Title	単眼カメラを配置した腕輪型デバイスを用いてクリックジェスチャ認識を行う手法の提案
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Click Gesture Recognition by Processing Image Obtained from Wrist-Worn Device Equipped with Monocular RGB Camera

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We propose a method to predict mouse click gesture by processing back of the hand image obtained from wrist-worn device equipped with a monocular RGB camera. In this research, we assume that such camera will be installed to wrist mounted device such as smartwatch. In fact, some smartwatch have camera installed for purpose of taking pictures. However, it is nearly impossible to observe finger movement and the movement occurs to back of the hand is subtle. Therefore, we investigate if it is possible to predict mouse click gesture only from image of back of the hand.

In this paper, we proposed ClickNet, a CNNLSTM network, to observe back of the hand deformation and predict mouse click gesture. To train ClickNet we created a dataset by collecting data from 6 people, and labeling them. As a result of training model using this dataset, we achieved F1 score of 0.88390 for mouse click recognition.

This research has following novelties. First, the use of wrist-worn device makes it more portable than non-wearable motion estimation methods and allows the user to continuously capture the hand in the field of view without effort. Secondly, the use of a small monocular camera eliminates the need for special sensors, and the built-in camera of an existing smartwatch can be used to reduce the cost. Since many people wear watch-type accessories and devices on a daily basis, the wrist-worn devices should be comfortable to wear for many people. Furthermore, we solved the problem of computation costs of semantic segmentation and calculation of optical flow by using distillation, which had been problem in existing methods.