ANIK KUMAR SAMANTA

Senior Engineer, Machine Learning and Data Science
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Research Interests

Data science, predictive maintenance, climate change, theoretical machine learning.
Signal Processing, high resolution spectral estimation, time-series analysis, statistical methods.
Federated learning, deep learning, classification.

Research Experience

March 2021 – Present: Senior Engineer, Machine Learning and Data Science, Eaton/Danfoss India Technology Centre
June 2016 – March 2021: Ph.D. Research Scholar, Advanced Technology Development Centre, IIT Kharagpur.
Oct 2012 – June 2016: Research Engineer, Centre for Railway Research, IIT Kharagpur.
June 2011 – Oct 2012: Project Engineer, Real-Time Embedded System Lab, IIT Kharagpur.
Teaching Assistance: Embedded Systems Lab (3 semesters), Real-Time Signal Processing Lab (2 Semester), Statistical Signal Processing (2 semesters)

List of Publication

Patents Filed:
1. A. Routray, A. Naha, **A. K. Samanta,** Amey Pawar, Chandrasekhar Sakpal, "A system for assessment of multiple faults in induction motors", WO2019167086A1, 2019

Journal Publication:
1. **A. K. Samanta**, A. Routray, S.R. Khare, & A. Naha, "Minimum Distance-based Detection of Incipient Induction Motor Faults using Rayleigh Quotient Spectrum of Conditioned Vibration Signal," in *IEEE Transactions on Instrumentation and Measurement*, vol. 70, pp. 1-11, 2021.
2. **A. K. Samanta**, A. Routray, S.R. Khare, & A. Naha, "Direct Estimation of Multiple Time-varying Frequencies of Non-stationary Signals". *Signal Processing*, vol. 169, pp. April 2020
3. **A. K. Samanta**, A Naha, A Routray, AK Deb "Fast and accurate spectral estimation for online detection of partial broken bar in induction motors", *Mechanical Systems and Signal Processing*, vol. 98, January 2018
4. A. Naha, **A. K. Samanta**, A. Routray and A. K. Deb, "Low Complexity Motor Current Signature Analysis Using Sub-Nyquist Strategy With Reduced Data Length," in *IEEE Transactions on Instrumentation and Measurement*, vol. 66, no. 12, pp. 3249 – 3259, December 2016.
5. A. Naha, **A. K. Samanta**, A. Routray and A. K. Deb, "A Method for Detecting Half-Broken Rotor Bar in Lightly Loaded Induction Motors Using Current," in *IEEE Transactions on Instrumentation and Measurement*, vol. 65, no. 7, pp. 1614-1625, July 2016.
6. A. Naha, K. R. Thammayyabbabu, **A. K. Samanta**, A. Routray and A. K. Deb, "Mobile Application to Detect Induction Motor Faults," *IEEE Embedded Systems Letters*, vol. 9, no. 4, pp. 117 – 120, Dec 2017.
7. C. Pradhan, C. N. Bhende, and **A. K. Samanta**. "Adaptive Virtual Inertia-Based Frequency Regulation in Wind Power Systems." *Renewable Energy,* vol. 115, pp. 558-574, 2018.

8. A. Naha, **A. K. Samanta**, A. Routray, and A. K. Deb "Determining Autocorrelation Matrix Size and Sampling Frequency for MUSIC Algorithm," *IEEE Signal Processing Letters*, vol.22, no.8, pp.1016-1020, Aug. 2015.
9. A. Mukherjee, A. Routray, and **A. K. Samanta**, "Method for On-line Detection of Arcing in Low Voltage Distribution Systems", *IEEE Transactions on Power Delivery,* vol. 32, no. 3, pp. 1244 - 1252. June 2017.
10. **A. K. Samanta**, A. Naha, D. Basu, A. Routray, and A. K. Deb, "Online Condition Monitoring of Traction Motor", Book chapter in *Handbook of Research on Emerging Innovations in Rail Transportation Engineering*, IGI Global.

