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Human Activity Recognition Using Neural Network

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Abstract - *Human activity recognition can be found in a variety of study domains, including medical organizations, survey systems, security monitoring, and human computer interface. This paper provides a viable technique to identifying six common human- centered actions (walking, sitting, standing, squat, punch and moving head) using Logistic Regression, Logistic Regression CV, and the CNN algorithm. A precise and pleasurable computer application that sense human body movements to acquire context information. As a repository, an activity recognition database is regarded publicly available in this case*.

Key Words: **CNN Algorithm**

1. INTRODUCTION

With the increasing rise in the need for security and surveillance, particularly in crowded areas like airports, shopping malls and social gatherings, the problem of human detection and activity recognition has attained importance in the vision community. Human activity recognition is an important area of computer vision research and applications. The goal of the activity recognition is an automated analysis or interpretation of ongoing events and their context from video data. Its applications include surveillance systems, patient monitoring systems, and a variety of systems that involve interactions between persons and electronic devices such as human-computer interfaces. Most of these applications require recognition of high level activities, often composed of multiple simple actions of person's lifestyle

2. MOTIVATION

The aims of Human-centered computing are to appreciate individual activities with their social perspective. Importantly the classification performance of the learned model using new data set as compared to the previous one, with reduced set of features and improved results

3. LITURETURE SURVEY

Syed K. Bashar, Md Abdullah Al Fahim and Ki H. Chon" Smartphone Based Human Activity Recognition with Feature Selection and Dense Neural Network"[1]Human activity recognition (HAR) has grown in prominence in recent years due to the embedded sensors in smartphones, with applications in healthcare, surveillance, human-device interactions, and pattern identification. An activity- driven hand-crafted neural network model for recognizing human activities is presented in this study. Selecting meaningful features from the provided time and frequency domain characteristics is made easier with the help of an algorithm developed using neighborhood component analysis. Afterward, a four-layer deep neural network is utilized to classify the input data into several groups. The fact that we were able to outperform most previous models despite utilizing fewer features shows just how important feature selection is. When compared to existing state-of-the-art methods, our proposed model outperformed the majority of other methods while using less features, demonstrating the critical nature of feature selection. The model was evaluated using a publicly available dataset of six daily activities from the UCI Health Risk Assessment (HAR).

Asmita Nandy, Jayita Saha, Chandreyee Chowdhury, Kundan P.D. Singh" Detailed Human Activity Recognition using Wearable Sensor and Smartphones"[2] Human activity detection is increasingly being employed in smart homes, eldercare, and remote health monitoring and surveillance. To better serve these goals, actions such as sitting in a chair or on the floor, taking a slow or brisk stroll, jogging with a weight, and so on must be recognized comprehensively. Few studies have attempted to differentiate between hard activities (such as walking while carrying a heavy burden) and their inverse (walking), which is crucial for effective health monitoring of the elderly and patients recovering from surgery. The usage of wearable and smartphone-embedded sensors has been presented as a solution for this goal in this work. As a result, the contribution of this work is to create an ensemble of classifiers to provide a framework for precise identification of static and dynamic activities, as well as their intensive equivalents. The ensemble is configured so that test instances are classified using weighted majority voting. The basis classifiers' output performance for the training dataset is sent into a neural network to determine their weights. We determined that our work has a recognition accuracy of greater than 94%.

Mohanad Babiker, Othman O. khalifa, Kyaw Kyaw Htike , Aisha Hassan, Muhamed Zaharadeen," Automated Daily Human Activity Recognition for Video Surveillance Using Neural Network"[3] Due to consumer needs for security, surveillance video systems are garnering growing attention in the field of computer vision. Observing human movement and predicting such senses of movement is promising. The need arises to design a surveillance system capable of overcoming the limitation of relying on human resources to continuously watch, observe, and record normal and suspicious events

without being distracted, as well as to facilitate the control of a largesurveillance system network. Intelligent human activity system recognition is built in this work. Background subtraction, linearization, and morphological operation were among the digital image processing techniques used at each stage of the suggested system. The human activity features database, which was taken from the frame sequences, was used to build a robust neural network.

