Priyam Dalmia

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Education

- **University of Melbourne** — Melbourne, Australia
  Master of Data Science; WAM: 80.0/100.0 — *Feb 2020 – July 2022*
- **Manipal Institute of Technology and Science** — Manipal, India
  Bachelor of Mechatronics Engineering; GPA: 3.45/4.00 — *Aug 2015 – July 2019*

Experience

- **Melbourne Data Analytics Platform** — Melbourne, Australia
  Data Science Intern — *Feb 2022 - June 2022*
  - **Research Project, Supervisor: Dr. Simon Mutch.**: Balerion: An ensemble of deep learning models for rapid and accurate emulation of semi-analytical galaxy formation function during re-ionization.
  - **Outcome**: Developed an extremely efficient model to act as an surrogate for existing methods. This provides massive (10^6) reduction in time and computational complexity allowing for faster exploration of the underlying parameter space and calibration to new datasets.
  - **Tools**: Python, Pytorch, wandb, fastapp, high-performance computation tools.
- **University of Melbourne** — Melbourne, Australia
  Research Assistant — *July 2021 - July 2022*
  - **Research Project #1, Supervisor: Dr. Andrew Cullen**: Adversarial decisions on complex dynamical systems using Monte Carlo methods.
  - **Research Project #2, Supervisor: Dr. Joseph West**: MuZero for optimal and continuous control of the Deep Brain Stimulation (DBS) neuro-stimulation device.
  - **Outcomes**: Successfully developed python-APIs for the both the projects, including packaged environments, support for integrating RLlib algorithms and built a highly distributed learning platform.
  - **Tools**: C++, Python, Tensorflow, PyTroch, OpenMPI, PyCuda.
- **Probe Information Services** — Bangalore, India
  Jr. Data Scientist — *Jan 2019 - July 2020*
  - **Project**: Deployment of an abstractive text summarization and classification pipeline to process legal and financial documents.
  - **Outcome**: Analysed and transformed multiple data silos to generate structured data packages for clients; quadrupled the individual document processing rate from 30 docs/hour to approx. rate of 110 docs/hour.
  - **Tools**: NLP, Spacy, Python, Java, CouchDB, Linux.
- **Buhler Pvt. Ltd** — New Delhi, India
  Intern — *May 2017 - Aug 2017*
  - **Project**: Designed proof-of-concept assemblies, mechanical linkages, 3D components and schematics in adherence to modern engineering standards.
  - **Outcome**: Organized models, drawings, and documentation into Autodesk Enterprise Product Data Management system; prototype complete models for development, 3D printing and CNC machining.
  - **Tools**: Autodesk Inventor and AutoCAD.

Research and Publications

- **Potential-based Rewards Shaping in the Predator-Prey Environment**: Under Review — We introduce two novel potential-based reward functions to encourage the emergence of cooperative and coordinate strategies for the classic multi-agent predator-prey environment. We conduct an empirical study to test the behaviours of these agents trained under the shaped rewards and provide empirical evidence to justify its use in mixed-settings to improve scalability and performance.
- **Distributed, Decentralized and Synchronous Multi-Agent A2C**: Under Review — We present a novel decentralized advantage actor-critic algorithm that utilizes learning agents in parallel environments with synchronous gradient descent. The approach outperforms existing decentralized MARL methods both in terms of training and computation costs by utilizing multiple GPUs and distributing the workload efficiently.

Projects and Articles

- **Efficient Implementations of RL algorithms for the PettingZoo environments.**: A collections of implementations for decentralized and centralized mixed multi-agents for the MpE and MAgent classes of the PettingZoo environments.
- **COMP90054 - SPARTAN: The smartest city.**: A cloud based web-platform built upon an active stream of data from the AURIN portal contained and deployed on the Melbourne Research Cloud.
- **The AI Economist**: An AI social planner that learns optimal economic policies for the real world. The aim is to develop more sophisticated AI policy models that meet usability requirements, such as explainability and robustness, to recommend real-world economic policies that improve social welfare.
- **COMP90054: therealpacman**: An autonomous agent built upon the Rapidly Exploring Random Tree algorithm to play the game of splendor.

Skills

- **Languages**: Python (5+ years), Linux & shell scripting (3+ years), C++ (2+ years), R (2+ years), JAX (1+ year), HTML & CSS (1+ year), SQL (1+ year).
- **Tools and Technologies**: Tensorflow, PyTorch, PyCUDA, Linux, R Studio, Docker, CouchDB, Matlab, Auto-desk Inventor, Unreal Engine 4, Catia 3D.

Professional References

- **Dr. Joseph West**: Thesis Supervisor and Project Lead.
  @ University of Melbourne
- **Dr. Simon J Mutch.**: Project Lead.
  @ University of Melbourne
- **Dr. Robert Turnbull**: Project Lead.
  @ Melbourne Data Analytics Platform