Prognosis Prediction of High-Risk Diseases in Adult Diabetic Patients using Forecasting_Models

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ABSTRACT

In the biomedical field, prognosis prediction of high-risk diseases which are common among the adult patient remains a challenge. The risk factor and symptoms of the high-risk diseases like diabetes, blood pressure, and hyper lipidemia are inflated in adult patients and typically lead to medical complications like fatal death. Deep learning models are used for Prognosis prediction of high-risk diseases and few works have been reported in the literature. Deep learning is part of a broader family of machine learning methods based on artificial neural networks. Prognosis prediction is carried out using recurrent neural networks using diagnostic histories for high risk diseases and it suffered from vanishing gradient problem. This was overcome by LSTM (long short-term memory) deep learning networks. The LSTM networks can be constructed in such a way that they are able to remember long term relationships in the data. The LSTM networks have been shown to model temporal sequences and their long-range dependencies more accurately than original RNN model. The long-term dependency problem is better handled in LSTM for doing prognosis prediction. The long short-term memory couples the historical data with recent real-time observations to predict the high-risk disease. LSTM combined with linear regression method models relationships between dependent and independent variables that are linear and sometimes result in incorrect prediction. Further it is sensitive to anamolies in data. In this direction the work in this paper focuses on designing a LSTM and GRU (gated recurrent unit) based prognosis prediction model using alternate regression methods like vector auto regression and ARIMA model. The paper reports the prediction results using variants of RNN models and LSTM models. The experiments were carried out using Pima Indian Dataset and UCI repository Dataset for diabetes.

