

# Forecast of Human Activity Recognition based on Smart phones using Machine Learning

Shalu Makde<sup>1</sup>, Prof. Vinod Mahor<sup>2</sup>

<sup>1</sup>M. Tech Scholar, Department of Computer Science & Engineering, Millennium Institute of Technology, Bhopal (M.P), India

<sup>2</sup>Assistant Professor, Department of Computer Science & Engineering, Millennium Institute of Technology & Science, Bhopal (M.P), India

## ABSTRACT

Human Activity Recognition database was built from the recording of 30 study participants performing activities of daily living (ADL) while carrying a waist mounted smart phones with embedded inertial sensors. The objective is to classify activities into one of the six activities performed. The experiments have been carried out with a group of 30 volunteers within an age bracket 19-48. Each person six activities wearing a smart phone on the waist. Using its embedded accelerometer and gyroscope, we captured 3-axial linear acceleration and 3-axial angular velocity at a constant rate of 50Hz. The experiments have been video-recorded to label the data manually. The obtained dataset has been randomly portioned into two sets, where 70% of the volunteers were selected for generating the training data and 30% the test data. The sensor signals (accelerometer & gyroscope) were pre-processed by applying noise filters and then sampled in fixed-width sliding windows of 2.56 sec and 50% overlap (128 readings/ window).

**Keywords :** Machine Learning; classification, dataset, Different classification Algorithms.

## Article Info

### Publication Issue :

Volume 8, Issue 6

November-December-2022

**Page Number :** 484-487

### Article History

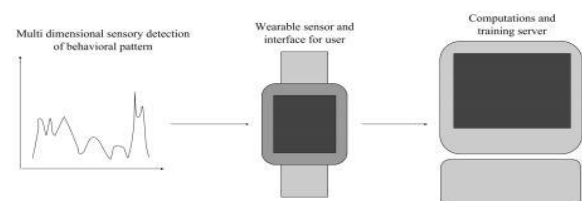
Accepted: 01 Dec 2022

Published: 15 Dec 2022

## I. INTRODUCTION

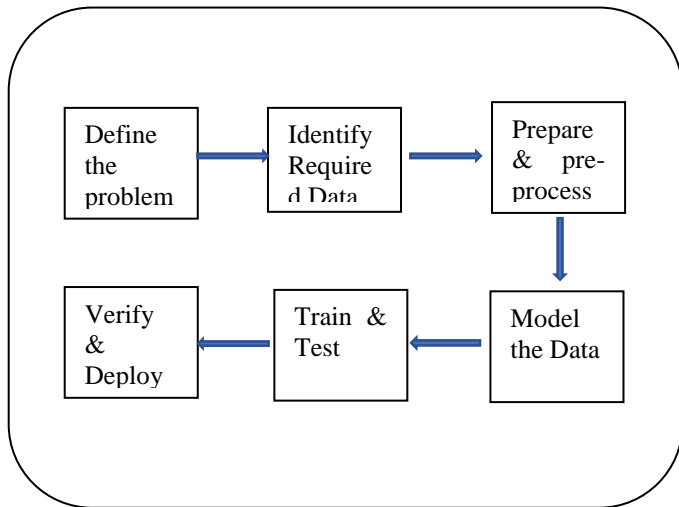
According recognizing human activities is a countless activities into this era where everybody is busy and sensors are easily available wearable computing. We all know we are in IoT era. It is very basic technologies to provide the activities performance by users when we trying to fetch their behaviour in the figure 1 there are three major components first component is using for detecting behavioural pattern

which is generated by any electronics device. Second components wearable sensors and interfaces are available. At last a computing server is required for processing this work.



**Figure 1:** Human Activity Recognizer

### 1.1 Data Mining Process



**Figure 2:** Process of Data Mining [4]

**Define the problem:** In this section we define our problem domain.

**Identify Required Data:** In this step we will select which type of Data set will suit the above problem domain.

**Prepare & pre-process:** In this step we will do the previous task for further analysis.

**Train & Test:** In this step data will be divided into two major parts Training and Testing. At Training Data, we will create a model or classifier. At Testing Data, we will verify the model.

**Verify & Deploy:** In this step we will deploy a selected model for any new Data set and try to find the prediction from given Data set.

