Preface

Opposing the false dilemma of logical reasoning vs machine learning, we argue for a synergy between these two paradigms in order to obtain hybrid AI systems that will be robust, generalizable, and transferable. Indeed, it is well-known that machine learning only includes statistical information and, therefore, is not *inherently* able to capture perturbations (interventions or changes in the environment), or perform reasoning and planning. Ideally, (the training of) machine learning models should be tied to assumptions that align with physics and human cognition to allow for these models to be re-used and re-purposed in novel scenarios. On the other hand, it is also the case that logic in itself can be brittle too, and logic further assumes that the symbols with which it can reason are already given. It is becoming ever more evident in the literature that modular AI architectures should be prioritized, where the involved knowledge about the world and the reality that we are operating in is decomposed into independent and recomposable pieces, as such an approach should only increase the chances that these systems behave in a causally sound manner.

The aim of this workshop is to formalize such a synergy between logical reasoning and machine learning that will be grounded on spatial and temporal knowledge. We argue that the calculi associated with the spatial and temporal reasoning community, be it qualitative or quantitative, naturally build upon physics and human cognition, and could therefore form a module that would be beneficial towards causal representation learning. As an example, in the on-going IJCAI Angry Birds competitions (`http://aibirds.org/angry-birds-ai-competition.html`), machine learning models generally struggle to achieve good performance, because there is no sufficient encoding of spatial and temporal structure and relations; shooting a bird with a given trajectory can clearly have some very well determined effect (based on the laws of physics), which could in turn cause a chain of effects to occur, but machine learning models are not able to capture this behavior, for the reasons mentioned earlier. A (symbolic) spatio-temporal knowledge base could provide a dependable *causal seed* upon which machine learning models could generalize, and exploring this direction from various perspectives is the main theme of this workshop.

Organizing Committee Members

- Dr **Michael Sioutis**, University of Bamberg, Germany (primary contact)
- Asst Prof **Zhiguo Long**, Southwest Jiaotong University, Chengdu, China
- Dr **John Stell**, University of Leeds, United Kingdom
- Prof **Jochen Renz**, Australian National University, Australia

Program Committee Members

- Bettina Finzel, University of Bamberg, Germany
- Bo Peng, Southwest Jiaotong University, Chengdu, China
- Esra Erdem, Sabancı University, Istanbul, Turkey
- Jie Hu, Southwest Jiaotong University, Chengdu, China
- Marjan Alirezaie, Örebro University, Sweden
- Ute Schmidt, University of Bamberg, Germany
- Zoe Falomir, Jaume I University, Spain
- Devendra Singh Dhami, Technical University of Darmstadt, Germany
- Diedrich Wolter, University of Bamberg, Germany
- Fabio Cozman, University of São Paulo, Brazil
- Fredrik Heintz, Linköping University, Sweden
- Hans Guesgen, Massey University, New Zealand
- Hua Meng, Southwest Jiaotong University, Chengdu, China
- Jae Hee Lee, University of Hamburg, Germany
- Jakob Suchan, German Aerospace Center (DLR), Germany
- Jean-François Condotta, Artois University, France
- Jochen Renz, Australian National University, Australia (co-chair)
- John Stell, University of Leeds, United Kingdom (co-chair)
- Kristian Kersting, Technical University of Darmstadt, Germany
- Matt Duckham, RMIT University, Melbourne, Australia
- Mehul Bhatt, Örebro University, Sweden
- Michael Sioutis, University of Bamberg, Germany (co-chair)
- Steven Schockaert, Cardiff University, Wales
- Tianrui Li, Southwest Jiaotong University, Chengdu, China
- Zhiguo Long, Southwest Jiaotong University, Chengdu, China (co-chair)
- Zied Bouraoui, Artois University, France