Yunfei **Luo**

Master's Student (CS/ML/AI) @ UMass Amherst

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My primary research interest is in Machine Learning, specifically in modeling of Multimodal data and Multitask Learning, and the applicability in various fields like Signal Processing, Healthcare, Computer Vision, and Natural Language Processing. My goal is to enable lightweight and robust solutions to target real-world requirements using machine learning techniques.

Education

09.2021 - 05.2023 — **Master of Science in Computer Science**
GPA : $3.92/4.0$ — University of Massachusetts Amherst, Amherst, MA
- Advisor : Ina Fiterau Brostean | Information Fusion Lab
- Courses Taken : Advanced Machine Learning, Neural Networks, Probabilistic Graphical Models, Reinforcement Learning, Advanced Natural Language Processing, Advanced IoT

09.2017 - 05.2021 — **Bachelor of Science in Computer Science | Bachelor of Science in Mathematics**
GPA : $3.84/4.0$ — University of Massachusetts Amherst, Amherst, MA
- Machine Learning and Computing Specializations

Fellowships, Scholarships, Awards, and Honors

2021 - 2023 — Bay State Fellowship | Full Tuition Scholarship

2017 - 2021 — Outstanding Undergraduate Course Assistant Award
Chancellor's Award, UMass Amherst

Publications

2023 / Under Review — **Personalized Student Stress Prediction with Hierarchical Multitask Learning , Nature Communications (Nat. Commun), Journal**
Yunfei Luo, Iman Deznabi, Abhinav Shaw, Tauhidur Rahman, and Madalina Fiterau Brostean
- Proposed a novel approach to modeling the Multimodal data, got results that outperform SOTA
- Modeled personalized and populational characteristics with Multitask Learning and Dynamic Clustering Method respectively
- Evaluated the performance under cold-start setting, to support the robustness of our method

Multi-modal | Fusion Methods | Mental Health | Machine Learning | Neural Networks | Time Series

2023 / Under Review — **Multi-task Learning on Tasks with Progressive Difficulties for Natural Language Processing, Association for Computational Linguistics (ACL) / Empirical Methods in Natural Language Processing (EMNLP-Findings), Conference**
Yunfei Luo, Yuyang Liu, Rukai Cai
- Introducing sub-tasks with progressive difficulties to improve the performance on main task. Inspired by how people learn. Experimented on text classification, sentiment analysis, and argument mining

Natural Language Processing | Multi-task Learning | Machine Learning | Neural Networks

2023 / Under Review — **Agent Performing Autonomous Stock Trading under Good and Bad Situations, AI for Agent-Based Modelling (AI4ABM) in International Conference on Learning Representations (ICLR), Workshop**
Yunfei Luo, Zhangqi Duan
- Researched and experimented with different reinforcement learning algorithms to train agents to perform stock trading. The methods are evaluated under scenarios with stable and non-stable market

Natural Language Processing | Multi-task Learning | Machine Learning | Neural Networks

Professional Experience

Summer 2022 to now — **Machine Learning Engineering Intern , Center for Data Science, UMass Amherst**

- Developed platform for Building Segmentation and Damage Assessment based on Satellite Imagery
- Integrated the Machine Learning pipeline along with User Interface for Imagery Fetching and Labelling
- Worked as Research Assistant after internship

Computer Vision | Machine Learning | Disaster Response | Software Development | Full-Stack Development

Summer 2020 to 06.2021 — **Data Engineering Intern , Institute for Applied Life Sciences, UMass Amherst**

- Built pipelines for fMRI data preprocessing and statistical analysis
- Conducted Research and Experiments with Machine Learning models for Stroke Detection : Autoencoders, CNNs, and GANs
- Worked as Undergraduate Research Assistant after internship

Machine Learning | fMRI | Data Preparation

Ongoing Research Projects

Satellite Imagery Based Building Segmentation and Damage Estimation. Machine Learning Research Project 06.2020 - now

- Conducted Research and Experiments with various Finetuning setting and Machine Learning techniques to support selections of final-deployed hyper-parameters and models

Multimodal Data | Signal Processing | Mental Health | Machine Learning | Multitask Learning | Time Series

Student Stress Prediction. Machine Learning Research Project 01.2020 - now

- Wrap up the manuscript, and work on applying the method to other datasets.

Multimodal Data | Signal Processing | Mental Health | Machine Learning | Multitask Learning | Time Series

Learning to Drop : Regularization, Hyperparameter Tuning, and Feature Selection, All-in-One 09.2020 - 12.2022

- Proposed a novel parametric Dropout based on Probabilistic Sampling. Searching for Conference/Workshop to submit.
- Evaluate the method in various tasks : Image Classification, Matrix Missing Value Imputation of Psychological Survey Scores, Musical Genre Classification, and Wearable Sensor based Human Activity Recognition.

Machine Learning | Neural Networks | *GitHub Link of Imputation of Psychological Survey Scores* | *GitHub Link of Musical Genre Classification*

Teaching Experience

Fall 2021 to Spring 2023 — **Graduate Teachinge Assistant, CICS, UMass Amherst**

- CS 311 Introduction to Algorithm in Fall 2021 and Spring 2023
- CS 590OP Applied Numerical Optimization, and CS 108 Foundation of Data Science in Fall 2022
- CS 220 Programming Methodology in Spring 2022
- Held office hours, led weekly discussion sessions, graded course works, answered questions on course forum, attended weekly TA meeting for discussing the progress/improvements of the course

Javascript | Algorithms | Numerical Optimization | Data Science | Teaching

Spring 2020 to Spring 2021 — **Undergraduate Course Assistant, CICS, UMass Amherst**

- CS 240 Reasoning under Uncertainty in Spring 2021, CS 311 Introduction to Algorithms in Fall 2020, CS 220 Programming Methodology in Spring 2020
- Helped with weekly discussion session, graded course works, and answered questions on Piazza

Javascript | Algorithms | Probability | Teaching

Professional Certifications

2022 IBM Artificial Intelligence Engineering Professional Certificate
2022 Neuroscience and Neuroimaging Specialization Certificate
2020 TensorFlow Developer Professional Certificate

References

Madalina Fiterau Brostean
Assistant Professor of Computer Science
University of Massachusetts Amherst
Lead of the Information Fusion Lab
@ mfiterau@cs.umass.edu

Subhransu Maji
Associate Professor of Computer Science
University of Massachusetts Amherst
Co-Director of Computer Vision Lab
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