Ahmed Medhat
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RESEARCH INTERESTS

Graph Learning, Distributed Graph Processing Systems, Computational Social Science, Network Medicine, Network Neuroscience, Weak Supervision.

RESEARCH EXPERIENCE

Senior Research Scientist, Network Science, *Meta*　　　　**Dec 2021 - Present**
- Designed a bulk synchronous parallel based implementation of graph convolutional networks that scales to 10s of billions of edges.
- Built models to improve conversational health using whole graph embeddings.
- **Publication**: Studied how the friendship paradox impacts posting on social networks using network simulations.
- **Working papers**:
  - *Using Graph Fourier Transforms for detecting emergence and dissolution of trends in social networks.*
  - *Computing multi-layer centrality using overlapping community detection.*

Senior Research Scientist, Data for Social Good, *Facebook* **Dec 2020 - Dec 2021**
- 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 creation motivations on Facebook.
  - Designed a taxonomy of content creation motivations and secured funding of $20M+ to a build a group for labeling content with that taxonomy.
  - Hired, trained and managed 600+ labelers, working across 3 continents and labeling content across 15 different languages.
  - Designed methods to adequately anonymize and obfuscate private data.
  - Worked with ML engineers to internationalize our models across 200+ languages by employing a translate-train learning model.
- **2015-2018 key project**: Investigated what drives people to share less or more content on Facebook. This work drew on on graph learning, 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.
- **Other research projects**:
  - Built a model for predicting how the network structure of a community shapes its vulnerability to the spread of misinformation.
  - Created algorithms for performing network experiments by globally partitioning social networks to optimize for concentrated network effects.
  - Skilled in end-to-end causal inference techniques, including difference-of-differences, regression discontinuity and meta-experiment analysis.

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 conducting 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. Utilized page rank for entity disambiguation, and the louvain method and pointwise mutual information 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).

Shankar Iyer, Brian Karrer, Daniel T. Citron, Farshad Kooti, Paige Maas, Zeyu Wang, Eugenia Giraudy, **Ahmed Medhat**. "Large-scale measurement of aggregate human colocation patterns for epidemiological modeling". Epidemics, page 100663, 2023.

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.

EDUCATION

American University in Cairo, Cairo, Egypt
Bachelor of Science, Electronics Engineering   **Jun 2009**
GPA: 3.802 (Highest Honors)

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 machine learning research can drive the invention of new technologies that will 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