Bibek Poudel

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Education

- **University of Tennessee, Knoxville** — Aug 2023 – Present
  Ph.D. in Computer Science, GPA: 3.83/4.0 — TN, USA
- **University of Memphis** — Aug 2019 – May 2023
  M.S. in Computer Science, GPA: 4.0/4.0 — TN, USA
- **Tribhuvan University** — Nov 2012 – Jan 2017
  Bachelor of Engineering in Electronics and Communication — Kathmandu, Nepal

Publications

- M. Villarreal, **B. Poudel**, J. Pan, W. Li. "Hybrid Traffic Control and Coordination from Pixels." *IEEE International Conference on Robotics and Automation (ICRA)* 2023.
- M. Villarreal, **B. Poudel**, W. Li. "Can ChatGPT Enable Intillegent Transportation Systems? The Case of Mixed Traffic Control via Reinforcement Learning." *IEEE Intelligent Transportation Systems Conference (ITSC)* 2023.
- R. Wickman, **B. Poudel**, M. Villarreal, X. Zhang, W. Li. "Efficient Quality-Diversity Optimization through Diverse Quality Species." *ACM Genetic and Evolutionary Computation Conference (GECCO)* 2023.
- **B. Poudel**, T. Watson, W. Li. "Learning to Control DC Motor for Micromobility in Real Time with Reinforcement Learning." *IEEE Intelligent Transportation Systems Conference (ITSC)* 2022.
- **B. Poudel**, W. Li. "Black-box Adversarial Attacks on Network-wide Multi-step Traffic State Prediction Models." *IEEE Intelligent Transportation Systems Conference (ITSC)* 2021.
- **B. Poudel**, W. Li, Suhai Li. "CARL: Congestion-Aware Reinforcement Learning for Imitation-based Perturbations in Mixed Traffic Control." In review, *IEEE International Conference on CYBER Technology in Automation, Control, and Intelligent Systems (CYBER)* 2024.

Preprints

- **B. Poudel**, W. Li, Kevin Heaslip. "EnduRL: Enhancing Safety, Stability, and Efficiency of Mixed Traffic Under Real-World Perturbations Via Reinforcement Learning." In review, *IEEE International Conference on Intelligent Robots and Systems (IROS)* 2024.
- M. Villarreal, **B. Poudel**, R. Wickman, Y. Shen, W. Li, "AutoJoin: Efficient Adversarial Training for Robust Maneuvering via Denoising Autoencoder and Joint Learning." In review, *IEEE International Conference on Intelligent Robots and Systems (IROS)* 2024.

Professional Experience

- **Graduate Research Assistant** — Aug 2023 – Present
  Department of Electrical Engineering and Computer Science, UTK

  Address the *Sim–2–real gap* in human driving behaviors using imitation learning and probabilistic sampling. Enhance the safety, efficiency, and stability of autonomous vehicles in mixed traffic among real-world human driving behaviors.

- **Graduate Teaching Assistant** — Aug 2019 – May 2023
  Department of Computer Science, U of M

  Delivered lectures, developed programming assignments, and graded submissions in graduate and undergraduate courses.

  Lectures:
  1. "Introduction to Transformers." *Slides.* Machine Learning (Spring 2023).
  2. "Optimization and Stochastic Gradient Descent." *Slides.* Artificial Intelligence (Spring 2023), Machine Learning (Spring 2023), Intro to Neurocomputing (Fall 2020, Fall 2021).
  3. "Introduction to Adversarial Machine Learning." *Slides.* Intro to Neurocomputing (Fall 2021).

  Assignments: Various AI and ML related topics including Recurrent and Convolutional Neural Network training, Reinforcement Learning algorithms such as DQN and PPO, and finetuning of BERT Transformer. *GitHub Repository.*

  Teaching Assistance: Courses covered include Software Engineering, Database Systems, Artificial Intelligence, Data Mining, Machine Learning, and Advanced Machine Learning.

Concurrent Projects

- "DocuMint: Docstring Generation for Python using Small Language Models."Benchmarked various small language models on the quality of their generated docstrings, created a fine-tuning dataset using the FOSS ecosystem, and fine-tuned Google's CodeGemma. Released the dataset and the fine-tuned model in HuggingFace.
- "BarterBaron, A Commerce App Based on Barter System." Engineered an eBay-like commerce platform based on barter system using Ruby on Rails with features like chat, search, and secure user authentication. Won **"Best project in the class"** award, COMP 7012 Software Engineering, University of Memphis.
- "Robustness to Input Corruptions and Adversarial Examples in Steering Angle Prediction." Used self-supervised learning to enhance robustness of computer vision models in steering angle prediction, under natural disturbances to camera such as rain, snow, fog, frost, pixelation, and blur. *Presentation Video.*
- "Latent Representation of Inputs: A Defense Against Adversarial Examples in Deep Q Networks." Used feature squeezing to improve the adversarial robustness of DQN algorithm trained to play Atari Pong.
- "Distributed Hyperparamter Tuning of Neural Networks.": Accelerated the hyperparameter tuning (grid and random search) of Multi Layered Perceptrons by upto 80%. Paralellized search objective using Distributed Hash Table, utilizing computational resources in multiple nodes.

Technical Skills

- **Data Analysis:** Proficient in the data analysis pipeline including data cleaning, exploration, visualization, and statistical analysis. Skilled in NumPy, Scikit-Learn, Pandas, Matplotlib, and Seaborn.
- **Modeling and Frameworks:** Proficient in building, training, and validating machine learning models, utilizing frameworks such as PyTorch, TensorFlow, and Keras, and HuggingFace.
- **Experimentation:** Skilled in virtualization tools like Conda and Venv. Proficient in managing and distributing experiments across multiple systems, and in experiment tracking and visualization with tools such as Weights & Biases.
- **Languages and OS:** Skilled in Python, C++, and LaTeX. Experienced with Linux (including shell scripting, software installations, package management), MacOS, and Windows.
- **Design and Hardware:** Proficient with Adobe Illustrator and the Sketch app. Experienced with hardware programming with Arduino.

Awards & Honors

- Travel Grant, Department of Electrical Engineering and Computer Science, UTK, 2023
- Travel Grant, Department of Computer Science, U of M, 2021
- "Best project in the class" award for BarterBaron, COMP 7012 Software Engineering, U of M, 2021
- Merit based scholarship (top 5% of the class in semesters 1, 2 & 3), TU

Academic Service

- **Reviewer:**
  1. IEEE International Conference on Intelligent Robots and Systems (IROS) 2022, 2023
  2. Robotics: Science and Systems (RSS) 2023
  3. IEEE Robotics and Automation Letters (RA-L) 2022
  4. ICLR Workshop on Generalizable Policy Learning in the Physical World 2022
  5. IEEE International Conference on Robotics and Automation (ICRA) 2021

Professional Membership

- IEEE student member
- Nepal Engineering Council

Personal Interests

- **Hobbies:** Gardening, Cooking, Movies, and Swimming