PREDICTION OF MEDICAL EVENTS IN ELDERLY USING SENSOR DATA: A CASE STUDY ON PULSE PRESSURE

Elena Florea

Dr. Mihail Popescu, Thesis Supervisor

ABSTRACT

The primary goal of this research was to find a link between abnormal levels of daily activities, provided by a sensor monitoring system, and pulse pressure (PP), using data mining algorithms. A widened PP predicts a higher risk of subsequent cardiovascular events, coronary heart disease, renal disease, heart failure, and mortality, particularly in the elderly. Furthermore, it seemed reasonable trying to predict the PP and compare the predicted PP trend with the measured PP trend. Different classification algorithms including neural network, robust regression, and SVM have been applied to two data sets corresponding to a male and female living at TigerPlace. The results suggest that the bed restlessness and motion levels may be used to predict high PP in elderly. The low heart rate led to an improved prediction rate. The robust regression proved to be the best algorithm. Differences between the predicted and measured PP trends might be able to provide a hint about the possibility of upcoming abnormal clinical events. Surprisingly, the medication influencing the motion and sleep pattern did not alter the PP prediction but the predicted PP trend was able to capture the influence of hyper- and hypotension medication, such as Lopressor and Lasix.