ARIEL LUBONJA

Interested in Software & ML Engineering Positions

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PROJECTS

Hierarchical Time Series

09/2023 - Present

- Potential Startup idea to improve Drug demand prediction
- Mix of Graph Signal Processing and LLMs.
- Details Redacted

Drugs Discovery through Graph and LLM Embedding

03/2023 - 07/2023
https://huggingface.co/datasets/Ariel4/related-drugs-network

- Reconciling Time Series predictions to drug similarity
- Created graph from Drugs.com
- node2vec, BioGPT, ChatGPT, BioBERT Drug Embeddings for similarity comparison and Demand Prediction

GPT4All for CSV Parsing & CSV Unstructured Data

05/2023 - 07/2023
https://github.com/ariellubonja/gpt4all-csv

- Extend LLM to answer questions on any CSV documents
- Parses all your Unstructured Data
- Langchain to create an Embeddings "Database" of the CSVs
- Use GPT4All, quantized to 4 bit and run locally on my MacBook!

Dall-E AI Image Generation Extension for Google Docs, Sheets, Slides

07/2022 - 08/2022
https://workspace.google.com/marketplace/app/ai_generated_images_dalle/867097413141?hl=en&pann=docs_addon_widget

- Serve Dall-E generated images to Google Docs, Sheets and Slides
- >5000 downloads, 4-star average rating

NLP - Chatbot for the University of Southern California (USC) - Alice in Wonderland

05/2019 - 07/2020 University of Southern California
https://alice.wonderland.usc.edu/chat/alice-endpoint.html

- Kaldi, Rasa, Mycroft, picovoice, CMU pronouncing dictionary
- Added Skill to Mycroft.ai chatbot
- Fine-tuned Google BERT on Q&A pairs about character entities
- Implemented Google Dialogflow API
- Used Mycroft as a Speech-to-Text engine
- Was Full-Stack Developer of this project + Client-side Deployment

Graph Encoder Embedding Scaleup & Parallelization

01/2022 - 05/2022
https://github.com/ariellubonja/GraphEmd

- Applied Ligra framework and frontier-based graph execution to parallelize this Node Embedding algorithm
- 289x speedup for Python version and 1400x for Ligra-C version
- Workshop presentation upcoming

WORK EXPERIENCE

Full Stack Developer - Python/Django, JavaEE, Angular

jBoxers

11/2018 - 08/2021 Sofia, Bulgaria

jBoxers is a company that offers software solutions in the fields of AI, Microservices, DevOps and Cloud

- Chatbot for the University of Southern California using Mycroft as a Speech-to-Text and Google Dialogflow as language models (see Projects). Flask API
- Developed the Desktop app for Alice. By using Electron, I cut down the app development time to 3 weeks instead of multiple months
- JavaEE WebSockets for non-REST chatting
- AWS & Google Cloud deployment + CI/CD, Docker, Vagrant, Datalku
- Other Duties: Use Case discussion and design with Library of Congress (LoC) project owner
- Developed enterprise solutions for LoC Virtual Card Catalog and Braille
- Supervised 2 summer interns

Junior Developer - JavaEE, Angular, Python/Django, SQL

05/2017 - 11/2018

- Ongoing project for LoC, using Angular for front-end and JavaEE/Spring for backend
- Developed tests using Sonar, JUnit, Selenium and Protractor

ACHIEVEMENTS

Fellowship to Johns Hopkins University

1/14 students funded by the Government of Albania, in their Excellence Scholarship, for students admitted to top-15 universities

Full Scholarship to American University in Bulgaria (Bachelor of Arts)

1/11 students awarded by the America-Albania Development Fund

334/340 in the GRE exam

93rd percentile in Quantitative (168/170)
97th percentile in Verbal Comp. (166/170)

PROJECTS

Parallel and GPU Implementation of Orthogonal Matching Pursuit

01/2021 - 05/2021
https://github.com/ariellubonja/omp-parallel-gpu-python

- Orthogonal Matching Pursuit, implemented using BLAS (cpu) and PyTorch GPU
- Our implementations vastly outperform those in Scikit-Learn, with the PyTorch version on GPU being over 100 times faster.
- Colab Demo
- Paper link

EDUCATION

Doctor of Philosophy, Computer Science

Johns Hopkins University

05/2022 - 08/2023

GPA
3.9 / 4.0

- Graph Learning & Embedding - Graph Neural Networks, node embedding (node2vec and Graph Encoder Embedding), Graph Attention, Community Detection. Extensive work on scaling these algorithms
- Johns Hopkins Turbulence Database - importing new datasets (NCAR) and distributing them across parallel filesystem
- Computer Vision: Transformers, dictionaries & filters, Convolutions & CNNs, segmentation, Edge & boundary detection, sparsity
- Presentations and Public Speaking

Master of Science in Engineering - Data Science

Johns Hopkins University

01/2021 - 05/2022 Baltimore, Maryland, USA

GPA
3.7 / 4.0

- Parallel Programming: TensorFlow, PyTorch, JAX, Spark, Dask, Ray, OpenMP, GPUs
- Machine Learning & Deep Learning: Regression, CNNs, Decision Trees, Random Forests, SVMs, RNN, LSTM, Transformers, Markov Models
- Algorithms & Data Structures
- Mathematical Statistics - Model fitting, estimators, bias-variance tradeoff
- Optimization - (Stochastic) Gradient Descent, grid search, Newton's Method, BFGS, Trust Region Methods, convex, (non-)smooth opti.
- Signal Processing and Graph Signal Processing

SKILLS

Python **PyTorch**
Sequence Models **Transformers**
Mycroft **Scikit-learn** **C++**
OpenMP **SQL** **AI/ML**
Graph Neural Networks
Convolutional Neural Networks
XGBoost **Linear/Logistic Regression**
Google Apps Script **AWS**
Google Dialogflow **Docker**