MILLEND ROY

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Research Interests

Energy Systems and **Technology for Emerging Markets** :

- Optimization and RL applications in decision-making of Smart Grid control.
- Build AI/ML-enabled solutions to drive sustainability goals in transportation and electricity generation.

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

Microsoft Research Lab India, *Technology and Empowerment Lab*

- *SCAI Research Fellow* with Dr. Akshay Nambi, Tanuja Ganu *July 2021 - Present*
  - EnCortex, a Decision Management Framework for Smart Grid Utility.
  - Anomaly detection in electric vehicle's battery systems.

- *Research Intern* with Tanuja Ganu, Dr. Akshay Nambi *Mar 2021 - July 2021*
  Energy consumption modeling for an electric vehicle fleet.

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

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.

Vardhan Consulting Engineers *April 2020 - May 2020*
Engineering Design Intern
Solar Resource Assessment and loss analysis for Annual Energy Production using PVsyst.

Indian Institute of Technology (IIT), Delhi, *Comm. Networks Lab* *May 2019 - July 2019*
Summer Research Fellow with Akash K. Mondal, Dr. Swades De
- Simulation Relays using SR Flip Flop logics and programmed auto-reclosures in circuit breakers
- A comprehensive survey of islanding detection methods.

Software

EnCortex - Stochastic Optimization for Renewable Energy sources [Under Patent Review].
Microsoft Research India

Skills

Languages	Python, C++, C
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

Publications

* - equal contribution

Under Review

3. 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.*
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. 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.

Projects

1. **Autonomous Self-Driving Car Simulation** [🔗]
   - Graphics creation using Kivy modules in Python: serving as the environment.
   - Deep Q-Learning used with specific reward policies where the taxi (3 sensors) has a to and fro journey.

2. **Seq2Seq Architecture based DL Chatbot**
   - Trained on Movie-lens dataset by building a Seq2Seq neural architecture.
   - Dropout regularization is used to remove any kind of overfitting and the losses are optimized using Adam optimizer.

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