### 1.1 Different machine learning algorithms

Since we know that in recent days Machine Learning algorithm play important roles in different industries. In this section we worked for sentiment analysis or finding polarity from movies reviews dataset. We know that we have number of algorithms to solve our problem out of them we are explain some algorithms:

## II. RELATED WORKS

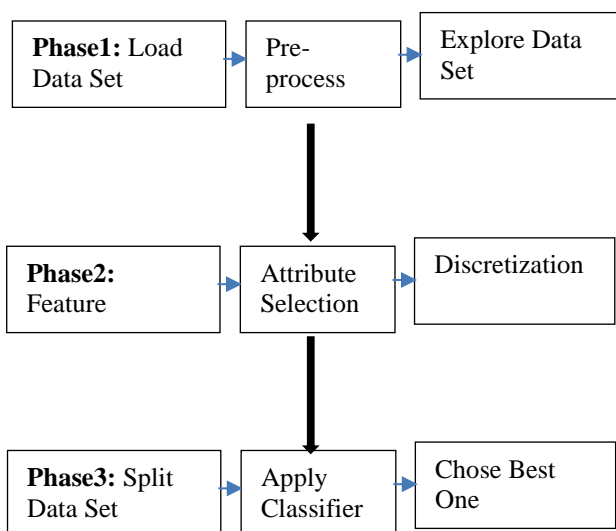
Data mining is burning topic in today's research field. Human Activity Recognition (HAR) is very meaningful in day to day life and having significant aspect in data mining. Here research is based upon tri-axial accelerometer. Here Walking, Running, Upstairs, Downstairs, standing, sitting cycling. To improve the accuracy of classification for daily activities.

Finally Authors concluded that novel method to collect data from both accelerometer and gyroscope using Smartphone. There are seven kinds of activities. Here Authors combines' time domain features with wavelet coefficients to extract features for improving the accuracy.

The accuracy of SVM is maximum claimed by authors in their work [3].

In this work Authors focus over use of Deep Learning approaches for Human Activity Recognition (HAR) Here Inputs are multichannel time series signals acquired from a set of body-worn inertial sensors [5]. Here Authors presents feature learning method that deploys convolution neural networks (CNN) to atomization of given feature learning.

With the progress of technology in music players, especially in intelligent cell phones, users have access to large archives. Quick and easy selecting favorite music among these large archives becomes one of the biggest problems for users [7].



**Figure 3:** Used Algorithms in Sentiment Analysis

(proposed Method)

### III. PROBLEM IDENTIFICATION

The Motivation of our Dissertation is that In Today’s hectic life nobody has time to detect the behaviour of their life style. Once it gets infected we all come under threaten. So we come to conclusion if we detected our working behaviour through any electronic devices like mobile and watch that will be easy for all. Here we fetch data from mobile and process it for finding some information.

### IV. PROPOSED METHOD

Authors studied number of research papers and come to decision that different methods is available to solve the problem some of them is going to be describe by authors:

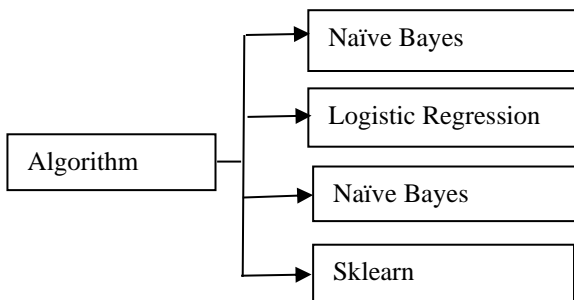


Figure 4 : Proposed Framework

### V. RESULT ANALYSIS

In the table 1 we are trying to show the Accuracy Results of Different Algorithms which we implemented.

Table 1: Output Results

Algorithms	Accuracy
Decision Tree with Grid Search	0.8659
Logistic Regression with Grid Search CV	0.9582
Linear SVC with Grid Search	0.9674

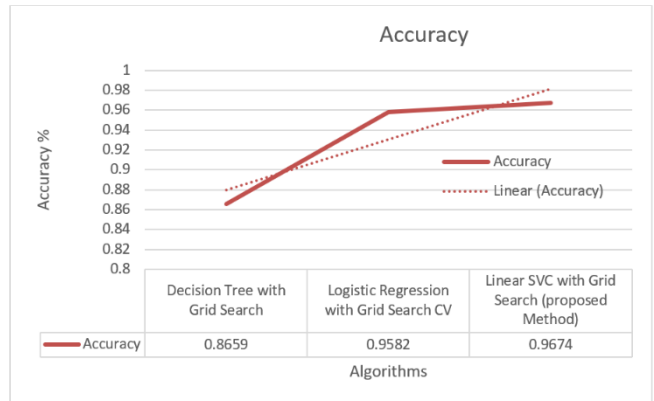


Figure 5 : Comparison Graph

In figure 6.1 By the analysis of above graph we can say that splitting of training and testing data is 70:30. we find that Decision Tree with Grid Search, Logistic Regression with Grid Search CV Linear SVC with Grid Search (proposed Method) gives 86.59 % , 95.82 & 96.74 respectively. Here Linear SVC with Grid Search our proposed methods.

