Yanbo Zhang

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- Practical theoretical complex systems researcher

EDUCATION

ARZIONA STATE UNIVERSITY
2018 - 2023, School of Earth and Space Exploration
Complex Systems | eLIFE Lab
PhD student in Geology
Tempe, Arizona, USA
Cum. GPA: 3.81

UNIVERSITY OF SCIENCE AND TECHNOLOGY OF CHINA
2013 - 2018, BA Physics
Condensed matter physics
Hefei | Anhui, China

SKILLS

General:
Complex Systems • Machine learning• Data Science • Computational Social Science
Programming language:
Python • Mathematica • C / C++ • Julia
Scientific computing:
NumPy • Pandas • TaiChi
Machine learning:
PyTorch

RESEARCH EXPERIENCE

MACROSTATE THEORY OF COMPLEX SYSTEMS | PhD project
Aug. 2018 – 2022 | Arizona State University
- Understanding emergence phenomena by macrostates
- Build artificial intelligence to learn macro and design micro

SELF-REFERENCE NEURAL NETWORKS | PhD project
2022 - | Arizona State University
- Exploring self-replicate neural networks in both theoretical and practical way
- Self-replicate can emergence as a bonus feature in evolution
- Building self-reflective neural network whom "knows" what it's doing

HYPERBOLIC EMBEDDING FOR HIERARCHICAL IMAGE CLASSIFICATION | PhD project
2020 – 2021 | Arizona State University
- Classify images in a hierarchical way
- Using hyperbolic space to embed the image features

FINDING EMERGENCE PARTICLES IN CELLULAR AUTOMATA | Undergraduate project
2017 | Karolinska Institutet
- Finding emergence particles in cellular automata in a automatic way
- Classify cellular automata by their computation ability

PUBLICATIONS

PAPERS

- **Yanbo Zhang**, Sara I. Walker, "An Artificial intelligence that can learn macro and design micro," 2022, *arXiv preprint* arXiv:xxxx.xxxxx.
- Hector Zenil, **Yanbo Zhang**, and Narsis A. Kiani. "Model Discovery and Discrete Inverse Problems with Cellular Automata and Boolean Networks." *Automata and Complexity*. Springer, Cham, 2022. 433-453.
- Zhang, J., Dong, L., **Yanbo Zhang**, Chen, X., Yao, G., and Han, Z. "Investigating time, strength, and duration of measures in controlling the spread of COVID-19 using a networked meta-population model." *Nonlinear Dynamics*, 2020, 101(3), 1789-1800.
- **Yanbo Zhang**. "Definition and Identification of Information Storage and Processing Capabilities as Possible Markers for Turing Universality in Cellular Automata." *Complex Systems*, 2018, 27.1.

SOFTWARE
- Yanbo Zhang, **INNLab** - invertible neural network library, *GitHub repository*, 2022, `https://github.com/ELIFE-ASU/INNLab`