Applying Thermopile Array Sensors and Machine Learning to Detect Falls of Older Adults

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With advancements in science and medicine, the population of older adults has grown around the world in recent years. As a result, fall detection systems are necessary for the wellbeing of older adults, but there are no existing solutions that are simultaneously accurate, accessible, and able to maintain privacy. In this project, a hardware and software platform has been developed to capture thermal images with a thermopile array sensor, remove interference caused by items other than a human body that radiate thermal energy, identify a human body from low-resolution images and track its movement, extract valid features from the identified body to reduce computational complexity, and employ neural network algorithms to detect falls from organized features. Performance evaluations show that the neural network algorithms can detect falls with high accuracy. Therefore, fall detection systems that use thermopile array sensors and machine learning algorithms are a promising approach to maintaining the health of older adults.

Awards Won:
Third Award of $1,000