

TREVOR BONJOUR

tbonjour@purdue.edu - <https://www.linkedin.com/in/trevor-bonjour/> - <https://tbonjour.github.io>

SUMMARY

PhD. candidate in Computer Science specializing in Deep Reinforcement Learning and Machine Learning with five years of software engineering experience. Research focuses on training adaptable agents in multi-agent environments with novelties. Skilled in working with diverse data types, including clickstream, text, motion-capture, medical, and high-dimensional data. Proficient in designing and implementing end-to-end machine learning systems, encompassing feature engineering, data preprocessing, model training, and evaluation. Committed to advancing the field of artificial intelligence with a passion for bridging theory and practice.

SKILLS

- Python, R, Java
- Tableau
- Machine Learning
- Reinforcement Learning
- Deep Learning
- PyTorch
- Data Visualization
- SQL, PL/SQL
- Scikit-learn, NumPy, SciPy, Pandas
- Natural Language Processing
- NoSQL, MongoDB
- Big Data
- SQL, PL/SQL
- Causal Inference
- Unix
- Agile Software Development
- Git

EDUCATION

- PhD, Computer Science Aug 2017 - Present
Purdue University, Lafayette, Indiana
- Master of Science and Engineering, Computer Science Aug 2015 - Aug 2017
Johns Hopkins University, Baltimore, Maryland
- Bachelor of Technology, Instrumentation and Control Engineering Aug 2006 - May 2010
Guru Gobind Singh Indraprastha University, Delhi, India

EXPERIENCE

Computer Science Department, Purdue University

Research/Teaching Assistant Aug 2017 – Present

- Developing deep reinforcement learning techniques to build agents capable of detecting and adapting to novel situations (unseen during training) in multi-agent environments
 - Developed a novel collusion detection method using an information theoretic approach
 - Improved standard deep reinforcement learning algorithms by incorporating a hybrid approach to Monopoly game play which resulted in a performance improvement of 20%
- Worked on solutions to reduce dropout rates, enhance learning, and improve user engagement for online learning platforms
 - Utilized text (video transcripts and course material) and clickstream (user interaction) data to discover potential areas of concern in online courses to improve future course design and enhance learning experience
 - Designed and implemented deep learning models to predict user engagement level and dropout probability to aid instructor interventions and reduce overall dropout rates
 - Used natural language and deep learning techniques such as word embeddings, recurrent neural networks (RNN), long short term memory (LSTM), attention mechanisms

- Took initiative to setup and maintain a centralized database that improved efficiency for 14 members in the research team
- TA for Computer Science Fundamentals (Spring 2020), Introduction to Java (Fall 2019), Data Mining and Machine Learning (Fall 2017, Spring 2018)
 - Conducted regular office hours, initiated paper review sessions, created homework assignments, exams and provided timely feedback for class of over 100 students

Hewlett Packard Labs

Machine Learning Research Intern

May 2022 – Aug 2022

- Developed techniques for learning parameter values from limited data to maximize output using a combination of Bayesian Optimization and Deep Reinforcement Learning

RightFit Analytics Inc., West Lafayette

Machine Learning Specialist

Jun 2020 – Aug 2020

- Used Statistical and Machine Learning tools to analyze physician performance
 - Utilized hospital discharge data to determine areas of improvement
 - Implemented statistical and causal models for feature selection and prediction to improve the overall performance of existing algorithms

Apex Neuro, Cambridge, Massachusetts

Research Intern

May 2018 - Aug 2018

- Automated data pre-processing and setup data analytics and machine learning pipelines designed for biomedical data
- Designed a centralized database with dynamic database schema and reduced data redundancy by 66%
- Developed software to ease data upload and defined a data upload protocol that improved overall efficiency by 30%

Malone Center for Engineering in Healthcare, Johns Hopkins University

Research/Teaching Assistant

May 2016 - Aug 2017

- Developed pipeline methods to infer the cause-effect relationship from observational data when the underlying causal graph is not known
 - Analyzed the causal effect (5 pounds) of radiation on weight loss in patients with neck and mouth cancer in collaboration with the Department of Radiology
- TA for Data Structures (Fall 2016), Probabilistic Graphical Models (Spring 2017)

Tata Consultancy Services, Columbus, Indiana and Pune, India

Software Engineer

Nov 2010 - Aug 2015

- Worked as an enterprise asset management consultant for NYSE/NASDAQ listed companies such as British Petroleum and Cummins Inc.
- Led a team of 7 developers to perform customizations for Java based Enterprise Asset Management application to enhance functionality and user experience in an agile development environment. Consistently received a customer satisfaction score of over 95%

- Delivered a stand-alone RESTful web service for industrial vending services for over 40 manufacturing plants
- Created automation scripts that reduced customization by 60% and deployment time by 70%
- Facilitated functional and technical training for over 100 fellow associates and trainees

PUBLICATIONS

- Bonjour, Trevor, et al. "Decision Making in Monopoly using a Hybrid Deep Reinforcement Learning Approach." accepted in *IEEE Transactions on Emerging Topics in Computational Intelligence*, 2022
- Bonjour, Trevor, Aggarwal, Vaneet, and Bharat Bhargava "Information Theoretic Approach to Detect Collusion in Multi-Agent Games", in *Uncertainty in Artificial Intelligence, UAI 2022*

RELEVANT COURSEWORK

Advanced Discrete Math, Advanced Machine Learning, Algorithm Design Analysis and Implementation, Artificial Intelligence, Big Data/Small Lang/Scalable Sys, Data Science for Education, Deep Learning, Introduction to Machine Learning, Machine Learning: Data to Models, Natural Language Processing, Randomized Algorithms, Stochastic Network Analysis

RELEVANT ACADEMIC PROJECTS

American Sign Language Assistant (ASLA)

- Converted American Sign Language to speech and text with an 88% accuracy. Used Leap Motion to extract relevant motion capture features and applied machine learning techniques for training. Conceptualized and implemented the project end to end.

Forum Topic Extraction

- Performed topic modeling for online clickstream data using Automatic Differentiation Variational Inference to bundle forum discussions by topics for online learning platforms.

Machine Learning as a Service for Exploring Large Data-sets

- Developed a system that aggregated similar job requests and demonstrated a high performance for prediction tasks on BPTI protein trajectories using deep neural networks and map reduce techniques

Classification of Piano Music Composers

- Engineered and extracted features from raw music files and used machine learning algorithms such as SVM, Naïve Bayes, Neural Networks. Performed k-fold cross validation and Principal Components Analysis (PCA) to classify, visualize and analyze results

AWARDS AND ACHIEVEMENTS

- *Boiler Changemaker Award*, The Graduate School, Purdue University, May 2023
- *Award for Exceptional Teaching and Instructional Support*, Purdue University, April 2021
- Best Project for Objected Oriented Software Engineering for ASLA
- Award for Best Leap Motion hack, MedHacks 2016: Designed and developed an at home physiotherapy guide web and mobile application that tracked exercises.
- Multiple Star of the Quarter/Month awards at Tata Consultancy Services