Detection of human activities using neural network by pattern recognition

Geeta Maurya

Abstract- There are various challenging task in automatically video stream for detecting human activities. The major difficulty of this task lies for human activities can be recognized is that temporal feature of video sequences and how to extract the spatial. The aim of this paper is to develop such a system with the Spiking neural network of integrate and fire neurons to do pattern recognition. Which will use the supervised neural network and with the help of the back propagation algorithm to recognize the pattern. The idea of this research is to develop a pattern recognition system which is more efficient and optimum. To achieve this goal, the proposed system use the supervised neural network which makes the proposed system more intelligent and the back propagation algorithm which firstly compute the input and after this it find the difference between the actual output and the expected one. If the difference is greater than zero then the error is propagated in backwards in order to recognize the pattern more accurately
.

Keyword: Spiking neural network, Pattern recognition, supervised neural network, back propagation algorithm.

1 INTRODUCTION

Detecting human activities by automatic way in a video stream in various complex scenes is a very challenging task for the intelligent robots and video surveillance applications. Existing work is depends on the activity detection has focused on representing and learning the local spatiotemporal features in activity sequences, and applying standard classifiers based on these extracted local features. Pattern recognition is a big challenging task in security mechanism. It is assumed that the detecting human activity is large enough & contains sufficient information for pattern recognition with the growing installation of surveillance cameras in many areas , there is an increasing demand of pattern recognition technology for surveillance applications, ranging from small- scale-alone camera applications in banks and supermarkets to large-scale multiple networked closed- circuit televisions(CCTVs) in law enforcement applications in public streets.

2 PREVIOUS WORK

Yan Meng et al. [1] human activity detecting by a gene regulatory using BCM model, Qiang Yu et al. [2] they test the performance of the network with digital images from the MNST and images of alphabetic letters. schuldt et al.[3] applied local features in the spatiotemporal representation to human action recognition using a support vector machine. Dollar et al. [4] introduced neural network approach for activity recognition

Based on spatiotemporally windowed data features. Matthias Oster et al. [5] represent the spike-based saccadic recognition system that uses a temporal-derivation silicon retina on a pan. Tilt unit and a VLSI multi-neuron classifier with a time-to-first spike output coding. Susumu Nagatoishi et al. [6] presented a system “Effect of Refractorinesson Learning Performance of a Pattern Sequence”. This paper focuses on the effect of the refractoriness on the performance of learning. In this paper the Elman network is being simulated which is consists of the neurons and use the back propagation algorithm to lean the pattern. Kshitij Dhoble et al. [7] this paper focuses on the development of the system based on the evolving spiking neural network which is a computational model that evolve the new spiking neurons and create the new links from the incoming data. The system uses the dynamic evolving spiking neural network to extract the spatio or the temporal features to recognize a pattern. Riano Lorenzo et al. [8]in this paper propose a three layered neural network for binary pattern recognition and memorization . Memorization in correct pattern and network stability achieved by the learning algorithms it can be inspired by other work. Network can be used for selecting output signals from the selection layer or the generalization layer.

3 PATTERN RECOGNITION

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Pattern recognition is a specific task that assigns an output value to a given input pattern. There are various methods used to implement pattern recognition, such as support vector machine, decision tree, maximum entropy classifier, naïve Bayes classifier, and perceptron. Most of these methods have lack of biological plausibility. In this paper, we will introduce an application to pattern recognition using spiking neurons, which holds biological evidences and enhance the performance of existing system by using back propagation algorithm.

The goal of the pattern recognition is to understand how the information is stored in a pattern. How the information is represented in the brain still remains unclear terms. There are several ways that human brain has been modelled, but these models are difficult for reaching comparable performance. In this modern world spiking neurons dealing with precise timing spikes improve on the traditional neural models in both precision and accuracy [2]. There are different types of spiking neurons models such that integrate-and-fir(IF) model, the Hodgkin-huxley-type model and the Izhikevich model [2] , we will work on the integrate-and- fir(IF) model , which is increase the performance of the pattern recognition and provide the efficient results by using supervised neural network .

The presented work is about to perform the pattern recognition. In this work, we have defined the pattern in the form "Human Actions". To present the work we have taken the image set in the form of different actions performed by the human such as running, hand waving etc.

The work is having two different directions. One process will be performed on the training image set and second will be performed on input image. The basic process includes the pre-processing, recognition and the post analysis. Where the pre-processing stage defines used to improve the effectiveness of the system in terms of efficiency and the accuracy. The post processing is used to estimate the reliability of the system. The recognition process is the actual process to identify the matching ratio with all images over the dataset. The image that will give the highest matching ratio will be presented as the identified image. Here to perform the matching, the neural based approach is suggested, that will be implemented on the featured images.

Once the pre-processing phase is done, we get the featured image set as well as feature input image with maximum similarity attributes. The recognition process will be performed on these featured images. The feature based one to one match of input featured image will be performed on each image of dataset. Based on the recognition process, most matched image will be identified. Now the matching ratio will checked during the post processing phase to verify the accuracy level.

