

# A Review of Human Activity Recognition Using Deep Learning

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**Abstract**— Human Activity Recognition systems are nowadays gaining increasing attention as users demand the seek of security. It is a promising tool to observe the human movements and predict such kind of sense of movements. The need arises to develop a surveillance system which is capable enough to overcome the shortcoming of the human resource dependency to do monitoring, observing the normal and suspect events all the time without any absent mind and also to facilitate the huge surveillance system network controls. This paper develops an intelligent human activity system recognition (HAR). Digital image processing techniques in series were used in each stage of the proposed HAR system.

**Key words:** Human Activity Recognition, Video Surveillance System, Deep Learning, Recurrent Neural Network.

## 1. Introduction

Human activity is more reliable in video surveillance system. There are lot of challenges facing the human activities. Human activities and movement acknowledgment is gaining significance in the perspective of security and observation additionally because of mental interests in understanding the standards of conduct of population. A solitary, aligned camera device is utilized to get the video from a get-together, which contributes to the framework. Beginning from this video, it recognize people, track them utilizing highlight point and foresee the transient directions.

This System handle human activity which seems complex to recognize for normal human. In the fast life generation, there is a need to recognize human activity in different environment so that person can make system usable in security, health care, video surveillance system, etc.

Human Activity Recognition (HAR) refers as the task of measuring and observing the physical activity and movements of a human being using the objective technology as basis.

As of late, Human activity Recognition (HAR) has generated extensive interest in different research zones because of its latent capability in proactive processing powers.

A solid framework fit for perceiving different human activities has numerous significant applications, for example, mechanized reconnaissance frameworks, human PC communication, brilliant home social insurance frameworks and control free gaming frameworks and so on. After performing these scenarios this system has problem in address or time due to sequentially performs.

## 1.1 Objective

The era of digitalization has allow computers that are able to analyse massive amounts of complex data.

Recognize single person activity and interaction activity.

Background subtraction on image.

Recognize activity from video.

They can perform better than human

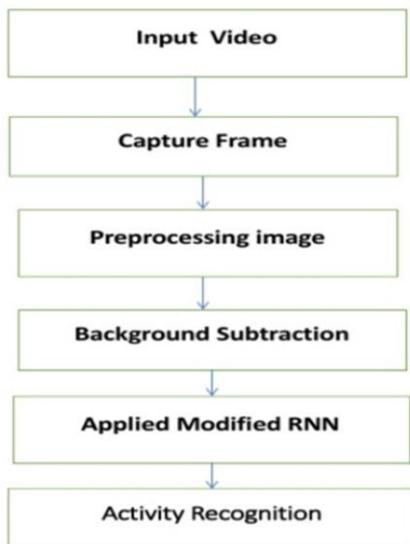
It is designed by capturing sequence data

Remember each and every information through time.

Useful in time series data prediction because it is Remember previous information and inputs as well.

Traditional neural networks can't do like this and it seems shortcoming.

### 1.2 Overview Of System



### 2. LITERATURE REVIEW

The study of Human Activity Recognition system (HAR) began with implementing the Machine Learning Approach. Over the years, many algorithms and methods are being used for solving real-world problems. Lot of research work and executions were completed using the integrated Machine Learning Algorithms. This section provides a brief overview of the transition of HAR system from ML to DL that is advancing over the years.

In the research conducted, Machine Learning approach is used for the implementing the HAR. SVM is the most precise approach and tested with highest success rating of 99.4% while the other methods also created effective models.

According to the published works, SVMs have frequently proved to be the most accurate predicting models among all. With the introduction of Deep Learning, these ML approaches have lost their limelight now.

