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Recurrent Convolutional Neural Network based Multimodal Disease Risk Prediction

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Abstract

With the rapid growth of biomedical and healthcare data, machine learning methods are used in more and more work to predict disease risk. However, most works use single-mode data to predict disease risk and only few works use multimodal data to predict disease risk. Thus, a new multimodal data-based recurrent convolutional neural network (MD-RCNN) for disease risk prediction is proposed. This model not only can use patient's structured data and text data, but also can extract structured and unstructured features in fine-grained. Furthermore, in order to obtain the highly non-linear relationships between structured data and unstructured data, we use deep belief network (DBN)to fuse the features. Finally, we experiment with the medical big data of a Chinese two grade hospital during 2013-2015. Experimental results show that the accuracy of MD-RCNN algorithm can reaches 96% and outperforms several state-of-the-art methods.

Keywords: Convolution neural network, deep learning, healthcare, multimodal fusion

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