Causality versus Predictability in Neural Network Modeling

5 steps on how to improve modeling using recurrent neural networks

- abstract -

Hans-Georg Zimmermann

In this talk I want to understand Causality as the intellectual effort to interpret a model behavior (e.g. a forecast) - it is the answer to the question `Why something happens´. On the other hand we have the goal to compute best possible predictions - it is the answer to the question `How something happens´. Unfortunately both goals do not match. To see this, we have to do a fast review on different forecasting methods. Neural networks are an appropriate framework for the modeling of high dimensional, nonlinear models. This may be function approximations or state space models, realized in form of various recurrent neural networks. Along this line we will improve our predictability, but loose at least a part of the interpretability. This is not a drawback of the modeling but a result of reconstructed unobserved hidden variables in the more advanced models. It is our decision to focus on the WHY or on the HOW.

Bio: Study of mathematics, computer science and operations research in Bonn, diploma 1982 in mathematics. Research in applications of control theory in economics at the University of Bonn until 1987, PhD 1987 in economics.

Since 1987 at Siemens AG, Corporate Technology department. Research in circuit simulation, since 1988 in neural networks. Current research interests: Optimization, time series analysis and economic and engineering applications of neural networks.

Work in the development of feed forward, (large) recurrent and neurofuzzy network architectures and algorithms for the modeling of economical and technical dynamical systems.

Since 1990 leader of the project group ' Neural networks for forecasting and diagnosis'. Head of the SENN development (Simulation Environment for Neural Networks). Current position: Senior Principal Research Scientist. Scientific Advisor of the German Society of Operations Research (GOR).

Proceedings 29th European Conference on Modelling and Simulation ©ECMS Valeri M. Mladenov, Petia Georgieva, Grisha Spasov, Galidiya Petrova (Editors)
ISBN: 978-0-9932440-0-1 / ISBN: 978-0-9932440-1-8 (CD)