Khalil Al Handawi, PhD

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Morgan Stanley, Montréal, Québec, Canada
Re: Python Developer - Infrastructure Observability Engineering
Job Number: 3224568

Dear hiring manager,

I would like to express my enthusiasm and excitement for the opportunity develop software solutions for Morgan Stanley. I come from a mechanical engineering background, but I have worked with computational and statistical models for the better part of my career (2017 - present). As a result, I have the sufficient depth of knowledge to understand software development cycles and practices as can be seen in the various software packages that I have authored as part of my academic career.

I am currently a post-doctoral research at the department of computer science and operations research (DIRO) at the Université de Montréal working under the supervision of Prof. Fabian Bastin, where I am recieving valuable training on computation, simulation, and optimization as part of an industrial project with the international air transport association (IATA). My current research focuses on developing a SQL database for archival and retrieval of flight records over the past decade. The database is intended to provide a data pipeline so that we may draw insights data about the past and current state of the civil aviation network. As part of this experience I have managed to understand database design, mySQL, and various data visualization and processing tools in R and Python.

I have also authored several Python libraries to facilitate complex engineering design analyses that are common in the industry. For example, engineers wish to understand the sensitivity of their designs with respect to certain decisions and client requirements. This results in changes that propagate through the various systems of the product (e.g., a change in an aircraft's wing could propagate to the fueselage design). I authored a Python library that performs said sensitivity and change propagation analysis on an engineering system (defined by the user) and returns various results and visualizations to convey the sensitivity results https://sed-group.github.io/mvmlib/index.html. Furthermore, I have deployed such modes as flask applications to provide a simpler graphical interface https://github.com/khbalhandawi/scale_AM_webapp

I also worked on public health projects during my postdoctoral studies and developed an epidemiological simulation application for predicting the trajectory of the pandemic. The simulation was interactive and employed a Qt user interface for providing a dashboard that the user can interact with during the simulation in realtime. This was a C++ library but laid out the foundations of object-oriented programming for me. I have also used parallel computation as part of this project (I used CUDA to accelerate linear algebra operations). I also have experience with a number of machine learning frameworks such as PyTorch and automatic differentiation which could prove useful for building statistical models where training data is abundant (e.g., the telemetry data steam that I may be working with at Enterprise Technology & Services (ETS)). I have also deployed said machine learning models (for COVID-19 forecasting) as flask applications to allow users to infer the pandemic growth rate and make predictions https://covid-forecaster-lebanon.herokuapp.com/.

Altough, I have worked on software projects for research purposes, this experience has taught me how to collaborate on such projects (through git, etc.) and I learned a lot of sound coding practices. I believe that my strong mathematical and simulation skills, experience in software development, and research skills could

add a lot of value to the ETS team. I feel that what I may lack in direct industrial experience, I can more than make up for through my research skills and ability to create novel solutions, while leveraging my engineering background to solve complex problems. I hope you enjoy going through my profile and my projects on my website and I hope we get a chance to discuss my skillset (https://khbalhandawi.github.io/projects/).

Yours sincerely,

Khalil Al Handawi