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THE UTILITY OF ARTIFICIAL NEURAL NETWORKS FOR THE PREDICTION OF METABOLIC SYNDROME WITH A PERSONAL QUESTIONNAIRE

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Artificial neural networks (ANNs) have been previously used for the prediction of diseases in several fields. This study aims to investigate the diagnostic accuracy for the prediction of metabolic syndrome (MS) with socioeconomic status (SES) and lifestyle behaviour using ANNs. The data of 24107 subjects' who underwent repeated examinations and answered repeated questionnaires in three-year stages from 2006 to 2014 at the Major Health Screening Centre in Taiwan, was collected and analyzed. The repeated measurements in the subjects' SES and lifestyle over time were set as predictive factors of MS and the factors were trained and tested using classical analysis performed with ANNs. Multiple layer perceptron and long short term memory networks with/without over-sampling techniques were exploited and compared and the optimal algorism was identified to be the model of risk prediction with Python package. Among them, 5882 (24.4%), 4703(19.5%) and 3593(14.9%) were diagnosed of MS in the three stages. ANNs analysis using a network with over-sampling technique performed with a sensitivity of 68.2% to 70.7%, specificity of 64.9% to 69.3, overall accuracy of 65.7% to 69.5 and harmony of recall and precision of 55% to 59% in the three stages, respectively. ANNs is a mathematical tool that may promote public health. SES and lifestyle behaviour questionnaire can be used as a useful screening tool to guide health workers involved in primary care decision making when MS is suspected.

BIOGRAPHY

Chih-Ming Lin obtained his PhD degree from National Yang-Ming University, with the specialties including Public Health and Social and Community Medicine and then started working at Ming-Chuan University where he has continued his research. Currently he has been working at Taoyan city, Taiwan.

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