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Detection of Optimal Activity Recognition Algorithm for Elderly Using Smartphone

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Abstract. This is a preliminary study regarding the design of a fall prediction system. The purpose of this work is to determine an optimal classification algorithm for a fall prediction system that is able to recognize the gait difference between healthy and elderly people using a triaxial accelerometer sensor on a smartphone. To evaluate our approach, 19 people participated in our experiments. We collected accelerometer data as they performed daily activities such as walking, hobbling, and sticking, and features including the mean, standard deviation, and horizontal and vertical components were calculated. A Naïve Bayes classifier, a Bayesian network, a support vector machine, the k-nearest neighbors (k-NN) algorithm, a decision tree, multilayer perception, and logistic regression were used to classify these features using the Weka assessment tool. An 10-fold cross-validation method was carried out to classify daily activities and to compare the accuracy of the classification of daily activities for healthy and elderly people. As a result, the overall accuracy of recognition was 97.4% for healthy adults and 71.1% for elderly people, and the k-NN algorithm was higher than the other classification algorithms with accuracies of 99.5% and 81.4%.

Keywords: Activity recognition, k-NN, a triaxial accelerometer sensor

1 Introduction

Recently, falling has become a serious problem among the elderly people. It is a leading cause of death and hospitalization in elderly people and the main cause of

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