Recognizing complex human activities using hybrid feature selections based on an accelerometer sensor

M.N.Shah Zainudin, author

Abstrak

Wearable sensor technology is evolving in parallel with the demand for human activity monitoring applications. According to World Health Organization (WHO), the percentage of health problems occurring in the world population, such as diabetes, heart problem, and high blood pressure rapidly increases from year-to-year. Hence, regular exercise, at least twice a week, is encouraged for everyone, especially for adults and the elderly. An accelerometer sensor is preferable, due to privacy concerns and the low cost of installation. It is embedded within smartphones to monitor the amount of physical activity performed. One of the limitations of the various classifications is to deal with the large dimension of the feature space. Practically speaking, a large amount of memory space is demanded along with high processor performance to process a large number of features. Hence, the dimension of the features is required to be minimized by selecting the most relevant feature before it is classified. In order to tackle this issue, the hybrid feature selection using Relief-f and differential evolution is proposed. The public domain activity dataset from Physical Activity for Ageing People (PAMAP2) is used in the experimentation to identify the quality of the proposed method. Our experimental results show outstanding performance to recognize different types of physical activities with a minimum number of features. Subsequently, our findings indicate that the wrist is the best sensor placement to recognize the different types of human activity. The performance of our work also been compared with several state-of-the-art of features for selection algorithms.