

JUNZE LIU

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OBJECTIVE

PhD candidate specializing in Machine Learning, seeking a full-time opportunity in the field for 2024. Eager to leverage advanced algorithms to drive innovation and solve complex challenges.

EDUCATION

University of California, Irvine

Sept. 2019 - Present

Ph.D. in Computer Science

GPA: 4.0/4.0

- Courses: Artificial Intelligence in Biology and Medicine, Introduction to Machine Learning, Statistical Natural Language Processing

University of Illinois at Urbana-Champaign

Aug. 2016 - May. 2018

M.Eng. in Computer Engineering

GPA: 3.7/4.0

- Courses: Computer Vision, Artificial Intelligence, Pattern Recognition, Parallel Programming, Distributed System, Interactive Computer Graphic, Virtual Reality

Shandong University

Sept. 2012 - June 2016

B.E. in Communication Engineering

GPA: 86.6/100

- Courses: Data Structure & Database Technologies, Digital Image Processing, Digital Signal Processing

RESEARCH EXPERIENCE

Deep-Learning-based Neutrino Kinematic Reconstruction

Ongoing

University of California, Irvine

Prof. Pierre Baldi

- Developed 2D and 3D CNN-based models for energy and direction regression of leptons (electron and muon) produced from neutrino interactions to reconstruct the neutrino momentum.
- Implemented Sub-manifold Sparse CNN models to improve the computation and memory efficiency when processing high-dimensional data.

Geometry-aware Sparse Autoregressive Models for Multi-layer Calorimeter Shower Simulation

Feb. 2022 - Nov. 2023

University of California, Irvine

Prof. Pierre Baldi

- Built autoregressive models using machine learning algorithms to provide fast and high-quality calorimeter shower simulated data generation for high-energy physics.
- Designed a framework allowing the autoregressive model to adaptively generate multi-layer calorimeter data of different geometries.

Machine Learning in High Energy Physics

Sep. 2017 - Aug. 2018

University of Illinois at Urbana-Champaign

Prof. Benjamin Hooberman

- Built supervised deep learning models for classification of particle (charged pion, electron, etc) shower images, and reached as high as 99% accuracy with 3D-CNN based architectures.
- Researched unsupervised models, such as Restricted Boltzmann Machine (RBM) and Deep Belief Network (DBN) on calorimeter data.

WORK EXPERIENCE

Applied Scientist Intern

June 2023 - Sept 2023

Amazon

Seattle, WA

- Explored causal discovery algorithms and applied them to enhance buyer risk prediction.

- Developed unsupervised causal discovery algorithms to uncover structural causal models within features, improving model explainability and feature selection.
- Implemented causal structure learning to improve cross-domain generalization of supervised classification, resulting in a significant 12% increase in AUC.

Research Assistant

July 2018 - Dec 2018

Jcube

Syosset, NY

- Developed an action understanding tool based on ConvLSTM related architectures, including human poses interaction recognition.
- Improved state-of-the-art accuracy of video scene recognition by introducing decision layers.
- Worked on weakly supervised classification of video scenes, focusing on cross-domain test problems.

Technology Intern

June 2017 - Aug. 2017

Ekistic Ventures

Chicago, IL

- Implemented a Region CNN model for illegal items recognition, adjusted to variant surveillance videos.
- Decreased false positive rate by adding multi-phase architecture to predict body-item relations.
- Designed a region labelling interface, and built a real-time tool, which is an end-to-end pipeline accepting video streams and outputting recognition results.

SELECTED PUBLICATIONS

Generalizing to new geometries with Geometry-Aware Autoregressive Models (GAAMs) for fast calorimeter simulation

Junze Liu, Aishik Ghosh, Dylan Smith, Pierre Baldi, Daniel Whiteson

Journal of Instrumentation, 2023

Vitreoretinal surgical instrument tracking in 3-Dimensions using Deep Learning

(* indicates equal contribution)

Sherif Abdelkarim*, Marialejandra Diaz Ibarra*, **Junze Liu***, Josiah K. To*, Pierre F. Baldi, Anjali Herekar, Baruch D. Kuppermann, Andrew W. Browne

Translational Vision Science & Technology, 2023

Deep-Learning-Based Kinematic Reconstruction for DUNE

Junze Liu, Jordan Ott, Julian Collado, Benjamin Jargowsky, Wenjie Wu, Jianming Bian, Pierre Baldi

NeurIPS Workshop on Machine Learning and the Physical Sciences, Vancouver, Canada, Dec 11, 2020

Calorimetry with deep learning: particle simulation and reconstruction for collider physics

(Primary contribution - authors are listed in alphabetical order as per the standard in particle physics)

Dawit Belayneh, Federico Carminati, Amir Farbin, Benjamin Hooberman, Gulrukh Khattak, Miaoyuan Liu, **Junze Liu**, Dominick Olivito, Vitória Barin Pacela, Maurizio Pierini, Alexander Schwing, Maria Spiropulu, Sofia Vallecorsa, Jean-Roch Vlimant, Wei Wei, Matt Zhang

The European Physical Journal C, 2020

SELECTED AWARDS / SCHOLARSHIPS

- Dean's Awards from Donald Bren School of Information and Computer Sciences 2019
- The Second Prize Scholarship, Shandong University 2013 2014
- Outstanding Overseas Student with Scholarship, Shandong University Dec 2013
- The 2nd Award of "Shenrong" Electronic & Optical Contest: Laser Sighting Vehicle May 2013

SKILLS

Programming Languages

Java, Python, C/C++, CUDA, C#, JavaScript, HTML5, CSS3

Tools & Platforms

Tensorflow, PyTorch, Caffe, Git, WebGL, Unity3D, Matlab, AWS S3