Rashad Eletreby

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H-1B Status | Pending I-485 | EAD Available

Education

Carnegie Mellon University — Pittsburgh, PA
PhD in Electrical and Computer Engineering — *Aug. 2015 – Sep. 2019*

Carnegie Mellon University — Pittsburgh, PA
MS in Electrical and Computer Engineering — *Aug. 2015 – Sep. 2019*

Cairo University — Cairo, Egypt
MS in Electrical and Computer Engineering — *Sep. 2012 – July 2014*

Cairo University — Cairo, Egypt
BS in Electrical and Computer Engineering — *Sep. 2007 – July 2012*

Technical Skills

Coding: Python, C++, Hive, SQL
Developer Tools: Git, Jupyter, Google Cloud Platform, VS Code, PyCharm, IntelliJ
Libraries: xgboost, PySpark, pandas, Keras, tensorflow, NumPy, Matplotlib, scikit-learn, igraph, networkx, joblib, requests, SciPy

Experience

Staff Data Scientist — December 2020 – Present
Walmart Inc. — *Hoboken, NJ*

- **Search Listing Diversity:** Designing algorithms based on image understanding to increase the diversity of search results and decrease duplicate listings at Walmart.com.
- **Learning to Rank:**
  - Full stack design of advanced machine learning models in the context of learning to rank to improve the relevance and conversion of search and browse results.
  - Developed the first Learning to Rank (LETOR) framework for baseline ranking layer that serves all of Walmart.com browse shelves. The developed framework led to 0.37% GMV lift. The project drove an additional $XxM in revenue.
  - Designed the first multi-objective LETOR framework to empower a unified search experience in support of Walmart OneApp launch. The Designed model achieved relevance improvements of 15%.
  - Created a LETOR framework that serves all of Walmart.com browse shelves. The rerank model induced by this framework led to 0.9% GMV lift and 2% discoverability lift. The project drove an additional $XxM in revenue.
- **Experimentation:**
  - Created a powerful offline tool that measures the performance of a feature in terms of GMV coverage. The tool played a crucial role in many business decisions across multiple teams whenever an online A/B test was not possible
  - Running and analyzing customer facing experiments through interleaving and A/B testing.

Senior Data Scientist — October 2019 – December 2020
Walmart Inc. — *Hoboken, NJ*

- **Learning to Rank:**
  - Developed a LETOR framework that serves all of Walmart.com browse shelves. The new model improved relevance by 5% and increased Ads revenue by 6.3%.
  - Improved key features used within the LETOR framework that servers all search queries at Walmart.com. The ranking model trained on the improved features yielded 12% improvements with respect to item discoverability.
  - Implemented fundamental algorithmic changes to the LETOR framework at Walmart to alleviate presentation bias and accurately model customer engagement. The ranking model induced by these changes led to 0.60% GMV lift and 5% latency improvement. The project drove an additional $XxM in revenue.

- **Experimentation:**
  - Implemented key enhancements to an offline tool that simulates online interleaving tests. The enhancements provided several key insights that aided in the decision making of many features.
  - Developed an offline tool that examines A/B and interleaving test data and provides insights on the key segments for which the treatment performed poorly as compared to the control. The tool has been utilized by several members in the organization and is considered as a starting point for Root Cause Analysis (RCA).

Research Assistant Aug. 2015 – Sep. 2019

Carnegie Mellon University *Pittsburgh, PA*

- **Discovering Social Circles**: Proposed methods for automatic community detection on social network subgraphs under the *social circle analysis* category. The proposed methods combine structural information (graph connectivity) and content information (traits pertaining to each node in the network) to determine communities within social network graphs
- **Random Graph Theory**: Proposed novel random graph models that capture the secure connectivity of large-scale, heterogeneous wireless sensor networks. Analyzed the absence of isolated nodes, connectivity, minimum node degree, and k-connectivity of the proposed graphs by means of rigorous mathematical proofs and computer simulations
- **Network Science**: Proposed and analyzed mathematical and simulation models that characterize the role of evolutionary adaptations in facilitating the spread of information and infectious diseases in real-world complex networks
- **Internet of Things**: Worked on the design, evaluation, and implementation of novel techniques that aim to i) disentangle and decode large numbers of interfering LP-WAN transmissions at a simple, single-antenna LP-WAN base station, and ii) extend the transmission range of the current LP-WAN sensors

Research Assistant Aug. 2014 – May 2015

University of Arizona *Tucson, AZ*

- **Physical-layer security**: Conducted research on physical layer security in multi-link wireless networks using artificial noise techniques

Honors and Awards

- *Making the Difference Award*, Walmart February 2021
- *Philip and Marsha Dowd Fellowship*, Carnegie Mellon University August 2017 - May 2018
- *CMU Presidential Fellowship*, Carnegie Mellon University August 2017 - May 2018
- *William J. Happel Fellowship*, Carnegie Mellon University August 2015 - July 2016
- *Carnegie Institute of Technology Fellowship*, Carnegie Mellon University August 2015 - July 2016

