Human Activity Recognition using SVM and Deep Learning

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Abstract—Human activity recognition is one among the foremost vital rising technology. Principle parts from the body parts territory are utilized for human movement acknowledgment to scale back spatial property. A multi scale delineation human action acknowledgment is done to save the segregate data before spatial property decrease. This paper could be a human action Recognition system for identification of person. It takes input a video of COVID-19 patients and searches for a match within the hold on pictures. This method is predicate d on Gabor options extraction mistreatment Gabor filter. For feature extraction the input image is matching with Gabor filter and further personal sample generation formula is employed to pick out a collection of informative and non redundant Gabor options. DNN (Deep learning Models) is used for matching the input human action image to the hold on pictures. This method is used in hospital management application for detecting the COVID-19 patient activity from surveillance cameras. By using the SVM and deep learning the human activity is recognized using matlab tool.

Index Terms—support vector machine, Gabor filter, Deep learning, Human activity recognition, COVID-19.

1.INTRODUCTION

The human activity recognition in hospital management system for COVID-19 patients is mandatory now-a-days. To recognize and detect the human behavior state, this type of activity recognition process is carried out in various fields like video surveillance to identify action, movements or unknown behavior of unauthorized persons. Many of the researches have contributed their work and developed the action recognition in surveillance system in effective manner. By and large, picture handling is recognized as low level, mid level and elevated level preparing. The lower level handling, additionally named as picture pre-preparing, includes crude procedure on pictures, for example, commotion expulsion, contrast improvement and picture honing. The mid level or moderate handling on pictures includes errands, for example, division, object portrayal, depiction and arrangement. The more elevated level handling includes picture acknowledgment, picture comprehension or PC vision. Video

surveillance systems play a very important role in the circumstances where continuous observation by visual analysts is not possible. Normally, visual analysts continuously monitor and collect data from various cameras, and report to the authorities when necessity arises. Now it is very important and difficult to build a automatic human action recognition system as a high level for the events occurring in the scene. To improve accuracy, support vector machine and deep learning technique are used to recognize the COVID-19 patients activity.

2.LITERATURE SURVEY

This section discusses about existing work of various research work on human activity recognition in high performance. Also, the application of SVM and Deep learning usage in various applications also discussed.

CemDirekoglu(2012) proposed a system for detecting the human activity in groups. The player position in the battleground, plan see whenever. It ought to have the option to comprehend the specific player position utilizing smooth dissemination. The movement highlights are gotten at each edge Using outline differencing and optical stream.

Cho Nilar et al(2018) has proposed a work which expands the electronic customer requests in this world. So it tends to be utilized for anticipating the human action for different application, for example, checking the old, and observation for identification of dubious individuals and items left out in the open spots.

Lin fan et al (2013) proposed a framework in which some sensor are embedded in cell phone and distinguished the exercises what they are doing. The Activity acknowledgment by utilizing a few sensors in cell phone can be utilized for medical care and sports the executives. Individuals can keep their cell phones in an alternate position. The accelerometer inserted sensor is utilized in this work.

K. G.Manosha Chathuramali et al [2012] proposed a framework which characterizes a spatiotemporal element descriptor of a human figure in a video, in light of the preparation models. The Support Vector Machine (SVM) classifier strategy, on a current spatiotemporal element descriptor settle these issues in human action acknowledgment.

Majd Latah [2017] proposed a methodology in which profound learning is applied to upgrade the acknowledgment exactness application with various zones. Concentrate the spatial and transient element from nearby video from utilizing the 3D CNN strategy. It orders each example dependent on recently separated highlights utilizing support vector machine strategy.

Min-Cheol Kwon et al [2018] proposed the human action acknowledgment which classifications into two different ways practice type and exercise pose. The web of things has given numerous applications to wearable sensors. It proposes a novel order model that groups human exercises into 11 distinct classifications including exercises that are profoundly dynamic and less dynamic in day by day life. Nihatnanc et al [2018] proposed a methodology for characterizing the every day and sports exercises acknowledgment has improved human life quality. Human movement dataset is utilized to approve and assess the individual action. The factual highlights were removed from the histogram of the nearby changes. In this work include separated were arranged by outrageous learning machines. This work proposed approach a to perceive the activity type and sex utilizing distinctive element extraction strategies.