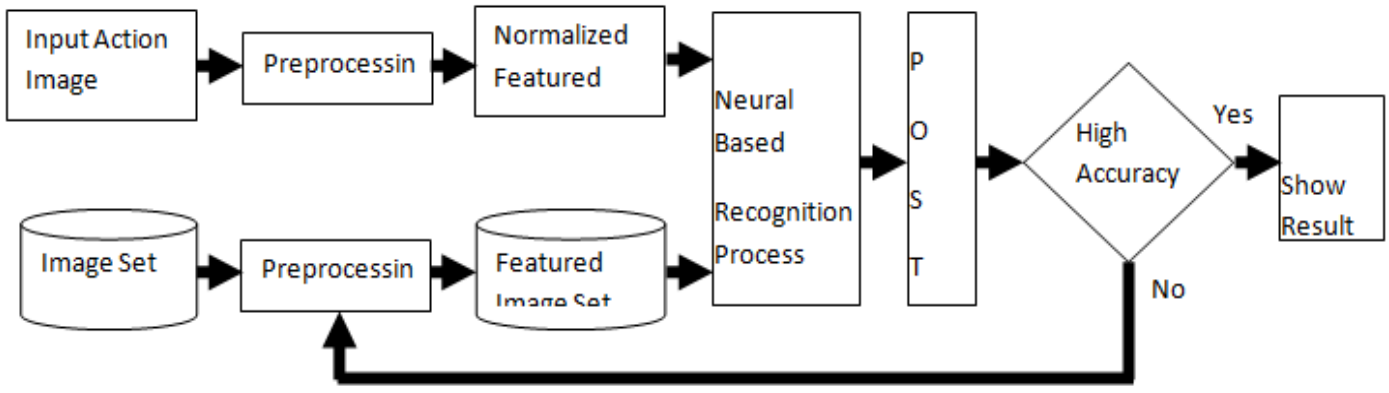

Figure 1: Recognition Architecture

3.1 Collection of Input Image set

To process on proposed model we have taken an Action dataset, show in following fig.2. The actual dataset is available in the form of videos; we need to perform the extraction of the images from these videos.

The current video database containing six types of human actions (walking, jogging, running, boxing, hand waving and hand clapping) performed several times by 25 subjects in four different scenarios: outdoors *s1*, outdoors with scale variation *s2*, outdoors with different clothes *s3* and indoors *s4* as illustrated below. Current the database contains 2391 sequences. All sequences were taken over homogeneous backgrounds with a static camera with *25*fps frame rate. The sequences were down sampled to the spatial resolution of *160x120* pixels and have a length of four seconds in average.

In this present work, the AVI file will be set as input video sequence from which the image extraction will be performed. Show is following figure.3. To process on this work we have first checked for the compression model already supported by the AVI sequence. If the compression model supports then the work will

Continue on it. In next stage we need to perform the splition on video sequence and extract the frames from this video. Once the frames are extracted the next work is convert these frames to image.

4 RESEARCH METHODOLOGIES

The methodology of proposed system consists of different system. Each step is arranged in pipelined manner.

4.1 Give input to the system

The proposed system will take the input as a static image in order to recognize the pattern form it. After this input system need to perform the several operations in order to recognize the pattern from it.

4.2 Pre-processing of the image

After taking input the system will perform the pre-processing on the given input. Pre-processing of the image use to find out the attributes related to the image such as pixel conversion of the image and resizing of the image. In this step the pattern which we want to recognised will be replaced by white pixels and rest of image pixels is replaced by the black Pixels. The white pixel image is the area of interest for us.

