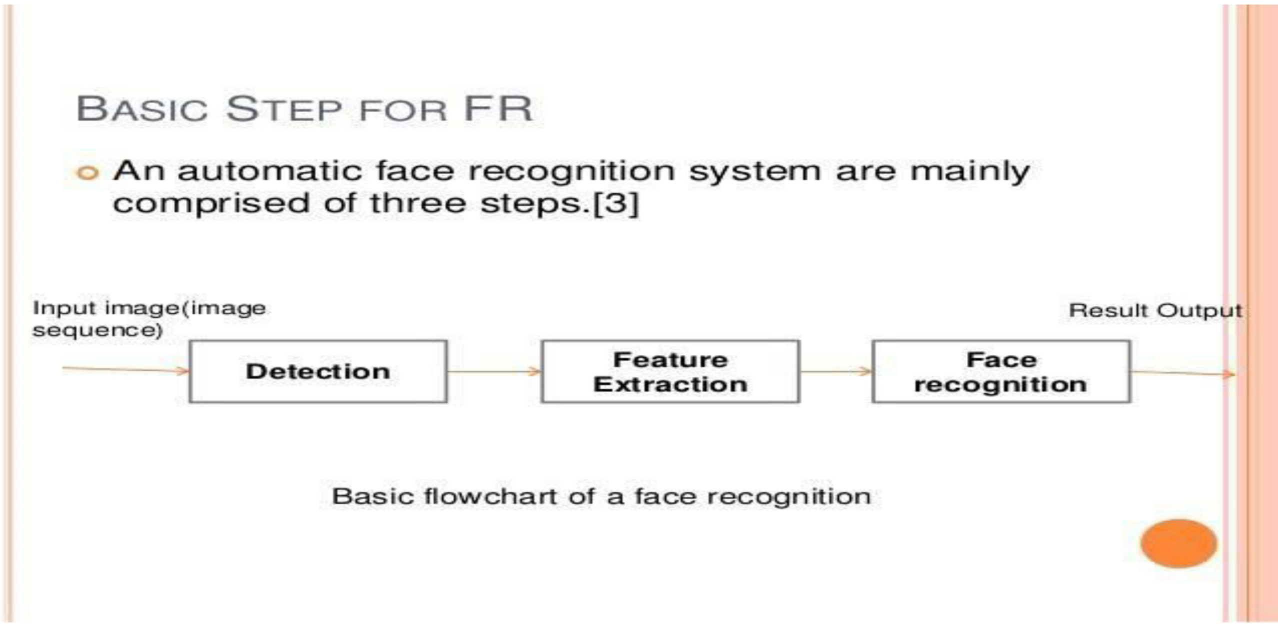

Fig 1.2 basic diagram of face recognitio

IV. CONCLUSIONS

In this seminar we studied face detection in face recognition.
The face recognition is a subject of machine learning and pattern recognition. That is frequently used for various different applications for authentication and secure access control due to their uniqueness.
The proposed work is dedicated to design and implement a face recognition model that accept the partial or complete face images in order to recognize the face class. In this context the three-step process is proposed to work where in first phase the face images are partitioned into multiple face parts this step is termed here as the pre-processing of images. Secondly the images are processed for feature extraction thus the LDA algorithm is proposed to implement.
Finally the neural network is proposed to perform training on extracted face features and classes and the trained model is used for recognizing the faces. In near future the proposed model is implemented and their performance is provided.

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