Sumit Dangi

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Education

Indian Institute of Science Education and Research (IISER) Bhopal, India **2019-2024**

BS-MS Data Science and Engineering
Minor: Electrical Engineering and Computer Science
GPA: 8.35/10

R.K.P. Sr. Sec. School, Madina, Rohtak, India **Graduated in 2019**

Central Board of Secondary Education (CBSE)
Score in CBSE Class XII: 91.2%

Areas of Interest

- Statistics
- Machine Learning
- Reinforcement Learning
- Autonomous Agents
- Deep Learning
- Computer Vision
- Motion Planning
- Intelligent Robotics

Research Experience

Pre-doctoral Research Associate **December'2024 onwards**

Indian Institute of Science (IISc), Bangalore, India
PI: Dr. Pavankumar Tallapragada
Project: Multi-agent Reinforcement Learning and Game Theory for Autonomous Robots

MS Thesis **May'2023-April'2024**

Artificial Intelligence and Robotics Lab, IISc, Bangalore, India
PI: Prof. Suresh Sundaram
Project: Motion Planning for Autonomous Vehicles

- Developed an **attention-aware reinforcement learning** (RL) method for decision making in real-world driving scenarios.
- Implemented neural network architectures using **PyTorch**.
- Gained **Linux** and **CUDA** experience.
- Worked with the **SMARTS** driving simulator for training and evaluation of models.
- Published and presented research at **IEEE SMC 2024**.

BS Thesis **January-April'2023**

IISER Bhopal, India
PI: Prof. P.B. Sujit
Project: A Reinforcement Learning approach to solve the Perimeter Defence Problem (PDP)

- Formulated the multiplayer PDP as a Markov Decision Process.
- Designed an **OpenAI Gym environment** to simulate the problem.
- Trained and tested multiple RL baseline models on the designed environment.

Research Internship **June-July'2022**

Robert Bosch Center for Data Science and Artificial Intelligence, IIT Madras, India
PI: Dr. Sridharakumar Narasimhan
Project: Reconstructing Water Distribution Networks

- Designed efficient water distribution networks from the available road networks using algorithmic and learning based methods.
- Developed a **web-app** to showcase the project.

PROJECTS

Wind energy-based path planning for electric UAVs using MDPs [link] *Instructor: Prof. PB Sujit*

- Implementation of a research paper on exploiting wind fields to minimize energy consumption on UAVs.

A reinforcement learning agent to play the Sokoban game [link] *Instructor: Prof. PB Sujit*

- Designed a custom RL environment for the Sokoban game.
- Implemented algorithms like On-Policy and Off-Policy Monte Carlo, SARSA, Q-learning, Policy Gradient Method.

Chicago crime detection using unsupervised learning [link] *Instructor: Dr Tanmay Basu*

- This course project demonstrates unsupervised learning methods to find patterns in data.
- We used the Chicago Crime dataset and explored feature engineering and clustering techniques for the analysis of the crime scene in Chicago.

Library seat occupancy detection [link] *Instructor: Dr Vaibhav Kumar*

- A method to detect seat occupancy in the College Library using an object detection model on the CCTV images.
- We utilize the YOLO model to detect objects and classify a seat as occupied or empty, which was then visualized on a website.

ACADEMIC ACHIEVEMENTS AND PARTICIPATION

- First author research paper accepted for publication at the IEEE Systems, Man and Cybernetics (SMC) 2024 conference at Kuching, Malaysia. (https://arxiv.org/pdf/2407.08932)
- Received travel grant for Poster Presentation at IEEE SMC 2024.
- Participated in the CODS-COMAD 2024 conference at IIIT Bangalore, India.

PROMINENT COURSEWORK

- Linear Algebra
- Multivariable Calculus
- Probability and Statistics
- Data structures and Algorithms
- C programming
- Advanced Programming in Python
- Artificial Intelligence
- Data Science and Machine Learning
- Deep Learning
- Computer Vision
- Reinforcement Learning
- Intelligent Robotics

TECHNICAL AND RESEARCH SKILLS

- Python, R, SQL, C, C++
- OpenCV, scikit-learn, NLTK, NumPy, Matplotlib, Pandas, OpenAI Gym, PyTorch
- Linux, Git
- MS Office, LaTeX
- Problem Solving, Literature Review, Report Writing, Presentation Skills

CO-CURRICULAR ACTIVITIES

- Managed technical events and maintained website for the ACM Student Chapter, IISERB.
- Organized a Treasure Hunt for Singularity 2022, IISERB.
- Won a silver medal as part of the College Volleyball Team, Inter-IISER Sport Meet (IISM) 2022.
- Conducted gaming events for Tenacity 2021 (Inter-IISER Esports Event).
- A member of the Dance Club, IISERB.