FATIMATELBATOUL HUSARI

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SUMMARY

Currently working as a short-term lecturer at Cihan University-Erbil, Kurdistan Region of Iraq in Informatics and Software Engineering (ISE) Department. I am teaching different subjects including artificial intelligence, image processing, algorithm design and programming, operating systems, machine learning and data mining.

RESEARCH INTERESTS

My area of interests includes predictive maintenance, condition monitoring and fault diagnosis in electrical machines & drives, power electronic techniques, control & automation, digital control systems, mathematical modelling, and simulation of electrical machines & drive systems in MATLAB/Simulink, m-file, signal processing, sensor data acquisition, data analysis and deep learning approaches for classification, pattern recognition.

SUPERVISED THESES

- Smart Scooter Using Internet of Things (B.sc thesis 2023-2024)
- Developing Earthquake System Using Arduino (B.sc thesis 2023-2024)

RESEARCH EXPERIENCE/POSITIONS

1 September 2023-till present — **Short-term lecturer at Cihan University-Erbil, Kurdistan Region of Iraq**

25 July 2022-25 January 2023 — **Short-term intern (Motion service) ABB company, Bangalore, India.**
During internship, I worked on condition monitoring and diagnostics of electrical machines, mathematical modelling of induction machine under different type of faults (i.e., inter turn fault and eccentricity fault), hardware-in-the loop, doing multiple experiments to test the setup for data collection and analysing/testing the data using signal processing techniques (i.e., FFT and DWT).

16 July 2018-17 October 2022 — **Full-time researcher in Electrical Engineering Department, IIT Roorkee, India. (Date of thesis defense is 17th October, 2022)**
During my Ph.D., I worked on condition monitoring and fault diagnosis of stator inter-turn fault detection in line-fed induction motor at an early stage. Moreover, isolation of stator inter turn fault from ambiguous conditions such as voltage imbalances. Also, the research work focuses on incipient detection and diagnosis of inter-turn short circuit fault (ITSCF) in induction motor fed by power electronics, preferably using three-line currents and voltages for a wide range of frequencies and load variations, estimation the fault severity in drive-fed induction motor in presence of the harmonics produced due to the high switching frequencies of the output inverter and designing novel hybrid architectures based on machine learning and deep learning techniques for performing the ITSCF detection at its very inception and fault severity assessment.
I prototyped experimental hardware setup and conducted extensive experiments to collect the healthy and faulty data using NI device, and I have developed LABVIEW code for the data acquisition device.

My research was based on the analysis of current signatures of induction machine by developing different approaches of deep learning. Moreover, I have developed different hybrid architectures of deep learning techniques to exploit the advantages of these techniques (i.e., CNN-LSTM, CNN-GRU and CNN-SVM) for early ITSCF detection and fault severity identification concurrently in variable frequency induction motor drives. In this research work, I designed deep learning frameworks with less complexity to eliminate the computational burden and for optimal fault classification.

July 2018-July 2020 **Teaching assistant TA and lab assistant in electrical engineering department, IIT Roorkee.**

20 July 2016-15 May 2018 **Master student**

M. Tech thesis on development and design the advanced control system using model predictive control (MPC) to control the current of grid-connected voltage source inverter. Also, I improved the MPC to ensure constant switching frequency of the inverter.

September 2014-June 2016 **Teaching Assistant (TA) and administrative and executive research assistant at Aleppo university, Syria**

I taught different courses for different grades, especially industrial automation, power electronics and drives, mathematical modelling of the machine and drive systems, automation of industrial technological process using PLC and PCI, simulation and modelling of machines and drives using LabVIEW and MATLAB.

September 2009-July-2014 **Bachelor student**

Bachelor thesis on development and design different control techniques (i.e., V/f, modified V/f, FOC, etc.) for different machine types (i.e., DC motor, Induction motor, permanent magnet synchronous machine (PMSM), etc.),

PUBLICATIONS

Published/Accepted

1- F. Husari and J. Seshadrinath, "Incipient Interturn Fault Detection and Severity Evaluation in Electric Drive System Using Hybrid HCNN-SVM Based Model," in *IEEE Transactions on Industrial Informatics*, vol. 18, no. 3, pp. 1823-1832, March 2022, doi: 10.1109/TII.2021.3067321.

2- F. Husari and J. Seshadrinath, "Early Stator Fault Detection and Condition Identification in Induction Motor Using Novel Deep Network," Accepted in *IEEE Transactions on Artificial Intelligence*, doi: 10.1109/TAI.2021.3135799.

3- F. Husari and J. Seshadrinath, "Stator Turn Fault Diagnosis and Severity Assessment in Converter Fed Induction Motor Using Flat Diagnosis Structure Based on Deep Learning Approach," Accepted in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 2022, doi: 10.1109/JESTPE.2022.3184754.

4- Hosseinzadeh, M., Rahmani, A. M., Husari, F. M., Alsalami, O. M., Marzougui, M., Nguyen, G. N., & Lee, S. W. "A Survey of Artificial Hummingbird Algorithm and Its Variants: Statistical Analysis, Performance Evaluation, and Structural Reviewing," *Archives of Computational Methods in Engineering*, 1-42, May 2024, doi: 10.1007/s11831-024-10135-1.