3.PROPOSED METHODOLOGY

The major criteria to consider in case of activity recognition, is to increase the accuracy of activity recognition through a long-term period of time. The proposed method uses support vector machine algorithm and convolution neural network for human activity recognition. Initially the input dataset collected is pre-processed using image processing technique. The image pre-processing technique used noise removal, convert the image to gray scale, threshold the image. The goal is to detect and classify short duration tasks that

compose a more complex activity. The aim of that process is to predict and classify long term action like running, jagging, jumping, and playing games. SVM is applied to preprocess the video in high dimensional feature space. The purpose of using the multiclass SVM classifier is that our data set include multiple activities done by different actors. The classification is then processed using multi class SVM to obtain long-term activity recognition. Figure 1 explains the processing steps of the proposed work.
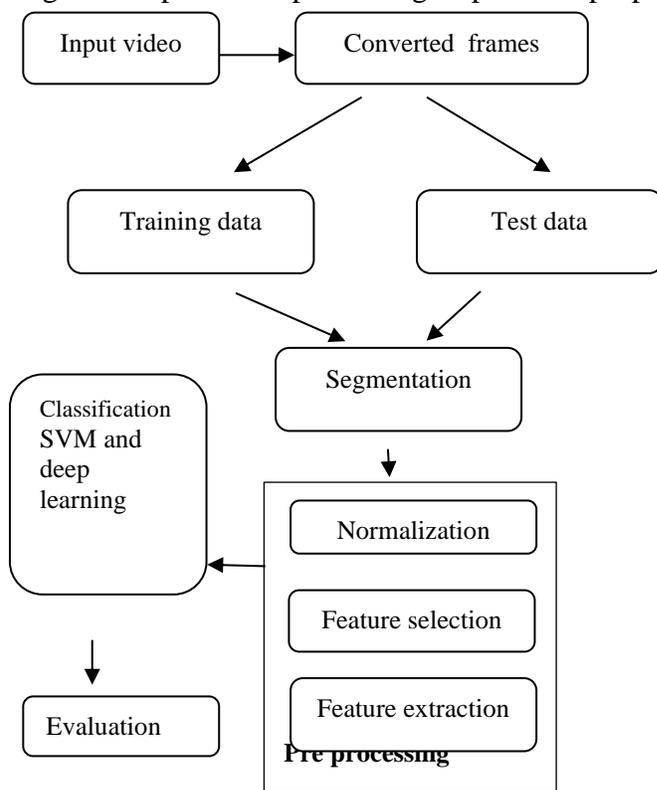
Figure 1 A Schematic representation of the system

The advantage of the proposed method is that image classification and feature extraction is applied to improve the recognition accuracy. Another advantage is that, the recognition is made based on three different classifications that make it useful to obtain deeper analysis for the future. The proposed approach to classify activity type, recognition of action, and gender.

4.SVM CLASSIFIER AND DEEP LEARNING

The COVID-19 patient input video sequence has to convert into frame. After converting the video into frame sequence to start the implementation process, a set of procedure to be followed one by one. Complete the process step one by one without any error. So the process steps are followed by using the SVM and deep learning methods. These two methods performed well and gives a required output to the user. The linear model of SVM algorithms is to be performed by solving classification and regression problems. The algorithm creates a hyper plane which separates the data into classes. SVM is a representation of the data as points in the space and separated into categories by a clear gap that is as wide as possible. The input video checks the different classes in the frame and extracted from various feature points to match feature extraction. SVM and deep learning classify the feature points and shows the different accuracy points in initial stage and implementation stage. Deep learning method classifies image using neural networks. It works on three layers

to give the required result, the layers are input layer, hidden layer and output layer. Moving a person to identify the activity from video sequence is difficult in real time. Gabor filter is used for feature extraction and feature classification techniques. In the spatial domain, the 2D Gabor filter is a Gaussian kernel modulated by a sinusoidal plane wave

$$\phi\Pi(f,\Theta,\Upsilon,\eta)(x,y)=(\hat{f}2/\pi\,\Upsilon\eta)e\,(\alpha^\wedge2\,x' +^{\beta\wedge}2\,y'^\wedge2)e \quad (1)$$

