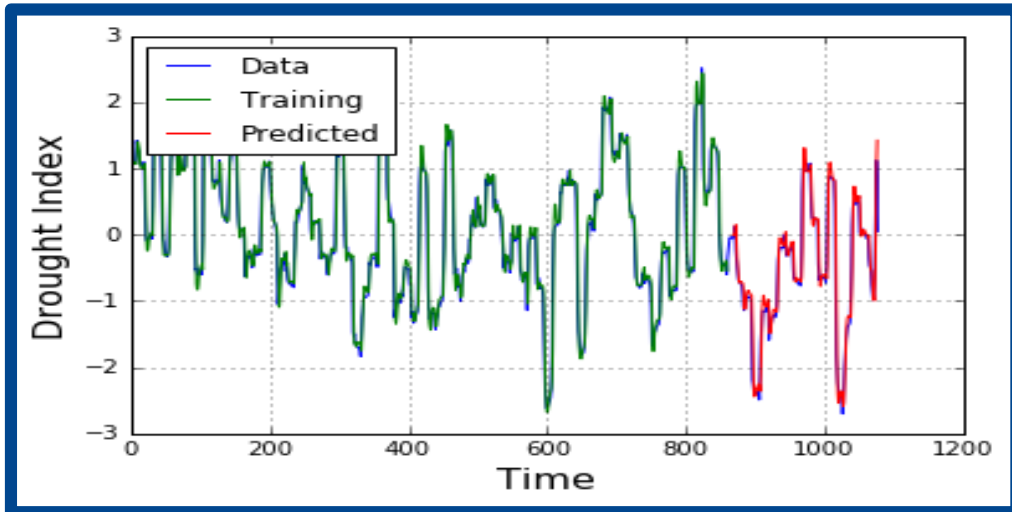


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*Department: Electrical and Computer
Engineering*

*Title: A Hybrid Deep Learning Approach for
Time Series Prediction based on Unsupervised
Feature Learning*

Major Professor: Dr. Abdollah Homaifar



RESEARCH QUESTIONS / PROBLEMS:

- Time series of real systems or processes contain diverse combinations of nonlinear and non-stationary dynamic behaviors. The data often contain temporal dependencies that can cause two otherwise identical points of time to predict different behaviors of the same observed process. Therefore, formulating and solving the dynamics of these processes is nontrivial

METHODS:

- A hybrid deep learning-based time series prediction model, inspired by recent advances in deep learning training algorithms is proposed

RESULTS / FINDINGS:

- This research has successfully explored a deep learning approach based on a deep belief network for time series prediction with significant improvement in performance using decomposition and noise filtering techniques

SIGNIFICANCE / IMPLICATIONS:

- The developed model solves the problem of local optimum solutions, one of the major challenges encountered in the training of deep neural networks
- High prediction accuracy in several applications such as electricity load consumption, and the climate sciences including drought prediction