

Artificial Intelligence & AI Convergence Network Colloquium

TITLE Discovering Symbolic Policies with Deep Reinforcement Learning

When : 2021.11.9.(TUE) A.M.10:30~

Where : Zoom

링크 <https://zoom.us/j/94530679446?pwd=bEFicjdTRmxXbk52ZlE5S3h5NFdiUT09>

회의 ID: 945 3067 9446, 암호 : 3898

Speaker : Sookyung Kim(Senior AI/ML Research Scientist, PARC, a Xerox Company)

Abstract : Discovering the underlying mathematical expressions describing a dataset is a core challenge for artificial intelligence. This is the problem of symbolic regression. Despite recent advances in training neural networks to solve complex tasks, deep learning approaches to symbolic regression are underexplored. We propose a framework that leverages deep learning for symbolic regression via a simple idea: use a large model to search the space of small models. Specifically, we use a recurrent neural network to emit a distribution over tractable mathematical expressions and employ a novel risk-seeking policy gradient to train the network to generate better-fitting expressions. Our algorithm outperforms several baseline methods (including Eureka, the gold standard for symbolic regression) in its ability to exactly recover symbolic expressions on a series of benchmark problems, both with and without added noise. More broadly, our contributions include a framework that can be applied to optimize hierarchical, variable-length objects under a black-box performance metric, with the ability to incorporate constraints in situ, and a risk-seeking policy gradient formulation that optimizes for best-case performance instead of expected performance.

BIO : Sookyung Kim is a Senior Research Scientist in PARC's Intelligent Systems Lab. Her research focuses on deep reinforcement learning, explainable AI and applied machine learning for physical science. Soo's research interest is Climate AI, AI-driven material discovery, AI-driven drug discovery and knowledge extraction using deep reinforcement learning. Prior to joining PARC, Soo worked at Lawrence Livermore National Laboratory, where she led comprehensive research projects to develop and deploy machine learning models to solve challenging scientific problems: Hurricane tracking, extreme climate event analysis, new drug molecular discovery. She has also taught tutorials and seminars in AI application for physical science at Seoul National University and KISTI (Korea Institute of Science and Technology). She served as a programming chair of Data Mining on Earth System Science (DMESS), ICDM and programming committee of Climate Informatics. Soo received her Ph.D in Computational Material Science and M.S in Computer Science and Engineering from Georgia Institute of Technology, and M.S in Electrical Engineering from Columbia University. One of Soo's favorite things to do is traveling around the world.

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