Conferences

1- F. Husari and J. Seshadrinath, "Inter-Turn Fault Diagnosis of Induction Motor Fed by PCC-VSI Using Park Vector Approach," *2020 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)*, 2020, pp. 1-6, doi: 10.1109/PEDES49360.2020.9379388.

2- F. Husari and J. Seshadrinath, "Sensitive Inter-Tum Fault Identifcation in Induction Motors Using Deep Learning Based Methods," 2020 *IEEE International Conference on Power Electronics, Smart Grid and Renewable Energy (PESGRE2020)*, 2020, pp. 1-6, doi: 10.1109/PESGRE45664.2020.9070334.

3- Husari, F., & Seshadrinath, J. (2019). Inter-Turn Fault Diagnosis of Induction Motor Fed by SVPWM-VSI Using Deep Learning Techniques. In 2019 *IEEE International Conference on Artificial Intelligence and Applications.* https://www.researchgate.net/publication/341216615.

Publications under review Husari, F., & Seshadrinath, J. **"**Novel Trihybrid DeepCGS Model for Early Stator Turn Fault Diagnosis in Variable Frequency Drive Fed Induction Motor" communicated to Elsevier.

WORKSHOPS/ SEMINARS/ CONFERENCES

- Participated in "an online course on "the Fundamentals of Deep Learning" organized by NVIDIA Deep Learning Institute, 12, Oct, 2021.
- Attended an advanced workshop on "PLC- (KOYO-ZEN)" organized by Electrical Engineering Department at Aleppo University, 3-18 March, 2013.
- Presented IEEE international conference on "Power Electronics, Drives & Energy Systems (PEDES)" at Malaviya National Institute of Technology, Jaipur, India, 16-19 December 2020.
- Presented IEEE international conference on "Power Electronics, Smart Grid & Renewable Energy (PESGRE)" at Le Méridien Kochi, Panvel, Kochi, India, 2-4 January 2020.
- Presented IEEE international conference on "Artificial Intelligence & Applications (ICAIA)" at COER university, Roorkee, Uttarakhand, India, 21-24 November 2019.
- Presented a workshop on "Artificial Intelligence as Trending Tool for Breast Cancer Early Diagnostic" organized by Biology, Radiography and Informatics & Software Engineering Departments at Cihan University-Erbil, Kurdistan Region, Iraq, 22 October, 2023.
- Presented a workshop on "From AI to GenAI: Exploring Latest Innovations" organized by Informatics & Software Engineering at Cihan University-Erbil and University of Southern Denmark, 25-26 March, 2024.
- Attended a training course on "Improve Presentation and Learning by Using Infographics" organized by Cihan University-Erbil, Kurdistan Region, Iraq, 24 September-12 October, 2023.
- Attended a training course on "Course Management Based on Moodle Platform" organized by Cihan University-Erbil, Kurdistan Region, Iraq, 3-7 September, 2023.
- Presented 5th international conference on "Communication Engineering and Computer Science" at Cihan University-Erbil, Kurdistan Region, Iraq, 24-25 April, 2024.

EDUCATION

16 July 2018-17 October 2022 **Full-time Ph.D. scholar in condition monitoring and fault diagnosis in induction machine drive (Date of thesis defense is 17th October, 2022)**
Indian Institute of Technology Roorkee, Roorkee-India

20 July 2016-15 May 2018 **Master of technology in Control and Automation**
Indian Institute of Technology Delhi, New Delhi-India

September 2009-July 2014 **Bachelor of Electrical Engineering Department**
Aleppo university, Syria

TECHNICAL SKILLS

Programming languages: C, C#, C++, Python (Tensorflow and Keras)

Software MATLAB, Code vision, LaTeX, LabVIEW, OrCAD

Equipments/devices used Programmable Logic Controller (PLC) (Koyo-zen, Siemens, LS), National Instruments (NI) device, Peripheral Component Interconnect (PCI)

COMMITTEES/ PROFESSIONAL GROUPS/ SERVICES

- Service for international refereed journals as invited manuscript reviewer to **1)** IEEE Transactions on Industrial Informatics (TII), **2)** IEEE Transactions on Intelligent Transportation Systems (ITS), **3)** IEEE Transactions on Power Electronics (PELS).
- Scientific committee member at the AI Center and curriculum designer for the Computer Science/AI branch at Cihan University-Erbil.

PERSONAL DETAILS

Gender: Female
Linguistic Proficiency: Arabic (Native Proficiency), English (Full Professional Proficiency) & French (Basic level)
Present Residence: Kurdistan Region of Iraq - Erbil

REFERENCES

1) **Prof Jeevanand Seshadrinath**, Associate Professor, Electrical Engineering Department, Indian Institute of Technology Roorkee, Roorkee, India
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   Email id: jeevanand.seshadrinath@ee.iitr.ac.in ; jeeva.cts@gmail.com
2) **Prof Yogesh Vijay Hote,** Professor, Electrical Engineering Department, Indian Institute of Technology Roorkee, Roorkee, India
   Email id: yogesh.hote@ee.iitr.ac.in
3) **Prof M. Felix Orlando,** Associate Professor, Electrical Engineering Department, Indian Institute of Technology Roorkee, Roorkee, India
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