Arya Kumar

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Education

University of Michigan - College of Engineering Ann Arbor, Michigan
BSE in Computer Science, Minor in Mathematics. GPA: 3.98; Dean's List, Angell Scholar *Expected May 2023*
Courses: Web Systems, Software Engineering, Data Structures and Algorithms, Real Analysis, Theoretical Statistics.
Upcoming: Networking, Operating Systems, Compilers, Designing a Search Engine, Bayesian Analysis.

Experience

- **Akuna Capital** Chicago, IL
  Quantitative Development Intern *May 2021 - Aug 2021*
  - **Post Trade Analysis**: Rewrote ~2000 lines of post trade analysis code leveraged by all trading teams, switching from a nonstandard dependency injection to a builder pattern. Redesigned API and deployed to production.
  - **Combo Trade Resolver**: Designing and creating a python service that consumes exchange combo trade definitions, and resolves them in a centralized TimescaleDB database for post trade analysis. Service will run in production cluster, reducing memory footprint of a key service for an estimated savings of $30,000/yr.
  - **Profit & Loss Analysis**: Enriching firm-wide post-trade profit and loss analysis with new algorithms, and increased fidelity. Analyzing D1 trading and options hedges with Jupyter Notebooks and Datagrip, and writing production code in Python. Thoroughly documenting analysis for further investigation by other teams.
- **BAE Systems – FAST Research Laboratory** Burlington, MA
  Software Engineering Intern *Jun 2019 - Aug 2019*
  - **IR-based heart rate detection**: Spearheaded a research project evaluating efficacy of IR imagery for determining heart rate of individuals from longer distances. Demonstrated feasibility of research approach as a robust real world solution to internal leadership, earning $100,000 in internal funding to continue development.
  - **Aerial Imagery Classification**: Developed a tool in Matlab to detect and classify points of interest in aerial imagery, aggregating Deep Neural Network, Bayesian, and FFT based models. Through careful profiling, improved accuracy of FFT-based computer vision algorithm by ~90%, while decreasing run time by 600%.
- **Siemplify** Tel Aviv, Israel
  Machine Learning Intern *Jan 2018 - Jun 2019*
  - **Data Ingesting**: Engineered machine learning pipelines to ingest log data from various cybersecurity platforms, and improve DDoS, phishing, and malware threat analysis using Jupyter notebooks with Keras and Pandas.
  - **Extensions**: Released pipelines as three extensions on Siemplify's official plugin marketplace. These extensions (~700 LOC each) are actively developed, and are used in security systems of multiple Fortune 500 companies.

Projects

- **Rust-Clippy – Open Source Contributor**: Devised, tested, and integrated a new performance lint to parse mid-level compiler representation and detect for non-short-circuiting boolean logic for Rust-Clippy, a Rust Foundation managed compiler tool. Clippy statically analyzes rust programs to catch common mistakes, and has ~500k downloads.
- **PennApps XX**: *3rd place of ~300, Best Open Source Contribution, and Hackers Choice Award.* Collaborated in team of 3 to create ImpromPPTX, a tool to automatically generate presentation slides in real time based on words spoken into a clicker. Built with Django and HTML/CSS, with NLP models leveraging FastText, Pytorch, and SpaCy libraries.
- **VTHacks 2019**: *1st place of ~200, and Category Awards.* Crafted Electromotivated, a website to automatically parse and analyze hand drawn circuits to help students and teachers transcribe and share physics problems. Designed full stack with Django and HTML/CSS, with classical CV models utilizing OpenCV, and deep CNNs written with scikit-learn.

Publications

- **(Upcoming) Judging a book by its cover: predicting marginal impact of titles on Reddit post popularity**: Proposes a novel Attention+CNN based model to assess community-level factors in post popularity with a focus on model interpretability. Currently under editorial review at ICWSM. *E. Weissburg, A. Kumar, P. Dhillon*
- **Standoff Heart Rate Estimation from Video**: Published April 2020 at SPIE Defense + Commercial Sensing conference. Analysed the use of signal processing based methods for remote heart rate detection. *Y. Deng, A. Kumar*

Activities

- **Atlas Consulting**: As Director of Professional Development, lead 50 members through technical & professional prep.
- **UMich Ballroom Dance Team**: Placed first in 10 national events in 8 different styles of Latin and standard dance.

Programming Skills

Languages: Python, C++, Rust, Javascript, SQL **Technologies**: Pytorch, AWS, SwiftUI, Docker, FastAPI, React