Mohamed Ragab

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Summary

Mohamed Ragab is a PhD student at School of Computer Science and Engineering, Nanyang Technological University (NTU), Singapore. Concurrently, he is with the the Institute of Infocomm Research (I2R), Agency of Science Technology and Research (A*STAR). Mohamed has strong background on the state-of-the-art machine learning and deep learning techniques. His research involves the development of robust and practical advanced deep learning and transfer learning approaches that can handle dynamic real-world predictive maintenance environments. Mohamed has established track record in delivering robust and practical deep learning approaches, which proved by publications in top tier conferences and journals. Previously, he has completed his M.Sc. degree and the B.Sc. degree (First Class Hons.) from the Department of Electrical Engineering, Aswan University, in 2014 and 2017, respectively.

Education

Doctorate of Philosophy in Computer Science and Engineering
Aug 2018- present

Nanyang Technological University, Singapore — *CGPA:4.88/5*

- Thesis Title: "Towards Realistic Data-driven Predictive Maintenance: A Deep Transfer Learning-based Approach ".
- Relevant Course Work: Deep Learning for Data Science, Data Mining, and Digital Image Processing.

Master of Science in Electrical Engineering
November 2017

Aswan University, Egypt — *GPA: 3.62/4*

- Thesis Title: "High-resolution Magnetic Image Reconstruction Based on Compressive Sensing".
- Relevant Course Work: Image and Video Processing, Medical Imaging, Electronic Circuits, Digital Communication Theory, and Wireless Communication Systems.

Bachelor of Science in Electrical Engineering
June 2014

Aswan University, Egypt — *GPA: 3.88/4*

- First Class Honours.
- Strong mathematical background with distinction in all math courses.
- Relevant Course Work: Digital Image Processing, Digital Signal Processing, Engineering Control, Analog Communication, Digital communication, Wireless Communication, Electronics (1,2,3), Electronic Circuits and Programming Languages (C++ and Java).

Employment

Research Scholar
Aug 2018 - present

A*STAR-Institute for Info-comm Research (I^2R), Singapore

- Developing 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
- Developing Advanced deep learning algorithms for time series data.
- Develop Transfer Learning and Domain Adaptation techniques to address the challenges of real-world predictive maintenance.

Assistant Lecturer
Dec 2017 - July 2018

Aswan University, Faculty of Engineering, Egypt

- Assist head faculty member with classroom instruction material, exams, and record keeping.
- Guide the development and training of the new graduate assistants.
- Lead, supervise, and plan undergraduate laboratory experience.

Teaching Assistant
Feb 2015 - Nov 2017

Aswan University, Faculty of Engineering, Egypt

- Undergraduate full-time teaching assistant usually 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 & Awards

2020	**Finalist Paper Award**, International Conference of Prognostics and Health Management (ICPHM)	*Detroit, USA*
2018	**Awardee**, Singapore International Graduate Award	*Singapore*
2017	**Best Master's Thesis Award** , Electrical Engineering Department, Aswan University	*Aswan, Egypt*
2014	**First Class Honours Bachelor's Degree** , Electrical Engineering Department, Aswan University	*Aswan, Egypt*
2014	**Exemplary Student Award** , Electrical Engineering Department, Aswan University	*Aswan, Egypt*
2012	**2nd Place** , Robot Design Competition	*Aswan, Egypt*

Publications

Journal Papers

[J1] **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.*

[J2] 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 Neural Networks and Learning Systems (TNNLS), 2021.* (Under-review)

[J2] **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 Pattern Analysis and Machine Intelligence (TPAMI), 2021.* (Under-review)

[J3] 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.

[J4] **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.*

[J5 **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 (Accepted)*.

[J6] **Mohamed Ragab**, Osama A. Omer, Mohamed Abdel-Nasser "Compressive sensing MRI reconstruction using empirical wavelet transform and grey wolf optimizer" *Neural Computing and Applications [Oct-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*

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, Reliability - Congestion Control - DNS, Web/HTTP, Content Distribution - Quality of Service and Real-time Apps - Network Security

ECE 424 Digital Signal Processing

- Undergraduate course covers the basics of digital signal processing. Topics included analysis of continuous-time and discrete-time signals, the realisation of discrete-time signals, discrete Fourier transform, fast Fourier transform, FIR filters and IIR filters.

CSE 302 Signals and Systems

- covers the fundamentals of signal and system analysis, focusing on representations of discrete-time and continuous-time signals (singularity functions, complex exponentials and geometrics, Fourier representations, Laplace and Z transforms, sampling) and representations of linear, time-invariant systems (difference and differential equations, block diagrams, system functions, poles and zeros, convolution, impulse and step responses, frequency responses).

