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Classification for Obstructive Sleep Apnea Syndrome Based on Random Forest

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Abstract : Background: Obstructive Sleep apnea syndrome (OSAS) is a common respiratory disorder during sleep. In addition, Body parameters were identified high predictive importance for OSAS severity. However, the effects of body parameters on OSAS severity remain unclear. Objective: In this study, the objective is to establish a prediction model for OSAS by using body parameters and investigate the effects of body parameters in OSAS. Methodologies: Severity was quantified as the polysomnography and the mean hourly number of greater than 3% dips in oxygen saturation during examination in a hospital in New Taipei City (Taiwan). Four levels of OSAS severity were classified by the apnea and hypopnea index (AHI) with American Academy of Sleep Medicine (AASM) guideline. Body parameters, including neck circumference, waist size, and body mass index (BMI) were obtained from questionnaire. Next, dividing the collecting subjects into two groups: training and testing groups. The training group was used to establish the random forest (RF) to predicting, and test group was used to evaluated the accuracy of classification. Results: There were 3330 subjects recruited in this study, whom had been done polysomnography for evaluating severity for OSAS. A RF of 1000 trees achieved correctly classified 79.94 % of test cases. When further evaluated on the test cohort, RF showed the waist and BMI as the high import factors in OSAS. Conclusion It is possible to provide patient with prescreening by body parameters which can pre-evaluate the health risks.

Keywords : apnea and hypopnea index, Body parameters, obstructive sleep apnea syndrome, Random Forest
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