Ahmed Medhat

amedhatm@gmail.com
http://amedhat1987.github.io

SUMMARY

I have been blessed with a diverse network science and machine learning research career within both academia and industry, working within network science research groups at Oxford and Facebook. My research career involved a combination of computational social science, graph learning and the engineering of supervised ML systems and datasets.

My research in Oxford involved using community detection methods to study wikipedia editor networks. While my research within startups and Facebook involved using network science and graph learning to study and create products for large scale social and financial networks, such as researching how social network structure shapes cognitive biases and social participation decisions, and building network and geographic datasets that aided WHO and UNHCR in response efforts to the Covid Pandemic and the Ukrainian refugee crisis, respectively. I have also built extensive experience in the end-to-end process for building predictive ML models, especially in creating algorithms and systems for ground-truth generation of visual and natural language labels, and learning from weakly supervised data.

RESEARCH INTERESTS

Graph Learning, Network Science, Deep Learning, Computational Social Science, Network Medicine, Network Neuroscience, Computational Biology, Weak Supervision

EDUCATION

Oxford University, Oxford, UK
Master of Science, Computer Science (Network Science) **Oct 2011**
Thesis: "A Network Modeling Approach to Assisting Collaboration in Large Scale Online Environments"
Thesis Grade: 68 (eq. 3.86 GPA)

American University in Cairo, Cairo, Egypt
Bachelor of Science, Electronics Engineering **Jun 2009**
GPA: 3.81 (*summa cum laude*)

RESEARCH EXPERIENCE

Senior Research Scientist, Network Science, *Facebook* **Dec 2021 - Present**

- Used GNNs and community detection methods for scalable node attribute prediction tasks in networks with billions of nodes and tens of billions of edges.
- Built models to improve conversational health by using whole graph embeddings.
- Designed a new multi-layer centrality metric that scales to billion-node graphs.
- Studied how the friendship paradox impacts content creation on social networks using network simulations. Producing 1 research paper and 3 in-progress papers.

Senior Research Scientist, Data for Social Good, *Facebook* **Dec 2020 - Dec 2021**
Data Science for Social Good is a team of scientists within the Computational Social Science Group, who are focused on leveraging Meta's mobility data to build datasets and tools to aid in natural and man-made disaster relief.

- Implemented algorithms for de-biasing geo-data derived from Facebook data to make it more representative of on-ground populations. This model was used for creating representative human co-location and population displacement maps.
- **Impact**: These datasets were used by WHO and UNHCR for crisis response to the COVID pandemic and the Ukrainian refugee crisis, respectively.

Principal Data Scientist, Sharing Ecosystems, *Facebook* **Oct 2015 - Dec 2020**
Led projects that investigated drivers of content sharing behavior to motivate creation of products that fulfill people's sharing needs. Specifically as related to the sharing of original, personal content.

- **2017-2020 Key Project**: Ran a 3 year effort to create ground-truth data and classifiers for understanding content types across most of the world's languages. Acquired particular experience in the labeling and normalization of multi-language data, label quality improvement via active learning, and in weak supervision methods to expand training set sizes.
- **2015-2018 Key Project**: Investigated what drives people to share less or more content on Facebook. This work drew on on graph learning, mass communication theory, causal inference and network experimentation, to quantify how audience size, perception biases, novelty effects and competition contribute to a person's decision to share content. Such as how the friendship paradox shapes a person's sharing rates due to perceiving their friends receiving more feedback than they actually do.

Chief Data Scientist, *DueDil* **March 2012 - October 2015**
I built the company's data science capabilities from scratch. Helping it become one of the top Financial Startups in Europe, and growing the company to over 100 employees and clients to over a million businesses in the process. I managed two applied research teams of around 8 physics and computer science PhD grads, and data engineers.

- Led an ML team conducted applied research to create novel datasets, e.g. matching company networks to bank transaction networks using node embeddings.
- Led an analytics team that used causal inference and controlled experimentation techniques to analyze product performance and predict user preferences.
- Published highly influential research on migrant entrepreneurs that went viral across the UK media, and was cited by the PM's office in political debates.

Researcher, *Oxford Internet Institute* **Oct 2011 - Dec 2013**
Analyzed networks of wikipedia editors to answer whether the content discussing different cultural groups was produced by and representative of them, or by people not representing that culture. Work involved a combination of network science, applied ML and geo-mapping. Such as utilizing personalized page rank for entity disambiguation and community detection to infer editor locations and ethnicities.

PUBLICATIONS

Medhat, Ahmed, and Shankar Iyer. "The Friendship Paradox and Social Network Participation." arXiv preprint arXiv:2211.05288 (2022). *Under Review at TheWebConf 2023*

Iyer, Shankar, Brian Karrer, Daniel Citron, Farshad Kooti, Paige Maas, Zeyu Wang, Eugenia Giraudy, **Ahmed Medhat**, P. Alex Dow, and Alex Pompe. "Large-Scale Measurement of Aggregate Human Colocation Patterns for Epidemiological Modeling." medRxiv (2022). *In final revisions for the Epidemics Journal*

Graham, Mark, Bernie Hogan, Ralph Straumann, and **Ahmed Medhat**. "Uneven geographies of user-generated information: Patterns of increasing informational poverty." Annals of the Association of American Geographers 104, no. 4 (2014): 746-764.

Medhat, A. "A Network Modelling Approach to Ranking Collaboration in Large Scale Online Environments" (2012). Workshop on Information in Networks. New York, NY.

PRESS COVERAGE

Fortune, "Data scientists are using the most annoying feature on your phones to save lives in Ukraine", 2022.

Facebook Research Blog, "Making our displacement maps more representative ", 2021.

Financial Times, Independent, Telegraph, Huffington Post, BBC + 10s of news mentions on Contribution of Migrant Entrepreneurs to the UK Economy, March 2014

Guardian and Huffington Post on Wikipedia Language Maps, November 2011

OTHER EXPERIENCE

Angel Investor & Venture Partner, *Ada Ventures* **May 2015 - Present**
I've done over 15 start-up investments and advisory engagements. Many of the founders I've supported built successful companies with 100s of employees. Through this I formed an understanding of how computational research can drive the invention of new technologies that can transform healthcare, finance, the climate and beyond.

SKILLS

Languages: Fluent in Spark, R, Python, C, C++, Java, SQL/Hive
Frameworks: Fluent in PyTorch, TensorFlow, Hadoop/MapReduce