

Finger-Gesture Recognition for Visible Light Communication Systems Using Machine Learning.

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Abstract

Gesture recognition (GR) has many applications for human-computer interaction (HCI) in the healthcare, home, and business arenas. However, the common techniques to realize gesture recognition using video processing are computationally intensive and expensive. In this work, we propose to task existing visible light communications (VLC) systems with gesture recognition. Different finger movements are identified by training on the light transitions between fingers using the long short-term memory (LSTM) neural network. This paper describes the design and implementation of the gesture recognition technique for a practical VLC system operating over a distance of 48 cm. The platform uses a single low-cost light-emitting diode (LED) and photo-diode sensor at the receiver side. The system recognizes gestures from interruptions in the direct light transmission, and is therefore suitable for high-speed communication. Gesture recognition accuracies were conducted for five gestures, and results demonstrate that the proposed system is able to accurately identify the gestures in up to 88% of cases.