$$x' = x\,\cos\Theta + y\,\sin\Theta \qquad (2)$$

$$y'= -x\sin\Theta +y\,\sin\Theta \qquad (3)$$

5.EXPERIMENTAL RESULTS

The SVM and deep learning are applied for human activity recognition of COVID-19 patient monitoring system for hospital management .Deep learning processes the input video sequence. The input video is split into frames, then the operations are performed one by one. This works is implemented using Matlab tool.
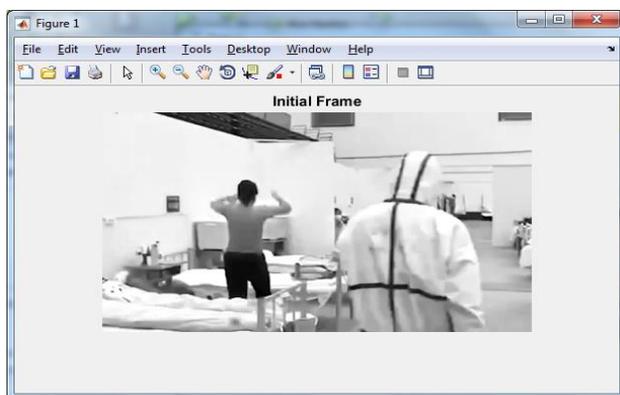

Figure 2 Input video is converted into frame

In figure 2, the input video file is running and divided into number of frames. If it was converted into frames the system can easily find out actions.
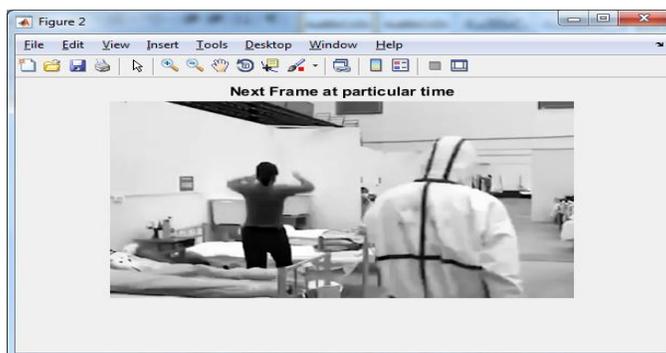

Figure 3 Frame extraction at particular time

In figure 3, the frame is captured at particular time and compared to initial frame. Then compared to next images to take cleared one for processing.
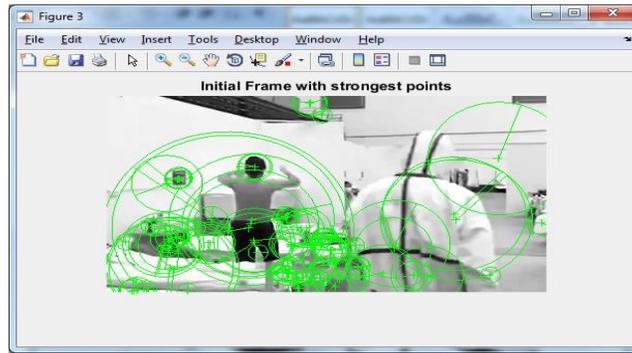

Figure.4 Strongest points selection for frame comparision

Figure 4 represents that the system selects a one clear frame to create the feature points .

Figure 5 Feature extraction usingOTSU method

In figure 5, OTSU method is used for finalization of the image and completes the pre-procesing step. Background subtraction is performed to clear all the noises.
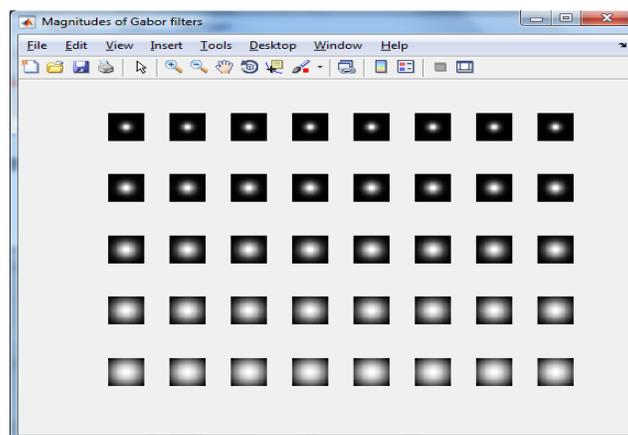

