Durgesh Kalwar

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https://durgesh-kalwar.github.io/

Education

- **Indian Institute of Space Science and Technology** — Thiruvananthapuram, India
  Masters in Machine Learning and Computing — *July 2019 – June 2021*
  - M. Tech Thesis: Safe Exploration in Reinforcement Learning
  - CGPA: 9.86/10

- **Sardar Vallabhbhai National Institute of Technology** — Surat, India
  Bachelors in Electrical Engineering — *July 2014 – May 2018*
  - B. Tech Thesis: Control Experiments on Quad-Rotor
  - CGPA: 8.82/10

Work Experience

- **Tata Consultancy Services Ltd. Planning and Control Research Area** — Mumbai, India
  Researcher — *September 2021 - Present*
  - Sample Efficient Reinforcement Learning (1 Publication) - General Value functions (GVFs) based Exploration strategy to effectively explore in a directed manner in hard exploration tasks
  - Offline Reinforcement Learning (1 Publication) - proposed a framework called GORL (Guided Offline-RL) that leverages a safety expert to guide the offline RL agent in choosing safe actions in uncertain states.
  - Supply Chain Optimization using Deep Reinforcement Learning - learning domain-backed inventory management policies using GVFs and using its predictions as a form of explainability into the decisions proposed by the RL agent.
  - Preliminary Phase: Safe Reinforcement Learning, Multi-agent RL, Adaptive Consensus based distributed training of neural networks for static graph topologies.

- **Indian Institute of Space Science and Technology** — Thiruvananthapuram, India
  Teaching Assistant — *September 2020 - may 2021*
  - Evaluating the students- Exams, quiz
  - Supervising and conducting Labs

- **Cairn Oil and Gas India LTD** — Barmer, India
  GET-Electrical Engineer — *July 2018 - June 2019*
  - Worked as electrical maintenance engineer.

- **Indian Institute of Space Science and Technology** — Thiruvananthapuram, India
  Intern — *June 2017 - August 2017*
  - Worked on a project "Estimation of state of a Quad-rotor, and control of its simulated model" under the guidance of Prof. K. Kurien Issac, IIST.

Projects

- **M.Tech Thesis-Work**:
  - **Safe Exploration in Reinforcement Learning**- We considered the problem of designing a sequential decision making agent for safe exploration and optimization of an unknown time-varying function which switches with time. For this switching environment, we proposed a policy called Adaptive-SafeOpt and evaluated its performance via simulations. And we also proposed a safe Thompson sampling based algorithm for linear bandit problem and evaluated it's performance via simulation.
- **M.Tech Mini-Projects**:
  - **Efficient reinforcement learning for motor skill control**- Implementation of the model-based reinforcement learning algorithm PILCO (probabilistic inference learning for control) to control the Mountain car (continuous action space) problem of the open-AI gym.
  - **NLP - Implementation of skip-gram model and sentiment Analysis**- As a course mini project in natural language processing, I implemented a skip-gram word2Vec model for word embedding. The model was trained on the Stanford Treebank dataset, followed by conducting sentiment analysis on this dataset.
- **B.Tech Projects**:
  - **Drone Development from Scratch**- Developed a Drone Software running on Stm32 Micro controller. The Software incorporated Kalman Filter and Improved PID control.
  - **Alcohol concentration measurement using MQ-3 Sensor**- Implemented on 8051 micro controller board
  - **Wireless Dirt Rider Robot**

Publications

- **Guiding Offline Reinforcement Learning using a Safety Expert** — Bangalore
  CODS-COMAD, 2024 — *Jan, 2024*
- **Follow your Nose: Using General Value Functions for Directed Exploration in RL** — London
  AAMAS-2023 — *May, 2023*
- **Follow your Nose: Using General Value Functions for Directed Exploration in RL** — Virtual Event
  RL4Games workshop, AAAI 2022 — *Feb. 2022*
- **Safe Sequential Optimization in Switching Environments** — Virtual Event
  National Conference on Communication (NCC-21), India — *July 2021*

Skills

Programming Languages: Python, C, Matlab, Latex
Deep Learning Frameworks: TensorFlow, PyTorch, Keras
Research Areas: Reinforcement Learning
Software: Ros, Gazebo
Controllers: 8051, STM32, Arduino

Academic Referees

1. Dr. Harshad Khadilkar, Associate Professor, Dept. of Aerospace, IITB, Mail: harshadk@iitb.ac.in
2. Dr. Vineeth B.S., Assistant Professor, Dept. of Avionics, IIST, Mail: vineethbs@iist.ac.in
3. Dr. Sumitra S., Associate Professor, Dept. of Mathematics, IIST, Mail: sumitra@iist.ac.in
4. Dr. Kurien Issac K, Senior Professor, Dept. of Aerospace, IIST, Mail: kurien@iist.ac.in