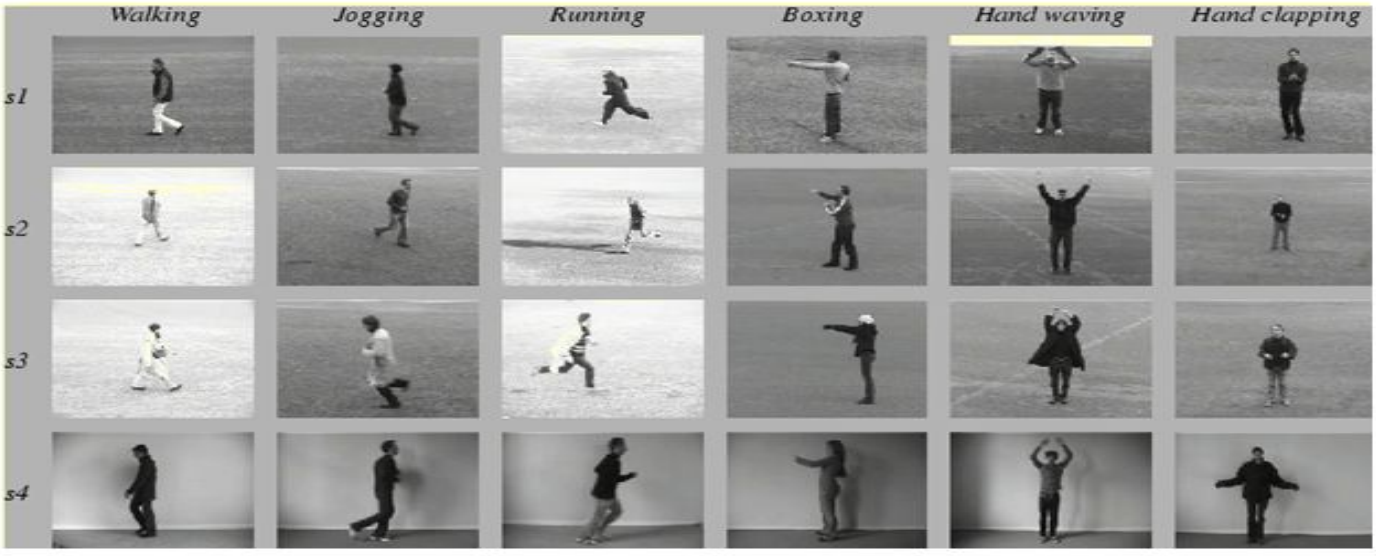

Figure 2: Input Set

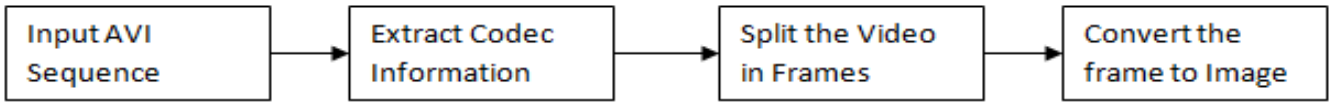

Figure 3: Image Extraction Model

4.3 Pattern recognition with the help of back propagation algorithm

A back propagation algorithm is a multilayer perceptron. A multilayer perceptron have been applied successfully to solve some difficult and diverse problems by training them in a supervised manner with highly popular algorithm known as an error back propagation algorithm. This algorithm is based on the error correction learning. A Back – propagation learning consider the two types of passes through the different layer of the network, a forward pass and a backward pass. In the forward pass, an activity pattern (input vector) is applied to the sensory nodes of the network, and its effect propagates through the network layer by layer .output is set by the actual response of the network. During the forward synaptic weights of the networks are all the fixed. In The Backward pass, the synaptic weights of the network are all the adjusted in accordance with an error-correction rule. The actual response of the net is subtracted from a desired output (target output) to produce an error signal. This error signal is then propagated backward through the network, over the direction of synaptic connections.

4.4 Match the pattern with pre-existing patterns in the database

After the pattern match with the help of back propagation algorithm, the next step is to recognise the pattern with the patterns which are already stored in the Database. If the pattern matches with the pattern that is already stored in the database the correspondence action of that pattern will be performed and if the pattern does not match the existing system will ask the user to input the new pattern which will be an image

5 CONCLUSION

This paper proposed intelligent system, which automatically detect the human activity and the proposed system uses the neural network to recognize the pattern which will make the system more intelligent. Proposed system can be used for military purposes, organization of digital media and by each and every one who wants to recognize the pattern for security issues. The goal of this study is to develop such a system which can easily recognize a pattern and is more efficient by using supervised neural network

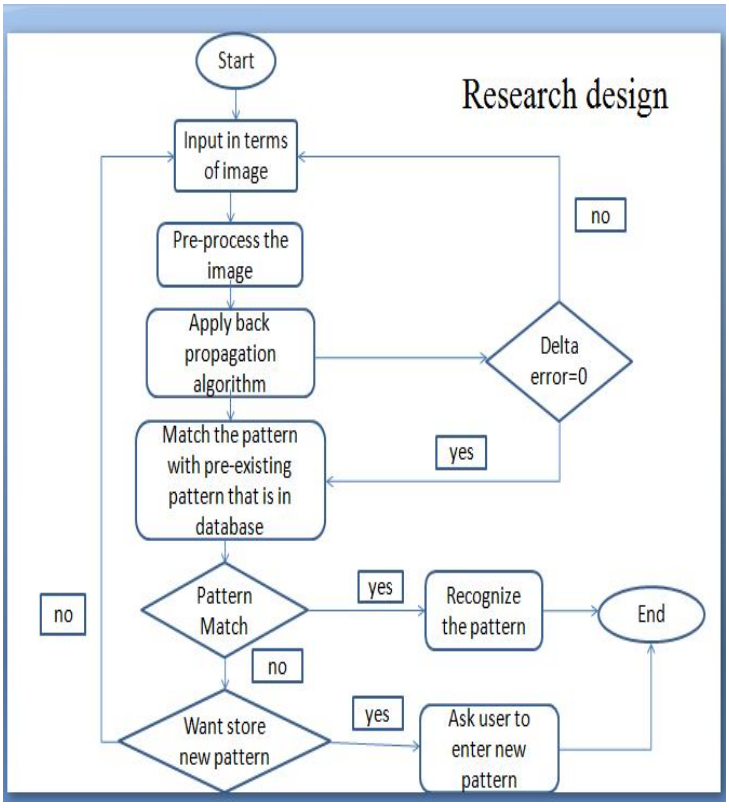

Figure 4: Research design

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