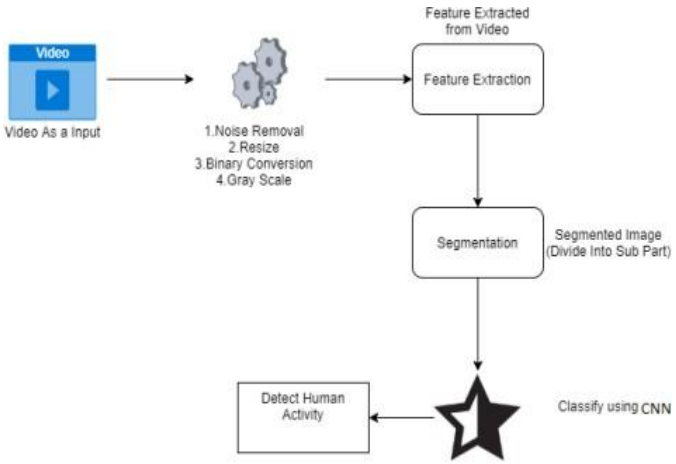
The activities model in the dataset was classified using a multi-layer feed forward perceptron network. The classification results show that all three stages of training, testing, and validation were completed successfully. Finally, these findings lead to a positive performance in the rate of activity recognition.

Neslihan Kose, Mohammadreza Babaee, Gerhard Rigoll," multi-view human activity recognition using motion frequency"[4] Spatiotemporal differences insubsequent video frames can be used to address the problem of human activity recognition. The use of multi-view movies is advocated in this research as anew method for recognizing human activities. A naive background subtraction is conducted first, employing frame differencing between neighboring frames of a movie. Following that, each pixel's motion information is captured in binary, indicatingwhether or not motion exists in the frame. The frequency of motion in each pixel throughout the clip is calculated by a pixel wise sum of all the different images in a view. These motion frequency features are used to evaluate categorization performance. Increasing the number of views used for feature extraction enhances performance, as different views of an activity provide complimentary information, according to our findings. Experiments on the multi-view human action datasets i3DPost and INRIAXmas Motion Acquisition Sequences (IXMAS) show significant accuracy.

Soo Min Kwon, Song Yang, Jian Liu, Xin Yang, Wesam Saleh, Shreya Patel, Christine Mathews, Yingying Chen "Hands-Free Human Activity Recognition Using Millimeter-Wave Sensors"[5] We demonstrate a hands-free human activity identification framework using millimeter-wave(mm Wave) sensors in this demo. Our network, in comparison to other systems, respects user privacy and can modify a human skeleton conducting the activity.

Furthermore, we demonstrate that our network can be built in a single architecture and further tuned for greater accuracy than networks thatcan only produce solitary outcomes (i.e. only get poseestimation or activity recognition). To prove the practicality and durability of our model, we will present it in various circumstances (i.e., in front of various backgrounds) and effectively showcase the correctness of our network.

4. SYSTEM ARCHITECTURE



5. Objective

- Design a simple, light weight, and accurate system that can learn human activity with minimum user interaction.
- Compare and find a model that best fit our systemin terms of accuracy and efficiency.
- Reduce the labeling time and labor works using active learning.
- The aim of the system we propose is to continuously track human activities.

???Algorithm

- Input – Well Annotated CSV Video Dataset
- Output – Detecting and tracking human Activity using video processing with better efficiency

1. Begin:
2. Pre-Process the CSV Video Dataset
3. Fed the video sample to CNN for feature extraction
4. For i=1 to Pn do // Extracting Feature
5. For Layers(K): 1 -> K-1 do // here K is 3
6. Obtain the edge feature map Fm
7. End For
8. End For
9. Apply equation on the feature map datasets to isolate gradient edges
10. Cropping out the Region of interest from step9

11. Apply Equation on detached ROI to represent all lines
12. Apply line tracing method illustrated in Given Video section
13. End

6. Conclusion

In this model we are able to recognized human activity based on their behavior. Our goal is to predict different activities which human performed on daily basis. We have implemented this model using machine learning algorithms and CNN algorithm. Here in this model we have improved the efficiency of model using the neurons which is best in prediction and classification. The main aim is to provide the optimization solution

8. References

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