Several researchers, over the years, developed DL-based solutions for the HAR problems. Although the accuracy rates were having fluctuations in both ML and DL approaches, Deep Learning outperformed Machine Learning methods because of its intuitive feature selection process. Numerous studies have also proved that Deep Learning DL techniques' self-learning capabilities has lead to higher accuracy in producing results with faster processing. The first applications of DL methods

have been implemented in computer vision and natural language processing. The exploration in the Among all the DL models, CNNs attracts the main attention of several HAR researchers. Using a 1-Dimensional CNN model to classify activity dare corded by smartphone sensors. It compares the performance of their proposed model with some shallow ML models like SVMs and DTs. The results of proposed model indicate that the CNN model provides more accuracy. By using a 2-Dimensional CNN to classify six daily activities recorded from 12 volunteers. They compare their methods against traditional ML methods w.r.t. both accuracy and computational overhead. The results concludes improvement with respect to both measures.

field of DL provides scope for significant development to HAR and its applications.

The authors usually apply different kind of variants of RNNs for tests. GRUs and LSTMs are used to recognize daily activities and detect the abnormalities in behaviour of the elderly people suffering from dementia. This helps author to compare the performance of these models with shallow ML.

The comparison of results indicates that RNNs are outperforming other ML models most of the evaluated measures (like accuracy, precision and recall), and also among all the investigated RNN models, LSTMs performed for slightly better use. LSTMs are used to classify human activity data which are collected by smart-homes. They also compare LSTMs model with CNNs and traditional ML models. Their evaluations indicate that LSTMs and CNNs also outperform other models of ML, and CNNs are much faster than LSTMs in training but less accurate. As in future work, it can be proposed to combine CNNs and LSTMs to take benefit of both sides. A study conducted by published author shows a comparative analysis of hybrid deep learning models for HA providing outstanding results.

This can be said as the new advancement to the evolution in field of Deep Learning.

#### 2.1 Proposed Methodology

In our proposed method, we will use recurrent neural network (RNN) which is type of artificial-

Neural (AI) network used in speech recognition and natural language processing (NLP). RNNs are such designed to recognize a data's sequential characteristics and hence use patterns that predict the next likely scenario.

RNN algorithm takes one data lets state a picture and then creates a succession of words. RNN then accepts arrangement of words as systematic info creating one yield. RNN accepts grouping of words as information producing succession of words as yield. The RNN cell contains a lot of feed forward neural systems because we have time steps.

It is able to subtract or eliminate the background portion in an image.

Background subtraction gives only foreground which is we have required.

This is used in object tracking, target tracking, traffic analysis, and video appliances.

### 3. Conclusions

In the current scenario of the fast life generation, video surveillance system is required to monitor people, or activities which are performed our in daily life. By reading above literatures and method. we are performing to derive proposed work. Every method has its advantage and its own disadvantage. The proposed system may be achieving best accuracy scenario.

There are lots of method work in under the concept of Deep learning and neural network, and if we can change parameter and find result as compare to the existing model, then it's a one new approach towards science technology.

So, we are performing this proposed work. In the wake of playing out, this means we are attempting to perform RNN with action and to perform human action recognizable proof.

By seeing those observations and clarity of those methods given Human Activity Recognition Using Recurrent Neural Networks unacceptable result this result I must say for video surveillance system and create new opportunity for digital area On receipt of project information in the form of functional requirements, specifications, use cases, we prepared

a document of understanding which conveys the following information to the External guide:

- Understanding technical requirements
- Assumptions and pitfalls in the project
- Estimated overall timelines and deliverables
- Required Information
- Resource requirements
- Approximate cost of the project

### References

Human Activity Recognition Using Deep Neural Network with Context Information, 2017, Science and technology Publication. [1]

Automated Daily Human Activity Recognition For video Surveillance Using Neural Network, 2017, IEEE [2]

Multiple Anomalous Activity Detection in videos, 2017, Science Direct [3]

Human Body and Limb Motion Recognition via Stacked gated recurrent units network,2018, IET journal [4]

Human activity recognition using deep learning,2018, Journal of Emerging Technologies and Innovative Research (JETIR)[5]

Machine learning Algorithms for Human Activity Recognition, 2019, IJITEE Publication [6]

Human Activity Recognition With Convolutional Neural Networks,2019[7]

Human Activity Recognition Using Smartphone, 2018, IJANA [8]

Human Activity Recognition Using Active Learning Methodology, 2019, IJITEE [9]

Human Activity Recognition Using Computer Vision Base Approach-Various Techniques,2020, IRJET [10]