Arjun Aggarwal

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Education

University of Maryland Expected: May 2025

B.S. Computer Science (Honors) & Applied Mathematics | GPA: 3.8 *College Park, MD*

- **Honors**: Dean's List (all semesters), CS Departmental Honors Program, OMSE Academic Excellence Award (Spring 2022)
- **Relevant Courses**: Algorithms I & II, Data Structures I & II, Discrete Structures, Parallel Computing*, Database Design*, Intro to Compilers, Intro to ML, Computer Systems, Computational Methods *(* are current)*

Experience

Amazon Web Services May 2024 – Present

Software Development Engineer Intern *Seattle, WA*

- Designed a system to aggregate AWS payment events dropped in transit between services in a sub-ledger reporting system catering to **10M** monthly events, ensuring **100%** completeness in reporting and automating **multi-hour** reconciliation time.
- Leveraged **Amazon SNS-SQS** messaging to track events across each service, newly providing detailed, **real-time monitoring**.
- Persisted event statuses to a new **DynamoDB** and wrote **AWS Lambdas** for read/write operations, enhancing status visibility.
- Extracted dropped events from the DB and persisted them to an **S3 bucket**, triggering **CloudWatch** alerts upon each addition
- Configuring SNS, SQS, DynamoDB, and S3 attributes using **AWS CloudFormation** stacks (IaC), enabling quick deployment.

Bank of America June 2023 – August 2023

Software Engineering Intern *Jersey City, NJ*

- Completed 3 projects as part of a POC aiming to transition BofA batch risk testing to stream processing using **Apache Kafka**.
- Automated risk data testing with **Python** and **SQL**, replacing an older Alteryx workflow and reducing run time by roughly **85%**.
- Integrated Bitbucket API with workflow tools, reducing manual **30+ minute** data check-in time to **seconds** for **750+ analysts**.
- Designed a test info microservice using **Java** and **Spring Boot**, containerized with **Docker**, replacing inefficient legacy scripts.

Capital One January 2023 – April 2023

Machine Learning Engineering Intern *College Park, MD*

- Applied **Spark**'s optimized distributed querying to the Card transaction graph (**900M edges**), enabling faster node info retrieval.
- Utilized Spark GraphFrames and **motif queries (DSL)** for filtered node searches, leading to median **6x faster** graph querying.
- Conducted **80 cloud-based trials** with varying RAM/storage metrics to validate results; presented metrics to stakeholders.

Projects

Hermes | *Backend: Python, FastAPI, MongoDB, BERT, Pinecone, AWS EC2* | *Frontend: TypeScript, ReactJS*

- Designed a CLI tool allowing developers to message code snippets and communicate via the terminal, expediting development.
- Implemented user messaging via **FastAPI WebSockets** with **MongoDB** to store chat data; deployed API to **AWS EC2** instance.
- Stored **BERT embeddings** of messages in a **Pinecone vector database**, providing users with semantic search for chat logs.
- Built an Admin page for various CRUD operations and an onboarding flow with payment options implemented via **Stripe API**.
- Utilized **$1K** award in credits from AWS Activate to host API and website built using **React** and **TypeScript**.

Unix-like Command Line Shell in C | *C, Makefile*

- Developed a Unix-like command line shell in **C** supporting boolean operations, pipes, and file redirection.
- Implemented CLI tokenization, constructing a tree data structure for efficient parsing and execution of commands.
- Optimized the build process using a comprehensive **Makefile**, establishing clear dependency rules to expedite compilation.

YOLOv3-based Vehicle Parking Pass Detector | *Backend: Python, Flask, YOLOv3, Google OCR* | *Frontend: HTML/CSS, JavaScript*

- Achieved **96% accuracy** in detecting vehicle parking passes with custom-labeled training data via **YOLO** real-time detection.
- Integrated **Google Cloud AI** optical character recognition to detect pass identification numbers, automating record-keeping.
- Designed a real-time visualization for school administration, hosting the model in a **Flask** server and an **HTML/CSS** front-end.

Skills

Languages: Python, Java, C/C++, OCaml, JavaScript/TypeScript, SQL, HTML/CSS
Other: Git, Django, Flask, FastAPI, Linux/Unix, Apache Spark, MongoDB, Pinecone