SOUMYABRATA TALUKDER

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CAREER OBJECTIVE

A dedicated, self-propelled, and goal-oriented **Ph.D. student majoring in Electrical Engineering**, with more than 8 years of past professional experience in project management and engineering in the energy and infrastructure sectors, intrigued towards **data-analytics, reinforcement learning, deep learning, optimization, control, and formal methods**.

EDUCATION

Iowa State University, IA, USA — *Aug 2017 - present*
Doctor of Philosophy (graduating in 2022) — CGPA: 4.00/4.00
Department of Electrical and Computer Engineering

Jadavpur University, Kolkata, India — *Jun 2005 - Apr 2009*
Bachelor of Engineering (1^{st} class with honors) — CGPA: 9.08/10.00
Department of Electrical Engineering

GRADUATE COURSES TAKEN

Convex Optimization	Deep Learning	Machine Learning for CPS
Data Analytics	Digital Feedback Control	Linear Systems
Nonlinear Systems	Stochastic Processes	Energy System Planning
Power System Dynamics	Advanced Topics in Power System	Applied Formal Methods

SKILLS

Domain	Data analytics, reinforcement learning, deep learning, convex and nonconvex optimization, large-scale coalition games, robust stability and control, model-predictive control, stability certification and control of nonlinear and/or networked systems, resilience of complex systems, formal methods.
Technical tool	Tensorflow, PyTorch, Scikit-learn, Pandas, CVX, Julia, SQL, PSS/E, DSATools, Powerworld, PSCAD, Nuxmv, Spin, Z3, AADL.
General tool	MS Office, MS Project, MS Visio, Latex.
Programming language	Python, Matlab, Java, C, C++, Fortran.
Operating system	Linux, Macintosh, Windows.
Managerial	Managing scope, time, cost, and quality of projects, leadership, stakeholder management, progress monitoring and reporting.

RESEARCH ARTICLES

1. **S. Talukder**, R. Kumar, *Robust Stability of Neural-Network Controlled Nonlinear Systems under Parametric Variability* - recently submitted in IEEE Transactions on Systems, Man, and Cybernetics: Systems (link).

2. **S. Talukder**, R. Kumar, *Online Early Prediction of Long-term Voltage Instability using Deep Learning* - submitted in The 53rd North American Power Symposium (NAPS 2021) (link).

3. **S. Talukder**, S. Liu, H. Wang, G. Zheng *Low-frequency Forced Oscillation Source Location - A Deep Learning Approach* - accepted in IEEE SMC International Conference 2021. (link).

4. **S. Talukder**, M. Ibrahim, R. Kumar, *Resilience Indices for Power/Cyberphysical Systems* - published in IEEE Transactions on Systems, Man and Cybernetics: Systems in Sep 2020 (link).

5. **S. Talukder**, R. Kumar, *An Enhancement in Sum-of-Squares Optimization based Region of Attraction Estimation for Power Systems* - published in IEEE PES General Meeting 2019 (link).

INTERNSHIPS AND OTHER PAST INDUSTRIAL EXPERIENCE

Tesla, Inc., CA, USA *Aug 2021 - Dec 2021*
Energy Optimization Intern

- Designed multiple energy price and regulation ratio forecasting algorithms and analyzed their comparative performance for AEMO real time energy market.
- Developed production code implementing the best forecasting algorithm, which has been deployed to be used by the energy autobidding algorithm to maximize its objective, while supporting the bulk electric grid more effectively with energy delivery, frequency-regulation and contingency services.

National Renewable Energy Laboratory, CO, USA *May 2021 - Aug 2021*
Bulk Power System Modeling Intern

- Worked in the Grid Automation & Control team on the two US Department of Energy projects: Near Term Reliability and Resilience (NTRR) and Virtual Operator Assistant (VOA).
- Contributed toward developing automated tools to generate near-term season-wise power-flow cases for each hour of a representative extreme day, by tuning the base WECC seasonal planning power-flow case ($\sim$ 25000 bus) for different operating hours of the day using demand and generation forecast computed from the historical database of Peak Reliability and CAISO.
- Studied transient stability under various contingencies, small signal stability, and effect of remedial action schemes on US Eastern-Western interconnection combined TSAT cases (maintained by Southern Power Pool (SPP)) for both peak demand and peak PV penetration hours.
- Analyzed hourly regional and company-wise historical generation and demand data as well as 2030 generation and demand projection from WECC production cost model (PCM) output, to develop a statistical predictive model for near-term conventional generation resources output forecast, given the hourly demand and solar and wind generation profile.
- Extensive hands-on exposure in handling and troubleshooting interconnection-wide bulk power-system modeling and simulation using PSS/E, TSAT, and Powerworld (incl. Python APIs).

