Mohamed Ragab

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Summary

Mohamed Ragab is a research scientist at the Center for Frontier AI Research (CFAR) and the Agency of Science, Technology, and Research (A*STAR). He received his PhD in Computer Science and Engineering from Nanyang Technological University (NTU) in Singapore, where he focused on developing robust and transferable AI for dynamic predictive maintenance applications. His research interests include deep learning, transfer learning, and robustness for time series applications. Mohamed has a track record of publishing in top-tier conferences and journals.

Education

- **Ph.D. in Computer Science and Engineering** 2018 - 2022
  Nanyang Technological University, Singapore *GPA:4.88/5*
  - **Thesis Title:** Towards Realistic Data-driven Predictive Maintenance: A Deep Transfer Learning-based Approach.
  - **Relevant Courses:** Deep Learning for Data Science, Data Mining, and Digital Image Processing.
- **M.Sc. in Electrical Engineering** 2015 - 2017
  Aswan University, Egypt *GPA: 3.62/4*
  - **Thesis Title:** High-resolution Magnetic Image Reconstruction Based on Compressive Sensing
  - **Relevant Courses:** Image and Video Processing, Medical Imaging, Electronic Circuits, Digital Communication Theory, and Wireless Communication Systems.
- **B.Sc. in Electrical Engineering** 2009 - 2014
  Aswan University, Egypt *GPA: 3.88/4*
  - **First Class Honours**
  - **Relevant Courses:** Digital Image Processing, Digital Signal Processing, C++, and Java.

Experience

- **Center for Frontier AI Research - A*STAR** Singapore
  Scientist I *June 2022 - Present*
  - Trustworthy AI
  - Privacy Preserving
  - Robustness
  - Uncertainty Quantification
- **Institute for Infocomm Research - A*STAR** Singapore
  Research Scholar *Aug 2018 - May 2022*
  - Implement end-to-end data science pipeline from data collection to machine learning model deployment for predictive maintenance tasks such as Anomaly detection, Fault Diagnosis, and Fault Prognosis.
  - Design Advanced deep learning algorithms for time series data.
  - Develop Transfer Learning and Domain Adaptation techniques to address the challenges of real-world predictive maintenance.
- **ST Engineering Aerospace** Singapore
  AI/ML Intern *Sep 2020 - Dec 2020*
  - Developed and applied LSTM, CNN, and autoencoder techniques for anomaly detection in predictive maintenance projects, resulting in improved capabilities for future projects
  - Developed deep learning with automatic feature extraction to realize a system for the early detection of a failure in aircraft engines
- **Aswan University** Egypt
  Assistant Lecturer *Dec 2017 - Jul 2018*
  - Assist head faculty member with classroom instruction material, exams, and record keeping.
  - Mentor and supervise students at Final year project's
- **Aswan University** Egypt
  Teaching Assistant *Feb 2015 - Nov 2017*
  - Assists with labs or discussion sections, hold office hours, do grading, attend weekly course staff meetings, and do occasional other tasks such as mentoring student in the E-learning version of courses.

Honors and Awards

- Finalist Paper Award at International Conference of Prognostics and Health Management - July, 2020
- Singapore International Graduate Award (SINGA) - August, 2018
- Best Master's Thesis Award - August, 2017
- First Class Honours Award at Bachelor's Degree - July, 2014

Teaching Experience

- **ECE 422 Computer Networks:** Computer Networks and the Internet - Protocols and Layering - Physical and Link layers - Retransmissions, Multiple access, Switching, Network layer, Internetworking , Intra, and Inter-Domain Routing - Transport layer,
- **ECE 424 Digital Signal Processing:** Undergraduate course that covers the basics of digital signal processing. Topics included analysis of continuous-time and discrete-time signals, discrete Fourier transform, fast Fourier transform
- **CSE 302 Signals and Systems:** covers the fundamentals of signal and system analysis, focusing on representations of discrete-time and continuous-time signals, complex exponential and geometric Fourier representations, Laplace and Z-transforms, sampling and representations of linear, time-invariant systems

Publications

Journal Papers

[J1] **Mohamed Ragab**, Emadeldeen Eldele , Zhenghua Chen, Min Wu, Chee-Keong Kwoh, Xiaoli Li "Self-supervised Autoregressive Domain Adaptation for Time Series Data" *IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2022.*

[J2] Emadeldeen Eldele , **Mohamed Ragab**, Zhenghua Chen, Min Wu, Chee-Keong Kwoh, Xiaoli Li and Cuntai Guan "ADAST: Attentive Cross-domain EEG-based Sleep Staging Framework with Iterative Self-Training. " *IEEE Transactions on Emerging Topics in Computational Intelligence, 2022.*

[J3] **Mohamed Ragab**, Zhenghua Chen, Wenyu Zhang, Emadeldeen Eldele, Min Wu, Chee-Keong, Kwoh, Xiaoli Li "Conditional Contrastive Domain Generalization Towards Real-world Fault Diagnosis " *IEEE Transactions on Instrumentation and Measurement, 2022.*

[J4 **Mohamed Ragab**, Zhenghua Chen, Min Wu, Chee-Keong Kwoh, Xiaoli Li "Attention Based Sequence to Sequence Model for Remaining Useful Life Prediction" *Neurocomputing, Elsevier, 2021.*