Academic Qualification

1. Doctor of Philosophy in signal processing from IIT Kharagpur, CGPA (till coursework): 8.67
   Thesis Title: *Frequency Estimation under Stationary and Non-stationary Conditions - A Case Study of Induction Motor Fault Diagnosis.* (Thesis review complete. Defence seminar to be delivered soon.)
2. Completed Master of Science (by Research) from IIT Kharagpur, CGPA: 9.69/10 in 2016.
   Thesis Title: *Designing Real-Time Diagnostics for Squirrel Cage Induction Motors*
   (a) Setting up 22-kW squirrel cage induction motor fault experimental test bed. (b) Development of low-complexity, high-resolution spectral estimator. (c) Development of a real-time SCIM fault simulator.
3. Passed B. Tech from Dr. B. C. Roy Engineering College (W.B.U.T) in Electronics and Communication Engineering with a GPA of (8.19/10) in 2011.
   Thesis Title: *An Intelligent Direction Monitoring Wireless System for Moving Objects.*
4. (10+2) from South Eastern Railway Mixed Higher Secondary School (CISCE) with 78.8% in 2006.
5. 10th from Sacred Heart High School (CISCE) with 80.6% in 2004.

Mentoring and Supervision

2019: Supervised a team of five interns for development of IoT-based fault detector, portable fault simulator, implementation of spectral estimators, and explored graph signal processing for earthquake epicenter estimation.
2018: Supervised two interns for non-stationary frequency estimation and detection of stationarity.
2017: Development of Wi-Fi current sensor, Internet based fault detection, and modification of Android based fault detection with four interns.
2016: Development of Android based fault detection system with one intern.
2015: Modification of the SCIM simulator with .mat initialization with one intern.
2014: Supervised a team of six interns for ARM implementation of the fault detection algorithm, efficient solvers for matrix inversion, and fast implementation of matrix multiplication.
2013: Mentored three interns in developing the SCIM fault simulation platform using SIMULINK real-time.
2012: Mentored a team of two interns in developing ARM-based signal processing application using CMSIS.

Hardware/Software Proficiency

1. Hardware Platforms: Intel-based SBC, STM Discovery boards, and Raspberry Pi.
2. Software Packages: MATLAB, Python, Simulink, Simulink Real-time, Google Colabs, Tensorflow, LaTeX.

Achievements

1. Adjudged "Top Idea Contributor" in Innologue Innovation event 2021 at Danfoss India Tech. Centre

2. Outstanding reviewer 2021, IEEE Transaction on Instrumentation and Measurement
3. Secured All India Rank of 225, with a rank of 35 in chemistry nationwide in National Science Talent Search Examination '05.
4. An active member of organizing committee of Entrepreneurship Week '09, (champion's runners up.)
5. Won the second prize for exhibiting 'Burning but not burning' at S. E. Rly. Boys High School in 2006.

Extra-Curricular Activities

Professional Activities:
1. Chair, IEEE Signal Processing Society Student Branch Chapter, IIT Kharagpur (2017-2019).
2. Founding member and Treasurer of IEEE Signal Processing Society Student Branch Chapter, IIT Kharagpur (2016-2017).
3. Graduate Student Member IEEE, and IEEE Signal Processing Society.
4. Reviewer of
   i. IEEE Transaction on Instrumentation and Measurement
   ii. IEEE Transaction on Industrial Applications
   iii. IEEE PES Transactions on Sustainable Energy
   iv. Elsevier Measurement
   v. Elsevier Shock and Vibration
   vi. International Journal of Electrical and Computer Engineering (IJECE)
   vii. IEEE Engineering in Medicine Biology Conference
   viii. International Conference on Systems in Medicine and Biology 2016
5. Hobbies:
   i. Swimming, cycling,
   ii. Reading novels, oil painting,
   iii. Numismatics.

Personal Details

Date of Birth: January 10, 1988.
Father's Name: Pankaj Kumar Samanta.
Languages Known: English, Hindi, Bengali, and German.

I hereby declare that the above information is true to the best of my knowledge.

Regards

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(ANIK KUMAR SAMANTA)
Date: September 16, 2021
Place: Kharagpur, WB.