GE Research, NY, USA *Sep 2020 - Dec 2020*
Fellow Intern

- Worked with the Software & Analytics and Electric Power teams in collaboration with the WAMS team of GE Digital to formulate and solve the low-frequency oscillation source location problem of bulk power systems using deep learning, where the input is 3D spectral features extracted from simulated PMU data. Effectiveness and robustness of the method are validated on IEEE 68-bus and WECC 179-bus test systems.
- Drafted an article reporting a part of the research finding, which got accepted in IEEE SMC 2021 international conference.

GE Research, NY, USA *May 2019 - Aug 2019*
Fellow Intern

- Worked with the formal methods team for the **Cyber Assured System Engineering** (CASE) project, led by DARPA. Proposed and developed an innovative graphical user interface that pro-

vides an intuitive and interactive *wizard* to set the mission-level cyber requirements as well as the cyber relations among the inter-dependent subcomponents involved in the mission.

- Got exposed to GE's Bayesian Hybrid Modelling tool, which uses a Gaussian process based learning technique for modeling and testing of dynamic input-output systems.

ITC Ltd., Bangalore, India *Dec 2012 - Jul 2017*
Assistant Manager - Projects

- Led design, procurement and construction of electro-mechanical services for two large-scale building projects including **high/medium voltage power distribution, solar PV integration, building management system** etc. The projects are IGBC LEED certified and the site spans over 9 acres of plot area and 0.6 million sqft. of built-up space.
- Took the role of a key coordinator among the interdependent disciplines (e.g. structural, interior, electro-mechanical etc.) of the overall project.
- Actively participated in the procurement process including tender preparation, finalization, bid evaluation and getting suppliers, contractors and consultants on-board.
- Other responsibilities included scheduling of overall project (including engineering, procurement, construction and handing over), resource and cash-flow planning, monitoring scope, time, budget and quality, periodic reporting to the management, risk analysis and management, site construction monitoring and contractor management, conflict resolution and stake-holder management.
- Supervised a team of six engineers who were responsible for electrical and mechanical and related works.

GE Grid Solutions, Noida, India (earlier Alstom Grid) *Jul 2009 - Nov 2012*
Project Engineer

- Directly responsible for testing and commissioning of a **400 kV outdoor generation substation including protection, SCADA, and DCS systems**. Overseen and managed site construction activities including installation of substation and generating plant auxiliary-electrical equipment, earthing, and lightning protection.
- Led engineering, procurement and construction of **6 outdoor transmission substation** projects.
- Responsibilities included scheduling of overall project (including engineering, procurement, construction and handing over), resource, sales and cash-flow planning, monitoring scope, time, budget and quality, periodic reporting to the management, risk analysis and management, leading coordination among in-house engineering, procurement and construction teams, site construction monitoring and sub-contractor management, stake-holder management.

CERTIFICATIONS

- *SQL for Data Science* by University of California, Davis through Coursera (link)
- *Advanced Relational Database and SQL* by Coursera Project Network through Coursera (link)

TEACHING EXPERIENCE

Iowa State University, IA, USA *Fall 2017 - Spr 2018*
Teaching assistant for EE-324 (Signals and Systems - II)

- Responsibilities included course-recitation, lab-proctoring and grading.

EXTRA-CURRICULAR ACTIVITY

Voluntary promoter of sustainability and optimal usage of natural resources. A **certified trainer** of **Green Rating for Integrated Habitat Assessment (GRIHA)**.

AWARDS AND ACCOLADES

1. Received **Letter of Recognition** from National Renewable Energy Lab, Co, USA in Aug 2021 for my contributions during an internship.
2. Received **Impact Award** from General Electric Global Research Center, USA, in Jul 2019 for developing an innovative graphical user-interface that made usage of a software toolset substantially easier.
3. Received **Certificate of Appreciation** from the CEO of ABD, ITC Limited, India, in Jun 2017 for timely delivery of a constrained project.
4. Received **Barindra Memorial Medal** from Jadavpur University, India, in Dec 2009 for distinguished academic performance in **Power System Design and Planning** during Bachelor of Engineering program.
5. Received **SEEA scholarship** from West Bengal State Electrical Engineers Association, India, in Aug 2008 for consistent academic excellence during Bachelor of Engineering program.
6. Received **National Merit Scholarship** from Govt. of India in Aug 2005 for academic distinction prior undergraduate program.