Arya Kumar

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Education

University of Michigan - College of Engineering Ann Arbor, Michigan
BSE in Computer Science, Minor in Mathematics. Cumulative GPA: 3.98; Dean's List, Angell Scholar *Expected May 2023*
Courses: Operating Systems, Compilers, Software Engineering, Data Structures, Real Analysis, Theoretical Statistics
Upcoming: Distributed Systems, Bayesian Analysis, Modern Algebra

Experience

- **Jane Street** New York City, NY
  Software Engineering Intern *Current: May 2022 - Aug 2022*
- **Stripe** Seattle, WA
  Software Engineering Intern *Jan 2022 - Apr 2022*
  - **Workflow Engine**: Developed a next-generation orchestration platform to write reliable fault-tolerant workflows, powering products such as Capital, Billing, Tax Reporting, and 10+ other product teams.
  - **Ruby Feature Parity**: Supported all ruby customers with features on the team road map. Built the ability to schedule processes from within another process (Child Workflows), and redesigned un-erganomic interfaces for safely communicating with running processes. Rolled out features to all running workflow executions (~500k/day)
  - **Temporal-Ruby**: Contributed to *coinbase/temporal-ruby*, an open source Ruby SDK for Temporal
- **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%.

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.

Publications

- **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. Published at ICWSM 2022. *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 President, manage 50+ members overseeing 5-7 projects, each semester.
- **UMich Ballroom Dance Team**: Placed first in 10 national events in 8 different styles of Latin and standard dance.

Skills

Languages: Python, C++, OCaml, Ruby, Rust, Typescript **Other**: Pytorch, Docker, FastAPI, React, Rat Tickling