[J5] **Mohamed Ragab**, Zhenghua Chen, Min Wu, Chuan-Sheng Foo, Chee-Keong, Kwoh, Ruqiang Yan, Xiaoli Li "Contrastive Adversarial Domain Adaptation for Machine Remaining Useful Life Prediction" *IEEE Transactions on Industrial Informatics, 2021.*

[J6] **Mohamed Ragab**, Zhenghua Chen, Haoliang Li, Min Wu, Chee-Keong Kwoh, Xiaoli Li "Adversarial Multiple-Target Domain Adaptation for Fault Diagnosis" *IEEE Transactions on Instrumentation and Measurement, 2021.*

[J7] Qing Xu, Zhenghua Chen, **Mohamed Ragab**, Chao Wang, Min Wu, Xiaoli Li "Contrastive Adversarial Knowledge Distillation for Deep Model Compression in Time-Series Regression Tasks", Neurocomputing, 2021.

[J8] Emadeldeen Eldele , **Mohamed Ragab**, Zhenghua Chen, Min Wu, Chee-Keong Kwoh, Xiaoli Li and Cuntai Guan "Self-supervised Contrastive Representation Learning for Semi-supervised Time-Series Classification " *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2021.* (Under-review)

[J9] **Mohamed Ragab**, Osama A. Omer, Mohamed Abdel-Nasser "Compressive sensing MRI reconstruction using empirical wavelet transform and grey wolf optimizer" *Neural Computing and Applications, 2018.*

Conference Papers

[C1] Emadeldeen Eldele, **Mohamed Ragab**, Zhenghua Chen, Min Wu, Chee-Keong Kwoh, Xiaoli Li, and Cuntai Guan"Time-Series Representation Learning via Temporal and Contextual Contrasting" International Joint Conference of Artificial Intelligence, IJCAI, 2021.

[C2] Wenyu Zhang, **Mohamed Ragab**, Ramon Sagarna "Robust Domain-free Domain Generalization with Class-aware alignment" IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2021)

[C3] Chao Jin, **Mohamed Ragab**, Khin Mi Mi Aung "Secure Transfer Learning for Machine Fault Diagnosis under Different Operating Conditions" International Conference on Provable and Practical Security (PROVSEC 2020)

[C4] **Mohamed Ragab**, Zhenghua Chen, Min Wu, Chee-Keong Kwoh, Xiaoli Li "Adversarial Transfer Learning for Remaining Useful Life Estimation" IEEE International Conference on Prognostics and Health Management (ICPHM 2020), (**Finalist Award**).

[C5] **Mohamed Ragab**, Osama A. Omer, Hany S. Hussien "Compressive Sensing MRI Using Dual Tree Complex Wavelet Transform with Wavelet Tree Sparsity," *34rd National Radio Science Conference (NRSC), 2017*

Supervised Undergraduate Projects

- **Smart Parking Management System :** The main objective of this project is to design and implement a system that provides parking occupancy estimation to help the drivers to save his time and find suitable place to park and provide parking analytic for the city authorities. This has been done using the technology of Internet of Things (IoT) coupled with Deep Learning. (2017)
- **To Be Smart with IoT** This project aims to develop smart grids and electrical networks with the aid of Cloud, internet of things protocols, and wireless communication protocols. (2016)
- **Implementation and Performance Analysis of UW-OFDM in Time Varying Channels** The purpose of this project is to evaluate the performance of the OFDM techniques in time varying environments (channels with multipath fading and Doppler shift)(2015)

Services and Professional Activities

- **Journal Invited Reviewer**
  - IEEE Transactions on Neural Networks and Learning Systems
  - IEEE Transactions on Instrumentation and Measurements
  - IEEE Sensors
  - IEEE Transactions on industrial informatics
  - Reliability Engineering
  - Neurcomputing
- **Program Committee Member**
  - International Joint Conference of Artificial Intelligence (IJCAI), 2022
  - Association for the Advancement of Artificial Intelligence (AAAI), 2022

Volunteer Experience

- **Volunteer at Egypt Scholars Incorporation:** The members of Egypt Scholars collaborate on a voluntary basis to facilitate the exchange of scientific and professional knowledge, skills and expertise both within Egypt and internationally.(2020-present)
- **Examiner at The Intel International Science and Engineering Fair(ISEF):** Intel Competition is held for School's students to develop their own projects and ideas in many disciplines, I have participated in the judge's committee of Electronics and Technology Track Projects. (2015-2017)

Skills Summary

- **Languages** Python, C++, Matlab, JAVA
- **Frameworks** Scikit, Pandas, Numpy, Pytorch, Keras
- **Tools** Docker, GIT, Wandb,
- **Platforms** Linux, Web, Windows, GCP, Alibaba Cloud
- **Soft Skills** Leadership, Communication and Presentation Skills, Academic Writing, Critical Thinking

References

1. **Assoc. Prof. Kwoh Chee Keong**
   Associate Professor,
   School of Computer Science and Engineering,
   Nanyang Technological University, Singapore
   Email: asckkwoh@ntu.edu.sg
2. **Adj. Prof. Xiaoli Li**
   Adjunct Professor, Nanyang Technological University,
   Department Head (Machine Intellection department),
   Institute for Infocomm Research (I2R),
   Agency of Science Technology and Research, Singapore
   Email: xlli@i2r.a-star.edu.sg