Chen Liang

AI Researcher

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Employment

Google Brain (now Google DeepMind) - *Staff Research Scientist* *Oct 2018 – Now*

- AutoML and Symbolic Discovery
    - Led the AutoML research project that discovers new machine learning algorithms through program search. One highlight is the discovery of the Lion optimizer that outperforms the state-of-the-art (Adam/Adafactor) in training vision, multimodal, image generation and language models, and is adopted in Google Ads models and Large Language Models (LLMs) such as MPT-30b.
    - Led the deployment of AutoML-discovered architectures and optimizers in Google Ads models, driving $XXXM revenue and XX% cost reduction, winning several company awards including the Google Tech Impact Award.
    - Deployed the AutoML Forecasting model in Google Cloud, driving $XXM revenue.
- Neural Symbolic Models and Reasoning
    - Led and mentored research projects in developing neural symbolic models for compositional reasoning with publications in NeurIPS, ICML and ICLR, etc.
    - Led projects on improving the reasoning ability of Bard.

Google Brain, DeepMind, Search - *Research intern* *2014 - 2018*

- Worked on semantic parsing, program synthesis, text similarity and language grounding with publications in NeurIPS, ACL and IJCAI, etc.
- Published the Neural Symbolic Machines, the first hybrid model that trains a neural sequence model to generate programs to perform compositional reasoning from weak supervision.

Education

Northwestern University, Evanston, IL, USA - *PhD* *Sept 2013 – Sept 2018*

- PhD, Department of Computer Science, Advisor: Kenneth D. Forbus
- Worked on Machine Learning, NLP and Cognitive Modeling

Peking University, Beijing, China - *B.S.* *Sept 2009 – July 2013*

- B.S., School of Physics
- Selected courses: Algorithms, Artificial Intelligence, CSAPP

Selected Publications

AutoML and Symbolic Discovery

X. Chen*, **C. Liang***, D. Huang, E. Real, K. Wang, Y. Liu, H. Pham, X. Dong, T. Luong, C. Hsieh, Y. Lu, Q. Le. **(*equal contribution)** Symbolic Discovery of Optimization Algorithms. NeurIPS, 2023

E. Real*, **C. Liang***, D. So, Q. Le. **(*equal contribution)** AutoML-Zero: Evolving Machine Learning Algorithms From Scratch. ICML-2020

D. So, **C. Liang**, Q. Le. The Evolved Transformer. ICML-2019

C. Liang, Y. Lu. Using AutoML for Time Series Forecasting, Google Research Blog Post

D. Peng, X. Dong, E. Real, M. Tan, Y. Lu, G. Bender, H. Liu, A. Kraft, **C. Liang**, Q. Le. PyGlove: Symbolic programming for automated machine learning. NeurIPS-2020

G. Ryan, S. Jonany, Y. Miao, M. Munn, C. de Souza, J. Dungay, **C. Liang**, D.R. So, Q.V. Le, and E. Real. Unified Functional Hashing in Automatic Machine Learning. In submission, 2023.

S. Li, G. Andersen, T. Chen, L. Cheng, J. Grady, D. Huang, Q.V. Le, A. Li, X. Li, Y. Li, **C. Liang**, Y. Lu, Y. Ni, R. Pang, M. Tan, M. Wicke, G. Wu, S. Zhu, P. Ranganathan, N.P. Jouppi. "Hyperscale Hardware Optimized Neural Architecture Search." ASPLOS, 2023

Neural Symbolic Language Models and Program Synthesis

C. Liang, J. Berant, Q. Le, K. Forbus, and L. Ni. Neural Symbolic Machines: Learning Semantic Parsers on Freebase with Weak Supervision, ACL-2017

C. Liang, M. Norouzi, J. Berant, Q. Le and L. Ni. Memory Augmented Policy Optimization for Program Synthesis with Generalization, NeurIPS-2018

X. Chen, **C. Liang**, A. Yu, D. Song, D. Zhou. Compositional generalization via neural-symbolic stack machines, NeurIPS-2020

X. Chen, **C. Liang**, A. Yu, D. Zhou, D. Song, Q. Le. Neural symbolic reader: Scalable integration of distributed and symbolic representations for reading comprehension. Spotlight in ICLR-2020

R. Agarwal, **C. Liang**, D. Schuurmans, and M. Norouzi. Learning to Generalize from Sparse and Underspecified Rewards, ICML-2019

Others

D. Patterson, J. Gonzalez, Q. Le, **C. Liang**, L. Munguia, D. Rothchild, D. So, M. Texier, J. Dean. Carbon emissions and large neural network training, 2022

T. Noraset, **C. Liang**, L. Birnbaum, and D. Downey. Definition Modeling: Learning to define word embeddings in natural language, AAAI-2017

C. Liang, P. Paritosh, V. Rajendran, and K. Forbus. Learning Paraphrase Identification with Structural Alignment, IJCAI-2016

C. Liang, and K. Forbus. Learning Plausible Inferences from Semantic Web Knowledge by Combining Analogical Generalization with Structured Logistic Regression, AAAI-2015