

ABSTRACT

Several studies on smart lighting have proposed light control based on accurate activity recognition, but this is an expensive solution. On the other hand, several studies have implemented other forms of activity recognition-based smart lighting using passive infrared (PIR) sensors, which are affordable but with limited performance. There is a research opportunity for a novel, affordable solution that is accurate and proven to increase user comfort. The aim of this dissertation is to find an affordable and accurate novel solution and then evaluate the relationship between the performance of the novel solution and user comfort. First, it is proposed that a novel method called classification integrated moving average (CIMA) be applied, which can increase activity recognition accuracy in smart lighting using a PIR sensor which is relatively more low-price than state-of-the-art (SoTA) solutions. Then, the novel EdgeSL architecture, namely edge computing architecture for smart lighting, will be applied utilizing distilled KNN for optimum processing time. Finally, it proves that the proposed novel method can increase user comfort. This is by utilizing the technology acceptance model (TAM). This dissertation research shows that CIMA is better than other SoTA research. This dissertation proves that user comfort can be measured with TAM. The Wilcoxon test shows significant differences in the TAMs created for smart lighting devices without CIMA and with CIMA. This shows that AI with CIMA is important to the user's comfort with smart lighting.

Keywords: smart lighting, classification-integrated moving average, user comfort, edge computing, technology acceptance model