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국문 강연제목: 논웨어러블 심탄도 기반 수면 예측 기기 개발 및 검증
영문 강연제목: Development of a non-wearable ballistocardiogram based sleep monitoring system and clinical validation

Abstract

Ballistocardiogram represents the vibrations of the torso due to the actions of heart pumping and can be measured using a non-wearable sensor. It promises a wide range of use in a variety of settings such as home sleep monitoring. However, measuring the signal cleanly and extracting meaningful parameters from the signal can be difficult due to its non-stationary nature. In this study, we present the development process of the Wethm Sleep Enhancer (Mellowing Factory Co. Ltd.) which is capable of extracting heart rate from ballistocardiogram and predicting sleep stages. The system is composed of two parts, hardware and a set of A.I. models which extract relevant features and predict sleep stages. The overall system is described, and the A.I. prediction model is discussed in detail along with the clinical validation of its performance. The results indicate that the proposed system can achieve accuracy of 75% with Cohen's K of 0.55, and future direction for improvement are discussed.

Brief Biosketch

이준녕 박사는 2020 년 ㈜멜로잉팩토리 창업 후 가정용 IoT 수면 모니터를 개발하고 있습니다. 시제품에 들어가는 모든 하드웨어 및 알고리즘 개발 부분을 리드하고 있으며, 생체신호 계측 및 생체신호 처리 연구도 활발하게 진행하고 있습니다. 최근에는 딥러닝 기반 수면 예측 방법에 대한 논문과 자체 지도 학습을 활용한 신호 분류 방법에 대해 논문을 개제했습니다.

Joonnyong Lee is the founder and CEO of Mellowing Factory Co. Ltd., where he is leading a team of engineers to develop an IoT sleep tracking device. His research areas include biosignal instrumentation, biosignal processing, and bioinformatics. Recently he has published one article on deep learning based sleep stage detection and one article on signal source separation using self-supervised methods.