Astarag Mohapatra

("Astarag" Meaning: colour of the sky during sunset)

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Education

National Institute of Technology Rourkela   **June. 2017 – June 2021**
B.Tech in Mechanical Engineering (Major)   *CGPA: 8.22/10.0*
B.Tech in Electronics and Communication Engineering (Minor)   *CGPA: 7.94/10.0*

D.A.V Public School Chandrasekharpur   **May 2015 – May 2017**
High School degree in Science   *90.2%*

Experience

University of Liège   **June 2021 – Present**
Visiting Reinforcement Learning Research Intern   *Remote*

- Developed a Deep Reinforcement learning pipeline for Partially Observable MDPs using PyTorch framework, refactored 10% of the existing codebase
- Developed a trading agent utilizing **FinRL** library by AI4Finance, resulting in 60% increase in Sharpe Ratio compared to the Industrial Average
- Utilized **Optuna** , **Ray tune** and **Weights & Biases** for **Stable Baselines3** and **RLlib** models for hyperparameter tuning, resulting in 30% increase in Sharpe Ratio over non-tuned model
- Explored the possibility of Google trends as a proxy for market sentiment analysis and improved the performance on volatile assets in Crypto-trading compared to the baselines. Link to project page is *here*

Sustainable Thermal Energy Systems Laboratory (STESL), NIT Rourkela   **Jan 2021 – July 2021**
Machine Learning Research Intern   *Remote*

- Implemented Machine Learning algorithms using sklearn library for thermal performance analysis of Evacuated U-tube Solar Collector to achieve SOTA 71% efficiency
- Implemented **Perumtation Feature Importance** using sklearn for feature selection. Published the paper on SSRN journal and is currently under-review on Solar Energy journal via Elsevier's online submission system. Link to project page is *here*
- Conducted 2 bootcamp session for Juniors on Machine learning algorithm implementation which helped them in their own publication on Liquid Dessicant systems.

OffNote Labs   **March 2020 – October 2020**
Deep Learning Research Intern   *Remote*

- Analysed different State-of-the-art models on Image Segmentation and conducted empirical comparison of various segmentation losses
- Categorised different loss functions and compiled it in a *blog post* for review. Reproduced SOTA models results for quantitative comparison between different implementations

FindMind Analytics   **April 2020 – June 2020**
Data Science Intern   *Remote*

- Developed a custom Convolutional Neural Network model from scratch using PyTorch for CAPTCHA digit recognition that achieved 97% accuracy. Involved in collection of CAPTCHA images using BeautifoulSoup and labelling bounding boxes using LabelBox
- Integrated Morphological transformation using OpenCV for preprocessing, resulting in 60% increase in accuracy
- Worked with Selenium Webdriver for automated data and image scraping. Developed efficient custom scraper for 15 websites

Publications

Elsevier for Solar Energy (under-review) and Social Science Research Network (SSRN)

- Published a paper titled *Implementation of Data-Driven Machine Learning Models for Design and Performance Optimization of Evacuated U-Tube Solar Collector*. It featured in the top 10 most downloaded paper in the month of September, within a month of publication.
- **Authors :** Astarag Mohapatra, P. K. S. Tejes, Chatur Gembalia and B. Kiran Naik

Analytics Vidhya on Medium

- Published Article on review of *Deep Reinforcement Learning in Quantitative Finance*. It has 4K+ views and 100 claps

- Published a Medium article **series** on *Policy Gradient Methods* and SOTA Actor-Critic Methods like *DDPG*, *PPO*, *TRPO* and *SAC* in Reinforcement learning
- Published *tutorials* and guides on using FinRL and its products

Nerd for Tech on Medium
- Published an comprehensive article on inner workings of Apple's white paper on CSAM (Child Sexual Abuse Material) detection

Certification

- Deep Learning Specialization DeepLearning.AI, Coursera
- Reinforcement learning Specialization University of Alberta, Coursera
- DeepLearning.AI TensorFlow Developer, Coursera
- Machine Learning Operation Specialization DeepLearning.AI, Coursera
- Python for data science and Machine learning Bootcamp, Udemy
- PyTorch: Deep learning Bootcamp Jose Portilla, Udemy
- Complete guide to TensorFlow for Deep Learning with Python, Udemy
- Algorithmic trading and Quantitative Analysis Using Python, Udemy
- C Programming, Lakshya Institute of Technology

Projects

Road Detection and Segmentation   **Oct 2019 - Feb 2020**
- ∗ Labelled drone images for road detection using labelme application for project under Prof. Sambit Bakshi
- ∗ Integrated SOTA Image segmentation models like U-Net and FCN on Tensorflow framework for fine tuning

Verge Website Scraper| *Python, Selenium, NLP*
- ∗ Developed a custom scraper using Selenium Webdriver and Python from scratch to extract news headlines and links based on keyword
- ∗ Implemented object-oriented programming practices such as inheritance to develop the backend for the database.
- ∗ Integrated Headlines Sentiment analysis with a fine-tuned Bert Model from HuggingFace

Anomaly Detection in Baldwin Pump | *PyTorch, Time-Series*
- ∗ Developed a custom Encoder-Decoder model for Anomaly detection pipeline in a time-series Baldwin Pump, achieved 0.91 F1 score
- ∗ Experimented with different time series architecture - LSTM, GRU, ARIMA, 1D-Conv for empirical analysis

Technical Skills

Programming: Python, PyTorch, sklearn Tensorflow, HTML/CSS, Selenium, JAX, Julia, OpenCV, JavaScript, PostgreSQL
Developer Tools: VS Code, Ray, Weights & Biases, Google Cloud Platform, Jupyter, GitHub, Docker
Operating Systems: Linux, Mac OS X, Windows

Achievements

FORMULA BHARAT EV-2019
- ∗ Worked on GLVS and Electronics subsystem with Team RoadRunner EV. Our team won the Best Procurement Report Award among 20 teams in Formula Student Electric Vehicle (FSEV) Concept Challenge 2019.

UCMAS: Abacus Academy
- ∗ Earned Grand Champion 3 times at state-level and represented state in country-level Abacus championship tournament

Volunteer

National Service Scheme
- ∗ Worked as a teaching Assistant for underprivileged students affiliated to Birsa Munda Vidaypith for 4 months. Helped them to prepare for their half-yearly exams.

Open Source Contributor
- ∗ Actively contributing to the FinRL community, published start-up guides for beginners and integrated automatic hyperparameter tuning in Reinforcement learning algorithms