

Mental Health Monitoring in the Pocket as a Life Changer? The AI View

Björn W. Schuller

Department of Computing, Imperial College London, UK

Mobile health is on the rise and opens up a seemingly ever growing potential of continuous 24/7 diagnosis, monitoring, and coaching in everyday life as sensor and embedded technology, mobile computational power, and intelligent data analysis is constantly making impressive progress. The growing range of new sensors thereby covers several biosignals and rich information, including next to motion and physiological measurement with increasing precision, also acoustic and visual markers complemented by textual markers from users' social activity, such as on smart devices, location information from GPS, and a range of further contextual information. Likewise, passive remote sensing and tracking of wellbeing and mental health "in the wild" is lately becoming ever more reliable and useful. Examples thereby include on-spot following up on emotion, stress, and cognitive and physical load, alcohol and further addictions, sleep disorders and snoring, eating disorders, depression, Autism Spectrum Condition, or Alzheimer's and Parkinson's disease. Exploited in meaningful ways, such automatically assessed information can be a crucial game changer in many individuals' lives. To unleash maximum user adherence and benefit, needed technical progress mainly concerns robustness and reliability, energy-awareness, interpretability, and privacy protection. In this context, I will focus on the "AI view" of embedded intelligent mental health monitoring "in one's pocket", at the wrist, elsewhere worn, or even invisible, discussing avenues for more efficient machine sensing "on the go". This includes seamless and holistic processing and analysis, adaptive signal and feature enhancement, efficiency optimised processing, privacy enhancing and volume reducing data compression, deep end-to-end learning for novel sensors and tasks, gamified smart active monitoring by dynamic active, semi-supervised, and transfer learning quickly adapting to users, novel ways of improving interpretability of diagnoses and learnt models, and sensor fusion and substitution in adverse settings. mHealth and AI are rapidly changing – ideally also our lives to the better