Mustafa A. Abdallah

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Research Interests

Game Theory, Deep Learning, Network Security, Behavioral Decision-Making, Speech Recognition, and Optimization.

Education

Purdue University, West Lafayette, IN. **Sep. 2017 – Summer 2021**

- PhD in Computer Engineering under supervision of Professors Saurabh Bagchi and Shreyas Sundaram, Current GPA: 4.0
- Courses: Graph Theory (A), Fault Tolerant Computer Systems (A), Lumped System Theory (A+), Optimization Methods For Systems And Control (A).

Cairo University, Egypt. **Sep. 2012 – Jul. 2016, Sep. 2007 – Jul. 2012**

- M.Sc. in Engineering Mathematics, GPA: 3.9
- B.Sc. in Electrical Engineering, GPA: 87.60/100, Distinction with honors, rank: 12/320

Relevant Experience

- Research Assistant; School of Electrical and Computer Engineering, Purdue University. Sep. 2017 – Present
  - Developed a behavioral security game model for studying security of Cyber Physical Systems.
  - Developed algorithm for automatic tuning of genomic error correction tools using Recurrent Neural Network.
  - Developed a machine learning algorithm to predict failure of sensor nodes in smart agriculture system.
- Part-time Engineer; Engineering Company for the Development of Digital Systems (RDI), Egypt. 2012 – 2017
  - Applied deep learning techniques to enhance performance of Arabic-based Speech Recognition applications.
  - Developed Speaker-Clustering algorithm in Multi-Genre Broadcast (MGB) challenge.
- Research Assistant; Engineering Mathematics and Physics Department, Cairo University. 2012 – 2017
  - Proposed automatic transcribing of unlabeled speech data using confidence measures.
- Summer Intern; National Telecommunications Regulatory Authority (NTRA), Egypt. Jun. 2011 – Sep. 2011
  - Performed site measurements (i.e., power and connectivity) and helped evaluate mobile operators.

Honors and Awards

- Travel Award for attending American Control Conference (ACC). 2019
- Best Fresher in DCSL Research Group, Purdue University. 2017
- Graduate Research Assistantship, Purdue University. 2017
- M.Sc. fellowship, Faculty of Engineering, Cairo University. 2012 – 2016
- Best Computer Engineering Graduation Project of the year 2012, Smart Village, Egypt. 2012
- B.Sc. with Honors from Faculty of Engineering, Cairo University. 2012
- Undergraduate Academic Outstanding Award from the Egyptian Government. 2007 – 2012

Technical Skills

- **Programming languages:** Python, C++, Java and Java Script.
- **Systems:** Linux, MongoDB, Windows.
- **Design and Simulation Software**: Matlab, and HTML.
- **Developments tools:** MS Visual Studio, Git Source Control, LaTex.
- **Libraries and SDKs:** TensorFlow, Kaldi, Cudamat, Numpy and Keras.

Publications

Conference Papers

- **M. Abdallah**, P. Naghizadeh, I. Khalil, T. Cason, S. Sundaram, and S. Bagchi,"BASCPS: Behavioral Decision Making in Security Games for Protecting Multi-Defender Cyber Physical Systems," Submitted to IEEE Symposium on Security and Privacy, Oct 2019.
- **M. Abdallah**, P. Naghizadeh, T. Cason, S. Bagchi, and S. Sundaram,"Protecting Assets with Heterogeneous Valuations under Behavioral Probability Weighting," accepted to appear at IEEE Conference on Decision and Control (CDC), 2019.[Link]
- **M. Abdallah**, P. Naghizadeh, A. Hota, T. Cason, S. Bagchi, and S. Sundaram,"The Impacts of Behavioral Probability Weighting on Security Investments in Interdependent Systems," American Control Conference (ACC), 2019.[Link]
- H. Ahmed, M. Elaraby, A. Moussa, **M. Abdallah**, and M. Rashwan "Unsupervised Speaker Clustering based on SOM and I-vectors for Speech Recognition Systems," Third Arabic NLP Workshop, European Chapter of the Association for Computational Linguistics (EACL), Valencia, 2017.[Link]
- M. Elaraby, **M. Abdallah**, S. Abdou, and M. Rashwan, "A Deep Neural Networks (DNN) Based models for a Computer Aided Pronunciation Learning System," International Conference on Speech and Computer (SPECOM), Springer Proceedings, Budapest, 2016.[Link]
- **M. Abdallah**, M. Al-Marri ,S. Abdou, M. Rashwan, and M. A. El-Gamal, "Improving Holy Qur'an recitation system using Hybrid DNN-HMM approach," Third International Conference on Islamic Applications in Computer Science, Turkey, 2015.[Link]

Journal Papers

- **M. Abdallah**, P. Naghizadeh, A. Hota, T. Cason, S. Bagchi, and S. Sundaram,"Behavioral and Game-Theoretic Security Investments in Interdependent Systems Modeled by Attack Graphs," IEEE Transactions on Control of Network Systems (TCNS), under revision, 2019.
- **M. Abdallah**, A. Mahgoub, S. Bagchi, and S. Chaterji,"Athena: Automated Tuning of Genomic Error Correction Algorithms using Language Models," Nature Scientific Reports (Impact Factor: 4.525), 2019.[Link]
- **M. Abdallah**, A. Moussa, S. Abdou, M. Rashwan, and H. Al-Barhamtoshy, "Automatic Selection of Speech Data based on Confidence Measure," International Journal of Engineering and Technology, vol. 8, no. 1.11, pp. 158-160, 2019.[Link]
- M. Al-Marri, H. Raafat, **M. Abdallah**, S. Abdou, and M. Rashwan,"Computer Aided Quran Pronunciation using DNN," Journal of Intelligent & Fuzzy Systems, vol. 34, 3257-3271, 2018.[Link]

Leadership Experience

- President; Egyptian Student Association at Purdue. May 2018 – May 2019
- Student academic member in IEEE Cairo University Student Branch (IEEE-CUSB). Fall 2011 – Spring 2012

Teaching Experience

- Teaching Assistant; Engineering Math and Physics Dept., Cairo University. Fall 2012 – Spring 2017
- Courses
  - Linear Algebra
  - Calculus
  - Probability and Statistics
  - Numerical Analysis
  - Differential Equations