Roshan Dhakal

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Bio

A Computer Science Ph.D. student researching at the intersection of robotics and machine learning. I am also a skilled software engineer with experience in contemporary software architectures and advanced technology services.

Experience

- **George Mason University** — Fairfax, Virginia
  Graduate Research Assistant — *May 2021 - Present*
  Currently working on developing learning augmented task and motion planner that enables robots to act intelligently in the environment they live in by anticipating the future, even with missing information. Research and development of research projects using Python, C++, Docker, GNU Make tools, LaTex, etc.
- **George Mason University** — Fairfax, Virginia
  Graduate Teaching Assistant — *August 2018 - May 2021, August 2023 - Present*
  - **GTA for Data Mining**: Write Python scripts for data mining projects. Conducted office hours for the students to help them with their problems on assignments and graded projects and assignments.
  - **GTA for Python Programming Language**: Help professors on creating python projects and assignments. Grade students' work and conducted labs and office hours.
  - **GTA for Computer Networking**: Write Python and Java programming scripts for projects on networking with TCP/IP and UDP. Conduct office hours to help students with their problems on assignments and Wireshark labs.
- **Kandara Tech** — Pokhara, Nepal
  Software Engineer — *May 2017 - April 2018*
  Worked on full-stack e-commerce web application development using RESTful API, responsible for processing over 100,000 transactions per second, written in Java. Maintained relational database using SQL. Written specifications and documentation for custom-built software solutions.

Education

- **George Mason University** — Fairfax, Virginia
  Ph.D. in Computer Science, Research: Robotics and Machine Learning — *August 2018 - May 2025*
- **George Mason University** — Fairfax, Virginia
  MS in Computer Science, Concentration: Machine Learning — *August 2018 - May 2021*
- **Tribhuwan University** — Pokhara, Nepal
  Bachelors in Computer Engineering — *August 2012 - May 2016*

Skills Summary

- **Languages**: Python, Java, C++, Javascript
- **Libraries/Frameworks**: PyTorch, TensorFlow, OpenCV, OpenAI, SciKit, Pandas, NLTK, Jupyter Notebook, Node.JS, Angular, Springboot
- **Tools**: Git, Docker, Latex, PDDL, Robot Operating System (ROS)
- **Web/Databases**: RESTful API, SQL, MySQL, HTML/CSS
- **Platforms**: Linux/Ubuntu, Web, Windows, AWS EC2, AWS Lambda, MS Office

Peer Reviewed Publications

- Dhakal, R., Talukder, R. Stein, G.J. (2023). Anticipatory Planning: Improving Long-Lived Task Planning by Estimating Expected Cost of Future Tasks. *In: International Conference on Robotics and Automation (ICRA). 2023*

Other Publications

- Paudel, A., Dhakal, R., Bhattarai, S. (2021). Room Classification on Floor Plan Graphs using Graph Neural Networks. arXiv preprint arXiv:2108.05947.

Technical Report/Literature Survey

- Dhakal, R (2021). Learning Heuristics for Robot Planning : A Survey. *Literature Review at the intersection of Machine Learning and Robotics*

Selected Projects

- Navigation Among Movable Obstacle using off the shelf Task and Motion Planning (TAMP) solver PDDLStream and Fast Downward planning system.
- Extended Kalman Filter (EKF) for Simultaneous Localization and Mapping (SLAM)
- Comparison between reinforcement learning algorithms (Actor Critic and DQN with Experience Replay on OpenAI gym environment.
- Room Classification on Floor Plan Graphs using Graph Neural Networks., Tools: Python, numpy, PyTorch
- Gait Authentication based on Wearable Sensor Data using different Machine Learning Approaches.
- Student Survey Application using Angular2, RESTful Web Services, AWS Relational Database, S3, Lambda and API Gateway. Application was developed using Kubernetes with CI/CD pipeline.
- Deep learning techniques for Depth Map estimation from Single Image using deep learning approaches such as Encoder-Decoder and UNet
- Estimation of Jump and Fall of Stock Market on given date using Ensemble Methods and multilayer perceptron.
- Using Java to develop Desktop Application for chat bot virtual assistance using Artificial Language Markup Language tags.

Honors and Awards

- Summer Research Initiation Award, GMU (Summer 2019)

Volunteer Experience

- **DMV Top 150 Networking Event, George Mason University** Arlington, Virginia
  Volunteered a pitching competition. *Feb 25, 2020*