

Neural Networks for next day prediction energy consumption: the Leaf Lab case Study

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Energy management have always been a great challenge in our society. The prediction of energy consumption of offices, apartments and even entire buildings could be the key for helping in reducing the energy utilization, in designing and sizing renewable energy and storage systems [1]. In this work we compared a combination of different architectures parameters and paradigms in order to forecast the next day energy consumption.

Our data are the recordings of the energy consumption and external temperatures in a period of two years, of the Leaf Lab, a building belonging to the Loccioni Group s.p.a. that kindly provided us those data. Feedforward, with different topologies, and Recurrent neural networks with a long short term memory unit have been used [2,3].

We trained and tested our networks using the data of the first year and then we forecasted the daily consumption of the next one. We evaluated each network in terms of the Mean Absolute Percentage Error (MAPE), the Mean Squared Error, (MSE) and the Root Mean Squared Error (RMSE). We got that the recurrent neural network performed better than the others obtaining a MAPE of 22%, a MSE of 18.03 and a RMSE of 4.25.

In this work, contrary to what is reported in the literature, validation has been carried out over a long period (one year); moreover, the data provided were noisy and had a large number of "holes". Despite this, our network managed to contain the error in almost all the predictions; only some of these presented a very high error.

References:

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