CSE 301 Digital Image Processing

- Introductions and Fundamentals - Intensity Transformations and Spatial Filtering - Filtering in the Frequency Domain - Image Restoration & Reconstruction - Morphological Image Processing - Image Segmentation -Color Image Processing - Image Compression- Image Wavelet Transform.

Supervised Undergraduate Projects

Smart Parking Management System *2017/2018*

- 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.

To Be Smart with IoT *2016/2017*

- It helps in developing and maintaining smart grids and electrical networks with aid of Cloud and internet of things protocols, and wireless communication protocols.

Implementation and Performance Analysis of UW-OFDM in Time Varying Channels *2015/2016*

- 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). In particular, our interest is in the newly proposed OFDM approach, (UW-OFDM). To recover the transmitted signal for bit error ratio (BER) evaluation in the presence of a time-varying scenario for different signal-to-noise ratio (SNR) levels, channel estimation will be based on compressed sensing techniques.

Internships and Trainings

Machine Learning Intern at ST Engineering Aerospace *September 2020*
- Anomaly detection using LSTM, CNN and Autoencoder techniques. I have provided an improved arsenal to tackle future component Predictive Maintenance projects.
- In advance detection of failure of various air-crafts engines using automatic feature extraction.

EF-NTU Startup Bootcamp: Deep Tech for Impact *March 2020*
- Why Entrepreneurship? - Bootcamp - Expectations - Finding your Edge - The Power of Co-Founding Teams - Edge-Based Ideation
- Identifying and Framing Your Problem and learning how to do market sizing

IoT applications impact on life and business. *Feb 2018*
- Description: info about IoT in general including impact on various business process in our daily life with uses cases from the implementations experience during trial and proof of concepts for the planned Egyptian smart cities (new Capital and others). this session is mixed between technical and business..

Developing End-to-End IoT applications. *Feb 2018*
- Description: This is technical Hands On learning session where the audience will learn how to practically implement the concepts learned in 1st session to develop and complete end-to-end IoT applications from IoT devices to cloud and vice versa (devices, networks, cloud based IoT AEP). The session includes practical know how and experience with applications utilizing Low power SigFox, NB-IoT) Target audience are students, postgraduates, technical solution architects, technical line managers, etc.

National Telecom Regulatory Authority (NTRA) Summer Internship *September 2013*
- Wireless Sensor Networks and Spectrum Monitoring.
- Lab Approvaland Quality of Service verification of Mobile phones.
- Alcatel-Mobile Networks Arch.And Optimization.
- TEData networks technologies and monitoring and Mobinil- Mobile network design and testing

Intel Ideation Camp *July 2013*
- Entrrepreneurship, ideation and full cycle from idea to prduct.
- Design the business model of existing use-cases

Actel Academy Internship *June 2013*
- Mobile package training and full expxosure to all generations of mobile networks (GSM, UMTS and LTE).
- Training on related softwares of mobile networks

Volunteering and Social Activities

Volunteer at Egypt Scholars Incorporation *2020-present*
- 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.

Referee at The Intel International Science and Engineering Fair(ISEF) *2015-2017*
- This is Intel Competition that held for School's students to make their own projects and ideas in many disciplines, I have participated as a judge in Electronics and Technology Track Projects

Information Technology Manager at Orphan Sponsorship Society *January 2013-present*
- Chairman of IT section of the Society
- Mange all public relation of the society and its social media identity.

Supervisor of Science club family at Aswan Faculty of Engineering *October 2016-2017*
- Scientific family aims to enhance student's skills (communication skills, presentation skills, CV making skills and Job hunting skills)
- mentoring of Senior students provide them with all the tools that help them to develop their own carrier.

Skills

Programming skills
- Python, C++, Java, MATLAB.
- Machine Learing Libraries: SkLearn, Pandas, and Numpy.
- Deep Learning Frameworks: Pytorch, Keras, and Tensorflow.

Language Skills

Arabic:
- Native speaker

English:
- Very good spoken and written
- IELTS score 6.5

References

1. **Assoc. Prof. Kwoh Chee Keong**
   Associate Professor,
   School of Computer Science and Engineering,
   Nanyang Technological University, Singapore
   asckkwoh@ntu.edu.sg

2. **Adj. Prof. Xiaoli Li**
   Adjunct Professor, Nanyang Technological University,
   Department Head (Machine Intellection department),
   Institute for Infocomm Research (i2R), A*STAR, Singapore
   xlli@i2r.a-star.edu.sg