MILLEND ROY

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EDUCATION

Indian Institute of Technology (IIT), Dhanbad   *2017 - 2021*
B.Tech in Electrical Engineering (EE)
GPA : 9.51/10.0 (**Institute Silver Medalist**)
Advisors : Dr. Kalyan Chatterjee & Dr. Bhukya K. Naick

WORK EXPERIENCE & RESEARCH PROJECTS

Microsoft Research Lab India, *Technology and Empowerment Lab*

– *SCAI Research Fellow* with Dr. Akshay Nambi, Tanuja Ganu   *July 2021 - Present*
  1. EnCortex, a Decision Management Framework for Smart Grid Utility.
     * Built core energy abstractions that are easily extensible.
     * Paired with modular optimizers including stochastic, traditional and reinforcement learning techniques.
     * Worked on a range of use-case scenarios:
       Carbon Arbitrage, Micro-grid Profit Maximization, Demand Matching and Bidding
     * MLOps compatibile for retraining, and finetuning RL models: Worked on Behaviour Cloning, OfflineRL, Far-Transfer and Near-Transfer
  2. Anomaly detection in electric vehicle's battery systems.
     * Modeled battery life cycles, State of Health (SoH) and rate of battery degradation.
     * Used clustering algorithms to group batteries of similar behaviour.
     * Extracted trends and seasonality across time in the patterns of battery degradation.

– *Research Intern* with Tanuja Ganu, Dr. Akshay Nambi   *Mar 2021 - July 2021*
  Energy consumption modeling for an electric vehicle fleet.
     * Direct use of primary features (like trip distance, trip expected time, etc) available before the trip.
     * Predicted Secondary non-trivial features (like regenerative braking energy, overspeeding, harshbraking counts, etc) through extensive feature engineering process
     * Prepared a 2-stage Model using LightGBM and AdaBoost
     * Work published in ACM COMPASS'22

Indian Institute of Technology (IIT), Dhanbad, *Power Systems Lab*   *Dec 2020 - May 2021*
Under-Graduate Student Researcher with Dr. Soham Dutta and Dr. D.K.Mohanta.
     * Bachelor's Thesis on A3C Reinforcement Learning based Islanding Detection in IEEE 9 Bus System.
     * Machine Learning based adaptive fault diagnosis considering hosting capacity amendment in active distribution network, an IEEE 33 Bus System (recently accepted at Electric Power Systems Research Journal).

Hurrey Tech Ventures R&D   *May 2020 - Oct 2020*
Data Science Intern
Hurr.AI, a reinforcement learning (AIEd and NLTK) based Recommendation Engine to surface '3Rs' : the right learning material to the right student at the right time.

Indian Institute of Technology (IIT), Delhi, *Comm. Networks Lab*   *May 2019 - July 2019*
Summer Research Fellow with Akash K. Mondal, Dr. Swades De
     * A comprehensive survey of islanding detection methods.
     * Synchro-Phasor Measurement Unit based anti-islanding detection in IEEE 9 Bus System.
     * Designed Simulation Relays using SR Flip Flop logics and programmed auto-reclosures in circuit breakers.
     * Generated a large fault-detection Dataset for later research.

SOFTWARE

EnCortex - Stochastic Optimization for Renewable Energy sources.
Microsoft Research India

Hurr.AI - an AI enabled Recommendation Engine based Learning Platform.
Hurrey Tech Ventures R&D

PUBLICATIONS

- equal contribution

Under Review

1. EnCortex: A General, Extensible and Scalable Framework for Decision Management in New-age Energy Systems
   Vaibhav Balloli*, **Millend Roy***, Anupam Sobti, Tanuja Ganu, Akshay Nambi. In: *20th USENIX Symposium on Networked Systems Design and Implementation (NSDI'23). Boston, MA, USA.*

Journal

2. Machine Learning Based Adaptive Fault Diagnosis considering Hosting Capacity Amendment in Active Distribution Network Sourav Kumar Sahu, **Millend Roy**, Soham Dutta, Debomita Ghosh, Dusmanta Kumar Mahanta. In: *Electric Power Systems Research (EPSR'23)*

1. A Data-Driven Fault Detection Approach with an Ensemble Classifier based Smart Meter in Modern Distribution System Soham Dutta*, Sourav Kumar Sahu*, **Millend Roy**, Pradip Kumar Sadhu. In: *Sustainable Energy, Grids and Networks (SEGN'23)*

Conference Publications

3. Reliable Energy Consumption Modeling for an Electric Vehicle Fleet
   Millend Roy, Akshay Nambi, Anupam Sobti, Tanuja Ganu, Shivkumar Kalyanaraman, Shankar Akella, Jaya Subha Devi, and S A Sundaresan. In: *ACM SIGCAS/SIGCHI Conference on Computing and Sustainable Societies (COMPASS). COMPASS'22. Seattle, WA, USA*

2. A Deep Learning Framework for Enhancing Maritime Coastal Security
   Millend Roy, Abhinav Gautam, Aayush Sugandhi. In: *2021 2nd IEEE International Conference for Emerging Technology (INCET). INCET'21. Belgaum, Belagavi, India*

1. Renewable Energy and Demand Forecasting in an Integrated Smart Grid
   Vishnu Vardhan Sai Lanka, **Millend Roy**, Shikhar Suman, Shivam Prajapati. In: *2021 IEEE Innovations in Energy Management and Renewable Resources(IEMRE). IEMRE'21. Kolkata, India*

Theses

1. Simulation and Classification of Islanding Condition Detection for an IEEE 9 bus system using PMUs and A3C based deep reinforcement learning algorithm respectively **Millend Roy**, Bhukya Krishna Naick, Kalyan Chatterjee. In: Bachelor's Thesis, EE'21, IIT Dhanbad.

SKILLS

Languages	Python, C++, C
Frameworks	PyTorch, StableBaselines, RLlib, rsome, Pyomo, scikit-learn, Keras, TensorFlow, NumPy, Pandas, SciPy, SymPy, Matplotlib, Seaborn, Plotly, Streamlit
Tools and Tech.	Matlab, Simulink, Tableau, Docker, Git
Courses	Power System, High Voltage Engineering, Control System, Signals and System, Analog and Digital Electronics, Inferential Statistics, Machine Learning by Andrew NG, Coursera Deep Learning AI Specialization, Practical Reinforcement Learning

SELECT AWARDS AND HONORS

- Convocation: Institute **Silver Medal** Holder of EE'21 batch, IIT ISM Dhanbad. — Aug 2022
- TEM Talk on Smart Grid Utilities and SCAI Technical Talk on Project Vasudha, internal to MSRI. — Dec 2021
- Fully-funded Masters Offer in Electrical Engineering at UiT, Norway for Fall 2021. — April 2021
- ASEAN India Hackathon'21 **Global Finalist**. — Jan 2021
- **Winner** of the Grand Finale of Smart India Hackathon'20. — 2020
- Samsung Innovation Awards **Finalists**. — 2020
- **Press:** Contribution to Hurr.Ai led to nomination of Hurrey in SAP ET Innovation Awards. — 2020
- SURGE'20 internship opportunity at IIT Kanpur. — 2020
- SPARK'19 internship opportunity at IIT Roorkee. — 2019
- TU Kaiserslautern, Germany internship opportunity for the summers 2020. — 2019