Hussein Mahfouz

SENIOR ASSOCIATE - URBAN ANALYTICS

Cairo, Egypt

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Education

University College London
London, UK

MSc (DISTINCTION) IN SMART CITIES AND URBAN ANALYTICS
Sep. 2019 - Aug. 2020

- Studied quantitative geography, network analysis, statistics and urban systems theory.
- Dissertation: Prioritizing Road Segments for Investment in Segregated Cycling Infrastructure - A Methodological Framework [github link].
- Received the RGS-IBG GIScience Dissertation Prize [link].
- Selected Projects:
    - Solving the Dead Mileage Problem for the Bus Fleet of the Cairo Transport Authority (CTA) using Linear Optimization [link]
    - Transport Accessibility Analysis in Greater Cairo - The role of informal transport [link]
    - Transport profiles in England and Wales (Cluster Analysis, Classification, and Web Vizualization) [link]

The American University in Cairo
Cairo, Egypt

BSc (HIGH HONORS) IN CONSTRUCTION ENGINEERING
Sep. 2011 - Jun. 2016

- Focused on Structural Engineering and Construction Project Management.

Work Experience

Transport for Cairo
Cairo, Egypt

SENIOR RESEARCH ASSOCIATE
Jan. '22 - Now

- Technical Lead for a project funded by the New Urban Mobility Alliance (NUMO) *Using New Urban Mobility Data in Accessibility Analysis*.
    - Studied the impact of Micromobility on Accessibility to opportunities, focusing on travel time improvements, micromobility supply constraints, and equity of access to opportunities
    - Responsible for literature review, methodology, data analysis, and project management
    - Data analysis scripts: augmenting OSM PBF files with realistic speeds from UBER/Mapbox data; Travel time matrix for different mode combinations (including micromobility) using r5r (calculated by running code in a docker image on a Digital Ocean droplet); cumulative accessibility calculations; equity of spatial distribution of accessibility

Cairo, Egypt

RESEARCH ASSOCIATE
Sep. '18 - Aug. '19 / Sep. '20 - Dec. '20

- Worked on the World Bank funded *Greater Cairo Region Mobility Assessment and Public Transport Improvement Study (MAPTIS)*.
    - Drafted a sampling strategy for primary data collection
    - Cleaned, validated, and prepared datasets for input into a four-step model
    - Data analysis scripts: travel time estimations (from GPS data) and GTFS feed creation; employment accessibility analysis; road segment passenger flow analysis; spatiotemporal boarding and alighting patterns
- Worked on the *Ghana Urban Mobility and Accessibility Project (GUMAP)* component on *Short term technical assistance for the completion of databases and maps of public transport routes and passenger flows in GAMA*.
    - Managed the field research operation
    - Conducted knowledge transfer workshops on data collection and analysis for the local departments of transport
    - Analysed the public transport network of Greater Accra, and co-authored project reports
- Worked on creating a spatial model of employment of Casablanca, Morocco for the World Bank
    - Proposed and implemented a methodology to create spatially disaggregated employment datasets in a data-poor context, accounting for informal employment
    - Documented the process in reproducible markdown files with embedded code
- Worked on the World Bank funded study: *Multimodal Transport Strategy for the Greater Cairo Region*.
    - In charge of fieldwork for mapping entire formal and informal public transport networks of the Greater Cairo Region
    - Developed a methodology to quantify and compare the impact of proposed bus corridors on regional accessibility
- Research and Development.
    - Developing and maintaining software to convert transit GIS data from primary data collection to GTFS feeds that are used for trip planning and analysis tasks (feeds contain both formal and informal modes of public transport)
    - Modelling road segment-level travel speeds for different travel modes using gps trackpoints from primary data collection exercises
    - Creating spatially disaggregated models of employment for cities without such data

Access to Knowledge for Development Center
Cairo, Egypt

RESEARCH ASSISTANT
Mar. '18 - Sep. '18

- Worked on gaining insights into transportation sector through data-driven research
- Carried out research on informal transportation on Cairo's Ring Road. The research focused on how informal transportation fills demand gaps, and the role of unofficial access points in accessibility to transport
- Carried out research on the impact of ride-sharing applications on the livelihoods and safety of women in Egypt

UN-Habitat
Intern

Cairo, Egypt

Jul. '16 - Dec. '16

- Worked on the mobility program which supported the government in shifting towards an integrated transportation system. Proposed solutions included a BRT system, bike infrastructure and improved passenger information
- Worked on a land readjustment project which provided inclusive solutions to the issue of urban sprawl on agricultural land

Technical Skills

Programming Languages (selected packages): R (tidyverse, data.table, sf, terra, sfnetworks, dodgr, r5r, gtfsrouter, ggplot, tmap), Python (pandas, numpy, scipy, scikit-learn, geopandas, networkx, osmnx), SQL

Markup Languages: CSS, HTML, LaTeX, RMarkdown

Spatial Analysis and Cartography: R, QGIS

Databases: PostgreSQL/PostGIS, MySQL, dbplyr

Version Control: Git

Transport Related Data Standards: GTFS, GBFS

Publications

A Road Segment Prioritization Approach for Cycling Infrastructure

Preprint

ARXIV

04, 2021

- **Mahfouz, H.**, Arcaute, E., Lovelace, R. (2021). "A Road Segment Prioritization Approach for Cycling Infrastructure. arXiv. *https://arxiv.org/abs/2105.03712*"

Multimodal network planning, identification of high capacity bus corridor and park and ride facilities in the Greater Cairo Region

Report

WORLD BANK REPORT

08, 2019

- Hegazy, M., Kalila, A., **Mahfouz, H.** (2019). "Multimodal Network Planning, Identification of High Capacity Bus Corridor and Park and Ride Facilities." World Bank Group.

Awards

2021	**rstudio::global 2021 Diversity Scholarship** - *RStudio* RStudio is a company that develops free an open source tools for the R programming language. Each years they provide a number of scholarships where recipients attend workshops held by their lead developers.
2020	**RGS-IBG GIScience Dissertation Award** - *Royal Geographic Society* The Royal Geographical Society (with the Institute of British Geographers) - RGS-IBG - GIScience Research Group is a group of academics and practitioners working on Geographic Data Science. Each year they award a prize for the best postgraduate dissertation in geographic information science in the UK and Ireland.
2019	**Chevening Scholarship** - *UK Foreign & Commonwealth Office* Chevening Scholarships are the UK government's global scholarship programme. Scholarships are awarded to outstanding candidates to do postgraduate degrees in the UK.

Languages

Arabic: Native.

English: Proficient User.

French: Basic User.