先端科学技術研究科　修士論文要旨

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要旨			

Telework has become a universal working style under the background of COVID-19. With the increased time of working at home, problems, such as lack of physical activities and prolonged sedentary behavior become more prominent. In this situation, a self-managing working pattern regulation may be the most practical way to maintain a worker's well-being. To this end, this paper validated the idea of using an Internet of Things (IoT) system (a smartphone and the accompanying smartwatch) to monitor the working status in real-time so as to record the working pattern and nudge the user to have a behavior change. By using the accelerometer and gyroscope enclosed in the smartwatch worn on the right wrist, nine-channel data streams of the two sensors were sent to the paired smartphone for data preprocessing, and action recognition in real-time. By considering the cooperativity and orthogonality of the data streams, a shallow convolutional neural network (CNN) model was constructed to recognize the working status from a common working routine. As preliminary research, the results of the CNN model show accurate performance [5-fold cross-validation: 0.97 recall and 0.98 precision; leave-one-out validation: 0.95 recall and 0.94 precision; (support vector machine (SVM): 0.89 recall and 0.90 precision; random forest: 0.95 recall and 0.93 precision)] for the recognition of working status, suggesting the feasibility of this fully online method. Although further validation in a more realistic working scenario should be conducted for this method, this proof-of-concept study clarifies the prospect of a user-friendly online working tracking system. With a tailored working pattern guidance, this method is expected to contribute to the workers' wellness not only during the COVID-19 pandemic but also take effect in the post-COVID-19 era.