Long Short-Term Memory Based Model for Modeling Nicotine Consumption Using an Electronic Cigarette and Internet of Things Devices

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Abstract : In this paper, we want to determine whether the accurate prediction of nicotine concentration can be obtained by using a network of smart objects and an e-cigarette. The approach consists of, first, the recognition of factors influencing smoking cessation such as physical activity recognition and participant’s behaviors (using both smartphone and smartwatch), then the prediction of the configuration of the e-cigarette (in terms of nicotine concentration, power, and resistance of e-cigarette). The study uses a network of commonly connected objects; a smartwatch, a smartphone, and an e-cigarette transported by the participants during an uncontrolled experiment. The data obtained from sensors carried in the three devices were trained by a Long short-term memory algorithm (LSTM). Results show that our LSTM-based model allows predicting the configuration of the e-cigarette in terms of nicotine concentration, power, and resistance with a root mean square error percentage of 12.9%, 9.15%, and 11.84%, respectively. This study can help to better control consumption of nicotine and offer an intelligent configuration of the e-cigarette to users.

Keywords : Iot, activity recognition, automatic classification, unconstrained environment
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