

Hamza Keurti

Curriculum Vitae

Zürich

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Personal Profile

I am a fourth-year PhD student in machine learning working on unsupervised learning of structured representations for embodied agents. I am broadly interested in how much perception emerges from the interaction of embodied agents with their environment. My interest spans representation learning, developmental psychology, group theory and category theory. I enjoy combining my mathematics and software engineering skills to get a closer understanding of intelligence and to tackle challenging real-world problems.

Education

- Since 09/2020 **PhD in Machine Learning**, *ETH Zürich + Max Planck Institute for Intelligent Systems Tübingen*, Switzerland + Germany
Research interests: Structured Representation Learning, Embodied Perception, Sensorimotor Dependencies, Group Theory, Causal Representation Learning.
Advisors: Benjamin Grewe, (Institute of Neuroinformatics), Bernhard Schölkopf, (Empirical Inference)
- 2018–2020 **Master in Advanced Computing**, *Tsinghua University*, Beijing, China, *GPA: 3.69/4.0*
- 2015–2020 **Diplôme d'Ingénieur**, *École Centrale Paris (CentraleSupélec)*, Paris, France, *GPA: 3.72/4.0*
- 2013–2015 **Preparatory Classes Maths Physics**, *Lycées Mohamed V - Moulay Youssef*, Morocco, *Top 15 Nationwide Academic Performance*

Work Experience

- 02/2018–
08/2018 **Software Engineering Internship**, *Schlumberger*, Houston, Texas, US
Prototyped a distributed optimization solution for very large networks with high number of tunable equipment. Unlocked the optimization of giant production networks. + tool for automatic decomposition of large networks. C++/Python. Patented.
- 07/2017–
01/2018 **Software Engineering Internship**, *Schlumberger*, Abingdon, Oxfordshire, UK
Coupled boundary conditions of two simulators for joint simulations. C++.

Extracurricular Activities and Achievements

- 2022 PhD Representative, CLS (ETH Zürich + MPIIS)
- 2020- CLS PhD Fellowship, CLS (ETH Zürich + MPIIS)
- 2015-2018 Recipient of the Excellence Scholarship among nationwide top 15 academic performances.
- 2016-2017 Tutored first year international students in Mathematics as part of the Help Project at Centrale.
- 2015-2020 Volunteered and paid tutoring of high school and bachelor students in mathematics and physics.

Other Skills

- Languages Arabic, French (Bilingual), English (Full proficiency), Chinese (HSK3), German (A1)
- Programming Python, C++, Shell, Pytorch.

Publications and Patent

- **Homomorphism Autoencoder—Learning Group Structured Representations from Observed Transitions**
H. Keurti, H. Pan, M. Besserve, B. Grewe, B. Schölkopf
(*ICML2023 + Oral @ NeurReps: NeurIPS 2022 Workshop - Best Abstract award from 91 submissions*)
- **Stitching Manifolds: Leveraging Interaction to Compose Object Representations into Scenes.**
H. Keurti, B. Schölkopf, P. Aceituno, B. Grewe (Under review @ *NeurIPS 2024*, Poster @ *GRaM - ICML 2024*)
- **Desiderata for representation learning from identifiability, disentanglement, and groupstructuredness.**
H. Keurti*, P. Reizinger*, B. Schölkopf, and Wieland Brendel. (Poster @ *TAGML - ICML 2023*)
- **Uncertainty Estimation under Model Misspecification in Neural Network Regression**
MR. Cervera*, R. Dätwyler*, F. D'Angelo*, H. Keurti*, BF. Grewe, C. Henning (Oral @ *NeurIPS 2021 Workshop Your Model is Wrong.*)
- **Pipeline Network Solving Using Decomposition Procedure**
K. Rashid, H. Keurti, RW. Lessard, TG. Tonkin (Patent)