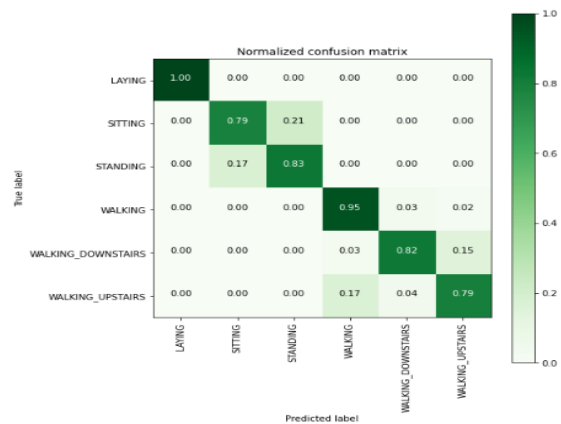


Figure 6 : Confusion Matrix of Decision Tree

In figure 6 By the analysis of above graph we can say that how Decision Tree Confusion Matrix play for better under standing. Here we have two class real class and predicted class where we have to make comparision

### VI. CONCLUSION

Authors studied number of research papers and came with some conclusion that by many approaches' Finally Authors concluded that when we implemented Tri-axial acceleration from the accelerometer and the estimated body acceleration. In this Angular velocity we find different Accuracy for Different Algorithms.

In future, the future works focus on applying some other techniques to improving the performances of these methods for up to maximum extent. Another concept that can be implemented Deep learning in place of machine learning technology. The reason behind this is best and efficient techniques using nowadays.

## VII. REFERENCES

- [1]. Erhan BÜLBÜL , Aydın ÇETİN , İbrahim Alper DOĞRU, "Human Activity Recognition Using Smartphones ," 978-1-5386-4184-2/18 ©2018 IEEE. .
- [2]. Tuan Dinh Le , Chung Van Nguyen, "Human Activity Recognition by smartphone "2015 2nd National Foundation for Science and Technology Development Conference on Information and Computer Science.
- [3]. Tian Ya, Chen Wenjie, "MEMS-based Human Activity Recognition Using Smartphones" Proceeding of 35th Chinese Control Conference July 27-29, 2016 , Chengdu , China
- [4]. Hanyuan Xu, Zhibin Huang , Jue Wang , Zilu Kang "Study on Fast Human Activity Recognition Based on Optimized FeatureSelection" , 2017 16th International Symposium on Distributed Computing and Applications to Business, Engineering and Science.
- [5]. Tahmina Zebin , Patricia J Scully, Krikor B. Ozanyan, Human Activity Recognition with Inertial Sensors using a Deep Learning Approach TahminaZebin would like to thank the Presidents Doctoral Scholaraward scheme,

University of Manchester for funding her PhD studies.

- [6]. Nweke Henry Friday, Ghulam Mujtaba, "Deep Learning Fusion Conceptual Frameworks for Complex Human Activity Recognition Using Mobile and Wearable Sensors" , 2018 International Conference on Computing, Mathematics and Engineering Technologies – iCoMET 2018
- [7]. A. Krizhevsky, I. Sutskever, and G. E. Hinton, "Imagenet classification with deep convolutional neural networks," Advances in Neural Info. Processing Sys, pp. 1097-1105, 2012.
- [8]. Y. Kim , "Human Detection and Activity Classification Based on Micro-Doppler Signatures Using Deep Convolutional Neural Networks," IEEE Geoscience and Remote Sensing Letters, vol. 13, pp. 8-12, 2016.

### Cite this Article

Shalu Makde, Prof. Vinod Mahor, "Forecast of Human Activity Recognition based on Smart phones using Machine Learning", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 8 Issue 6, pp. 484-487, November-December 2022.

Journal URL : <https://ijsrcseit.com/CSEIT228676>