Figure 6 Gabor filters to clear the noises in image

After completing the pre-processing Gabor filter approach is used to extract the feature points from the image is shown in figure 6.
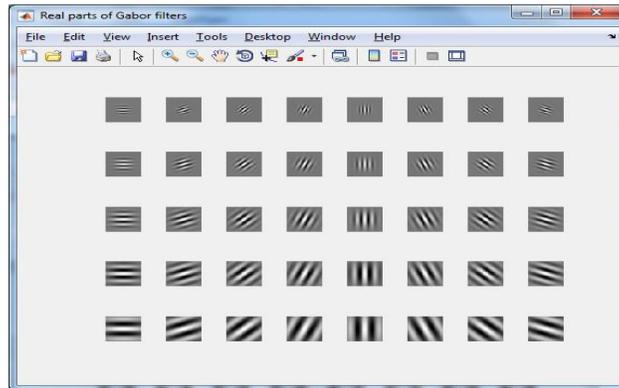

Figure 7 Gabor filter for feature classification

Gabor filter is to extract the features from the image is shown in figure 7. Feature points are extracted from the image at various points of that frame.
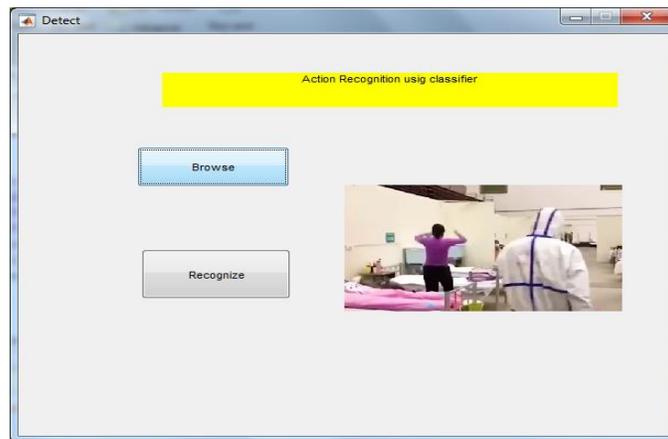

Figure 8 Action recognition by using GUI browser window

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Figure 8 shows action classifier using the deep learning method. The deep learning steps are verified the extracted points and then classify it one by one. To classify each and every point in the image.
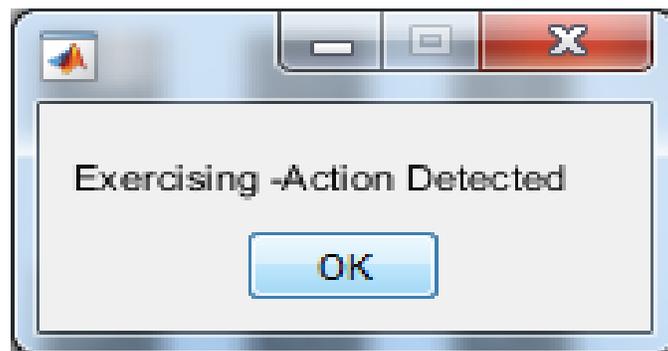

Figure 9   Detection of patient activity

6. CONCLUSION

The activity detection by the COVID-19 patient monitoring system in hospital management is implemented using Matlab tool. The activity movement of COVID-19 patient is distinguished and checked. These kinds of exercises acknowledgment is profoundly utilized in security reason area. Since, it tends to be effortlessly applied to recognize the human action in least time. By joining nearby highlights with DNN can be determined with a novel strategy for action acknowledgment that gives high acknowledgment execution contrasted with other relative methodologies. While neighborhood highlights have been dealt with freely in this work, the spatial and the worldly relations between highlights give extra signs that could be utilized to improve the aftereffects of acknowledgment. At last, utilizing the territory of highlights, and furthermore plan to address circumstances with numerous activities in a similar scene. Future work of this undertaking is to distinguish the COVID-19 patient ailments, as in the event that they are ordinary state or unusual state.

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