

# TREVOR BONJOUR

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## SUMMARY

PhD. student in Computer Science specializing in improving human computer interaction using artificial intelligence. Over the past 7 years in academia, I have worked with varied forms of data such as clickstream, text, motion-capture, medical, and other high-dimensional data (protein structures). Proficient in designing and implementing end to end machine learning and deep learning systems - feature engineering, data preprocessing and visualization, model training, evaluation, and selection. 5 years of prior software experience helped in design of efficient and scalable solutions.

## 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 reinforcement learning techniques to build agents capable of detecting and adapting to novel situations (unseen during training) in multi-agent environments
  - 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

### **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.
- Lead 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", accepted in *AAAI Symposium* (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**

- 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