

# Study on Stress Estimation Using Smartphone Log

Recent years, interest in mental health care is increasing. In 2015, Ministry of Health, Labor and Welfare has made stress checks obligated. This study aims to encourage individuals to understand the degree their stress in order to promote self-care and prevent mental disorders in advance. We propose a method to estimate owner's stress from smartphone log. Figure 1 shows the overall flow of the method. Each data of smartphone is acquired, and the feature is calculated based on the behavior related to stress. We created clusters between participants with similar behavior, implementing machine learning for each cluster. Feature values which are considered to be effective for estimation are selected for each cluster, and LF / HF (used as a stress index) for each day is set to 1 while above the average of participants or to 0 while below the average. Then, we performed machine learning with the correct data. Here, we used the result of pervious research shown in Table 1 to design feature values. The emphasis here is on regular exercise information and interpersonal communication. The flow of feature extraction is shown in Fig.2. It is difficult to measure the conversation with a smartphone so that we use an estimation model. Through the experiment with 19 people, we achieved an accuracy of 67.9%, which has demonstrated the effectiveness of the proposed algorithm.

**Keywords:** Stress, Smartphone, LF / HF, Interpersonal exchanges

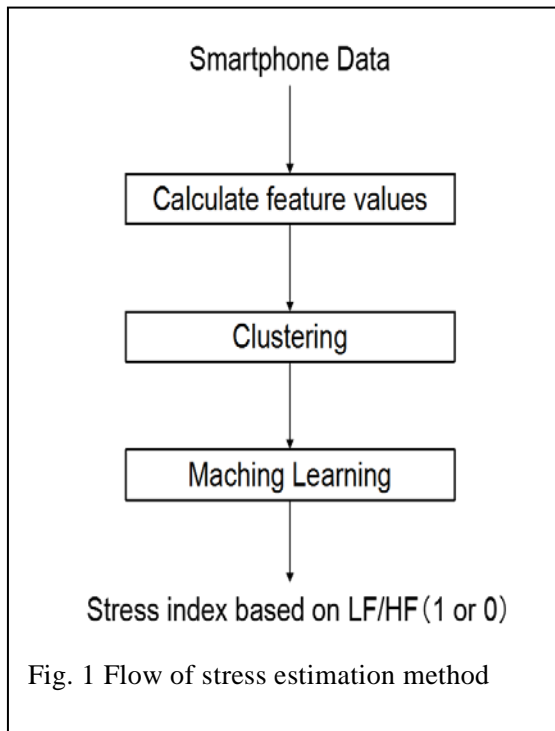


Table 1 Behavior index used as feature value

Category	Examples of actions and indicators related to stress
<b>Go Outside</b>	Go out? On foot? Place visited
<b>Environment</b>	How about the ambient brightness? How about the pressure?
<b>Interest</b>	Enjoy hobbies and play? Enjoy the day off?
<b>Communication</b>	Communication on smartphone Talked face to face?
<b>Meal</b>	Number of meals and time,

