Assignment 12.1	
Research for Deep Learning with Time Series Data	
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The paper "Exploring the Use of Recurrent Neural Networks for Time Series Forecasting" discusses the application of Recurrent Neural Networks (RNNs) in predicting future values in time series data. The authors highlight the potential of RNNs in capturing temporal dependencies and complex patterns in sequential data, particularly in handling irregular time series data. They focus on two widely used methods: missing value during the pre-processing stage and algorithm modification dealing with values during the learning process. The paper reviews models that can handle problems with irregular time series data, such as Dilated RNN (DRNN) and modified attention mechanisms, which have been proposed to address the issue of missing data and improve forecast accuracy compared to traditional models like AutoRegressive Integrated Moving Average (ARIMA) and GRU4. The model developed in the research is a baseline RNN model that undergoes optimizations to create three modeling scenarios, demonstrating the effectiveness of RNNs in forecasting scenarios where individual time series may not contain sufficient data for complex modeling.

The paper "Time Series Prediction by Using Convolutional Neural Networks" presents a unique sales prediction method based on Convolutional Neural Networks (CNNs). The authors investigate the use of CNNs in sales prediction for real pharmaceutical product data, comparing their model's performance against traditional and statistical prediction methods. The results indicate the CNN-based model's accuracy and efficiency, with benefits including the capacity to automatically extract features from historical sales data and the potential to beat conventional methods. The model can be trained on big datasets, resulting in more accurate predictions. The authors conclude that the proposed method is a feasible alternative to standard sales forecasting methods, with higher accuracy and efficiencies. The dataset utilized to train and test the ANN prediction models came from the Ecuadorian pharmacy industry, notably the Farmaenlace chain, containing weekly sales of 100 distinct products over a 5-year period.

The paper "On The Rainfall Time Series Prediction Using Multilayer Perceptron Artificial Neural Network" introduces the Multilayer Perceptron Neural Network (MLPNN) as a tool for predicting Rainfall Time Series. The study uses the MLP network to make multi-step predictions (1, 5, 10, 20 steps) and compares its performance in terms of MSE and NMSE to other networks such as Jordon Elman, SOFM, and RNNs. The results reveal that the MLP and Jordan Elman networks function similarly, with the MLPNN outperforming previous networks in predicting rainfall time series. The investigation is carried out using Neurosolution 5.0 software, demonstrating the MLP network's effectiveness in predicting rainfall time series. The paper emphasizes the importance of neural networks in managing nonlinearities and non-stationary data, with a focus on the MLP's optimal performance for short-term rainfall predictions.

References:

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