

ADDING INTELLIGENCE TO A FLOOR BASED ARRAY PERSONNEL DETECTOR

Fadi Muheidat

D. Harry W. Tyrer

ABSTRACT

A high-risk problem for seniors is falls. Therefore, there is value in detecting falls. We enhanced smart carpet, which is a floor based personnel detector system, to detect falls using a faster but low cost processor. Our new hardware front end reads from 128 sensors (the sensors output a voltage due to a person walking or falling on the carpet). The processor is Jetson TK1, which provides more computing power than before. We generated a dataset with volunteers who walked and fell to test our algorithms. Data Obtained allowed examining data frames read from the data acquisition system. We used different algorithms and techniques, and varied the windows size of number of frames ($WS \geq 1$) and threshold (TH). We found that at ($WS = 8$), and threshold ($TH = 8$) using connected component labeling algorithm (CCL) produced a fall sensitivity of 87.9%. We then used the dataset obtained from applying a set of fall detection algorithms and the video recorded for the fall patterns experiments to train a set of classifiers using multiple test options using the Weka framework. We found that the widow size ($WS = 8$) at a threshold ($TH = 8$) using connected component algorithm generated attribute contributed to the fall sensitivity. Other algorithms attributes did not contribute significantly to the detection of the fall. More work needs to be done to embed the software into a single integrated package.