

DetectAsana: Classification of Body Postures and Movements

Bhavey Wadhwa
2018135
IIIT Delhi

bhavey18135@iiitd.ac.in

Ritik Garg
2018305
IIIT Delhi

ritik18305@iiitd.ac.in

Rohit Makkar
2018087
IIIT Delhi

rohit18087@iiitd.ac.in

1. Motivation

With the increasing population and life expectancy, the world demands healthcare systems for Ambient Assisted Living(AAL). AAL is an emerging field that aims at exploiting ICT in personal and healthcare systems to render personalized, adaptive, and anticipatory requirements. Human Activity Recognition(HAR) can be used to provide information about a person's daily routine to develop an e-health system to support the care of the elderly, chronically ill, and people with special needs. We aim to use uni-modal wearable sensor data for the classification of body postures and movements. But the question remains 'Why' and 'Which' algorithm is the best for the particular dataset, as there is no universally accepted algorithm for the same. Here, we will try to answer the 'W's' by comparing the various algorithms for the "PUC-Rio" dataset and will try to implement the algorithm to compare the results.

2. Related Work

1.Classification of posture and activities by using decision tree :Ting Zhang Wenlong Tang Edward S. Sazonov : This paper deals with the classification of activities using decision tree providing computational efficiency which can help in monitoring physical activities.

2.Wearable Computing: Accelerometers' Data Classification of Body Postures and Movements: L.N. Barros, M. Finger, and A.T.R. Pozo : which works with the data collection using wearable device with 4 accelerometer, training the model using adaboost and decision trees, giving high accuracies (measured using confusion matrix).

3.Classification and analysis of human activities: J. Mary Hanna Priyadharshini ; S. Kavitha ; B. Bharathi : This paper presents a novel analysis of a multivariate time-series dataset namely PAMAP2 (physical activity monitoring) using different classification algorithms

3. Timeline

October 5, 2020

- 1.Literature Review and Preprocessing of data
- 2.Feature Selection and Classification using Logistic Regression

December 1, 2020

- 1.Progress Report**
- 2.Feature Selection and Classification using SVM, RF and ANN/CNNs and comparing based on evaluation metrics like accuracy, efficiency, sensitivity, error rate, and AUC score.

**The Progress Report will be maintained as we go along in the project.

4. Individual Contributions

Bhavey Wadhwa

Studying different algorithms, doing relevant literature hunt and analyzing the scope of AdaBoost and ANN/CNN algorithms

Ritik Garg

Classification using logistic regression and Studying Mathematics and related topics involved in the project.

Rohit Makkar

Implementation of different Machine learning algorithms and analysis and comparison of Random Forest and SVM based algorithms.

**A combined effort will be required for final Comparison of different algorithms used based on evaluation metrics and providing concrete reasoning.

5. Final Outcome

Compare the results obtained from different ML/DL algorithms used and providing a concrete reasoning for the same. The evaluation metrics shall be accuracy, efficiency, sensitivity, error rate, and AUC score on the PUC-Rio DataSet.