

## **Hybrid classification method to detect the presence of human in a smart building environment**

*Nurul Farzana Ahmad Mahmud<sup>1</sup>, Nor Azuana Ramli<sup>2</sup>*

<sup>1</sup>Electrical Engineering Section, Universiti Kuala Lumpur British Malaysian Institute, Gombak, Selangor, Malaysia

<sup>2</sup>Centre for Mathematical Sciences Universiti Malaysia Pahang Gambang, Pahang, Malaysia

### **ABSTRACT**

There are various types of sensors to detect the presence of human available today. However, the implementation of sensors only is not enough to detect human presence accurately. This occupancy aspect is important as it is one of the factors that affect energy consumption in the building which had been neglected. In order to increase the accuracy of human presence, the machine learning method needs to be applied. The main objective of this study is to develop a better system to detect the presence of human in the smart buildings based on sensor and machine learning methods. Since this study used two different types of sensors, a comparison of accuracy between collected data need to be performed. Then, average every hour from the most accurate collected data sensor used to train the model by using a decision tree, k-nearest neighbour and hybrid classification. The accuracy between the classifiers has been compared but it is not satisfactory to prove which classifier is better. Hence, performance evaluations such as receiver operating characteristics curve and root mean square error were applied. The results showed that bagged trees have the highest accuracy which is 67.6% with the lowest root mean square error values and 0.98 area under the receiver operating characteristics curve.

### **KEYWORDS**

Machine learning; Hybrid classification; Smart building; Infrared sensor; MATLAB

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