Patents

(P3) **R. Eletreby**, C. Mu, Z. Wang and R. Mukherjee *"Systems and Methods for Improving eCommerce Search Ranking Via Labelling Enhancements in LETOR"* - patent pending

(P2) **R. Eletreby**, D. Zhang, S. Kumar and O. Yağan *"Empowering Low-Power Wide Area Networks in Urban Settings"* - patent granted by USPTO

(P1) M. Krunz, B. Akgun, P. Siyari, H. Rahbari, **R. Eletreby**, and O. Koyluoglu *"Systems and methods for securing wireless communications"* - patent granted by USPTO

Publications

Technical Reports

(T1) **R. Eletreby** and M. Blanco *"Social Circle Analysis via Content and Structure Augmentation"* - Source code and report are available at: https://github.com/reletreby/structureAug

Journal Papers

(J6) **R. Eletreby** and O. Yağan *"Secure Connectivity of Heterogeneous Wireless Sensor Networks Under a Heterogeneous On-Off Channel Model"* - IEEE Transactions on Control of Network Systems (submitted)

(J5) **R. Eletreby**, Y. Zhuang, K. M. Carley, O. Yağan, and H. Vincent Poor *"The Effects of Evolutionary Adaptations on Spreading Processes in Complex Networks"* - Proceedings of the National Academy of Sciences (March 2020)

(J4) **R. Eletreby** and O. Yağan *"Connectivity of Inhomogeneous Random K-out Graphs"* - IEEE Transactions on Information Theory (June 2020)

(J3) **R.Eletreby** and O.Yağan *"k-connectivity of Inhomogeneous Random Key Graphs with Unreliable Links"* - IEEE Transactions on Information Theory (January 2019)

(J2) **R.Eletreby** and O.Yağan *"Connectivity of Wireless Sensor Networks Secured by Heterogeneous Key Predistribution Under an On/Off Channel Model"* - IEEE Transactions on Control of Network Systems (February 2018)

(J1) **R.Eletreby**, H.Elsayed and M.Khairy *"Optimal Spectrum Assignment for Cognitive Radio Sensor Networks Under Coverage Constraint"* - IET Communications Journal (December 2014)

Conference Papers

(C15) A.Sridhar, O.Yağan, **R.Eletreby**, S.Levin, J.B.Plotkin, and H.V. Poor *"Leveraging A Multiple-Strain Model with Mutations in Analyzing the Spread of Covid-19"* - IEEE ICASSP 2021

(C14) O.Yağan, A.Sridhar, **R.Eletreby**, S.Levin, J.B.Plotkin, and H.V.Poor *"Modeling and Analysis of the Spread of COVID-19 under a Multiple-strain Model with Mutations"* - HDSR 2021

(C13) M.Sood, A.Sridhar, **R.Eletreby**, C.W.Wu, H.V.Poor, and O.Yağan *"Epidemic Spreading of Mutating Contagions over Multi-Layer Contact Networks"* - NetSci 2021

(C12) **R.Eletreby** and O.Yağan *"On the Connectivity of Inhomogeneous Random K-out Graphs"* - IEEE ISIT 2019

(C11) **R.Eletreby** and O.Yağan *"Connectivity of Wireless Sensor Networks Secured by the Heterogeneous Random Pairwise Key Predistribution Scheme"* - IEEE CDC 2018

(C10) **R.Eletreby**, Y.Zhuang and O.Yağan *"Evolution of Spreading Processes on Complex Networks"* - Conference on Complex Systems 2018

(C9) **R.Eletreby**, Y.Zhuang and O.Yağan *"Evolution of Spreading Processes on Complex Networks"* - IEEE ITA 2018 - Invited Abstract

(C8) **R.Eletreby**, D.Zhang, S.Kumar and O.Yağan *"Empowering Low-Power Wide Area Networks in Urban Settings"* - ACM SIGCOMM 2017

(C7) **R.Eletreby** and O.Yağan *"Secure and Reliable Connectivity in Heterogeneous Wireless Sensor Networks"* - IEEE ISIT 2017

(C6) **R.Eletreby** and O.Yağan *"Connectivity of Inhomogeneous Random Key Graphs Intersecting Inhomogeneous Erdős-Rényi Graphs"* - IEEE ISIT 2017

(C5) **R.Eletreby** and O.Yağan *"On the network reliability problem of the heterogeneous key predistribution scheme"* - IEEE CDC 2016

(C4) **R.Eletreby** and O.Yağan *"Node isolation of secure wireless sensor networks under a heterogeneous channel model"* - Allerton 2016

(C3) **R.Eletreby** and O.Yağan *" Minimum Node Degree in Inhomogeneous Random Key Graphs With Unreliable Links"* - IEEE ISIT 2016

(C2) **R.Eletreby**, H.Rahbari, M.Krunz *"Supporting PHY-layer Security in Multi-link Wireless Networks Using Friendly Jamming"* - IEEE GLOBECOM 2015

(C1) **R.Eletreby**, H.Elsayed and M.Khairy *"CogLEACH: A Spectrum-Aware Clustering Protocol for Cognitive Radio Sensor Networks"* - CROWNCOM 2014