Münchner Physik-Kolloquium

Sommer 2018

Deep X: Deep learning with deep knowledge

Prof. Dr. Volker Tresp, *Ludwig-Maximilians-Universität München and Siemens*

Monday, 2 July 2018, 17:15 h
Hörsaal H 030, Fakultät für Physik der LMU, Schellingstraße 4, München

We argue that a labeled graph is an appropriate description of world state and world events on a cognitive abstraction level, representing facts as subject-predicate-object triples. A prominent and very successful example is the Google Knowledge Graph, representing on the order of 100B facts. Labeled graphs can be represented as adjacency tensors which can serve as inputs for prediction and decision-making, and from which tensor models can be derived to generalize to unseen facts. We show how these ideas can be used, together with deep recurrent networks, for clinical decision support by predicting orders and outcomes. Following Goethe's proverb, ''you only see what you know'', we show how background knowledge can dramatically improve information extraction from images by deep convolutional networks and how tensor train models can be used for the efficient classification of videos. We discuss potential links to the memory and perceptual systems of the human brain. We further propose quantum algorithms to solve high-dimensional tensor decomposition problems, which could be implemented on a D-Wave quantum annealer or noisy intermediate-scale quantum computers. We conclude that tensor models, in connection with deep learning, can be the basis for many technical solutions requiring memory and perception and might bridge modern physics and modern AI.

Student event: Meet the speaker

*We invite you to a **student-only** discussion-round with Prof. Dr. Volker Tresp before his Munich Physics Colloquium talk.*

Be curious and feel free to ask any question.

Monday, 2 July 2018, 16:00 h
Room H 522 (5th floor), Fakultät für Physik der LMU, Schellingstraße 4, München