

Neural-Symbolic Learning and Reasoning

Dagstuhl Seminar 14381

Final Programme

Monday 15th of September

Morning session Chair: Garcez

09:15 – 09:45 Welcome (Artur Garcez, Marco Gori, Pascal Hitzler, Luis Lamb)

09:45 – 10:15 Dominik Endres, Making the latent category structure of fMRI data explicit with Formal Concept Analysis

10:15 – 10:30 coffee break

10:30 – 11:15 Peter Foeldiak, Semantic structure in explicit neural codes

11:15 – 11:45 Jacqueline Fairley, Symbolic Data Mining Methods Applied to Human Sleep Records

12:15 – 13:45 lunch break

Afternoon session Chair: Hitzler

13:45 – 14:15 Risto Miikkulainen, Grounding Meaning in Perceptual Representations

14:15 – 15:15 Guenther Palm, Learning in hierarchies

15:15 – 15:30 Formation of breakout discussion groups

15:30 – 16:00 coffee break

16:00 – 17:15 breakout groups (i.e. parallel discussion sessions):

A. Can inference and learning be interpreted as laws of Nature? (chair: Gueret)

B. Affordabilities and actionability (chair: Feldman)

C. Consolidation of learned knowledge (chair: Silver)

D. From fMRI to high-level representations (chair: Miikkulainen)

17:15 – 17:55 Report from the breakout groups

18:00 dinner

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Tuesday 16th of September

Morning session Chair: Lamb

09:00 – 09:30 Jerry Feldman, Natural Language Understanding

09:30 – 10:00 Tsvi Achler, Symbolic Neural Networks for Cognitive Capacities

10:00 – 10:30 Jerry Feldman, Binding Problem

10:30 – 10:45 coffee break

10:45 – 11:15 Daniel Silver, Lifelong Machine Learning and Reasoning

11:15 – 11:45 Leo de Penning, Dreaming and Consciousness in Deep Neural-Symbolic Cognitive Agents

12:15 – 13:45 lunch break

Afternoon session Chair: Hitzler

13:45 – 14:15 Vivien Mast, Concepts, Goals, and Communication

14:15 – 14:45 Gadi Pinkas, Boltzmann Machines, Binding Problem, Learning Constraints

14:45 – 15:15 Natalia Díaz Rodríguez, Human activity modelling and recognition with fuzzy ontologies

15:15 – 15:30 Formation of breakout discussion groups

15:30 – 16:00 coffee break

16:00 – 17:15 breakout groups:

A. Ontology learning (chair: Hitzler)

B. What is symbolic, what is sub-symbolic? (chair: Achler)

C. Binding problem (chair: Pinkas)

17:15 – 17:55 Report from the breakout groups

18:00 dinner

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Wednesday 17th of September

Morning session Chair: Lamb

09:00 – 9:30 Alan Perotti, Neural-Symbolic Runtime Verification

9:30 – 10:00 Bernd Neumann, Learning Compositional Robot Activities from Examples

10:00 – 10:30 Artur Garcez, Neural-Symbolic Systems, Deep Logic Networks and Applications

10:30 – 10:45 coffee break

10:45 – 11:15 Christophe Gueret, Evolutionary and Swarm computing for the Semantic Web

11:15 – 11:45 Andrey Mokhov, Mining Graphs from Event Logs

11:45 – 12:00 Joshua Welch, Decoding the Symbols of Life: Motivating Problems from Computational Genomics

12:15 – 13:45 lunch break

Afternoon recreation: trip to TRIER

18:00 Barbecue (Neural-Symbolic Computing meets Control Theory meets Software Engineering)

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Thursday 18th of September (Morning session Chair: Garcez)

09:00 – 09:30 Pascal Hitzler, Combining Learning and Reasoning for Big Data

09:30 – 10:00 Subramanian Ramamoorthy, Abstracting low-level policies towards symbols for higher level reasoning in dynamic environments

10:00 – 10:30 Dragos Margineantu, Interactive Intelligent Systems: Scaling Learning with the Expert in the Loop

10:30 – 10:45 coffee break

10:45 – 11:15 Francesca Lisi, On Concept Learning as Constructive Reasoning

11:15 – 11:45 Claudia d'Amatto, On extracting rules for: enriching ontological knowledge bases, complementing heterogeneous sources of information, empowering the reasoning process

11:45 – 12:00 Luciano Serafini, Ontology-based Image Recognition

12:15 – 13:45 lunch break (Afternoon session Chair: Margineantu)

13:45 – 14:15 Luc de Raedt, Advances on Probabilistic Logic Programming

14:15 – 14:45 Manoel Franca, Fast Relational Learning using Neural Nets

14:45 – 15:15 Steffen Hoelldobler, Human reasoning of episodes in connectionist networks

15:15 – 15:30 formation of breakout discussion groups

15:30 – 16:00 coffee break

16:00 – 17:15 breakout groups:

A. Reasoning about Uncertainty: Probabilities or Belief Revision, Deep Networks or Nonmonotonic Logic (chair: Lamb)

B. Is the Visual System Provably Feedforward? (chair: Tsvi)

C. Consolidation of Learned Knowledge: Closing the gap in the learning-reasoning pipeline (chair: Silver)

D. Demo & Implementation Fest (chair: de Penning)

17:15 – 17:55 Report from the breakout groups

18:00 dinner

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Friday 19th of September

Morning session Chair: Besold

09:00 – 9:15 Daniel Silver, Commonground between life-long learning and neural-symbolic integration

09:15 – 9:30 Son Tran, Representation reuse for transfer learning

09:30 – 10:00 Yann LeCun, The Unreasonable Effectiveness of Deep Learning

10:00 – 10:30 “What have we learned? Setting benchmarks and challenges” (chair: Garcez)

10:30 – 10:45 coffee break

10:45 – 12:00 feedback, follow-up meetings and publications, and goodbyes (chair: Lamb)

12:15 – 13:00 lunch