PRANAV SUKUMAR

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EDUCATION

Columbia University GPA: 4.1

M.S. in Computer Science, Machine Learning Track (Aug 2023 – Dec 2024)

- Relevant Coursework: High Performance Machine Learning, Robot Learning, Computer Vision, Computational Imaging, Networks, Virtual Reality and Augmented Reality.

University of California, Berkeley GPA: 3.9

B.S. in Electrical Engineering and Computer Sciences (EECS), Minor in Data Science (Aug 2019 – May 2023)

- Relevant Coursework: Machine Learning, Artificial Intelligence, Operating Systems, Robotics, Databases, Algorithms, Data Structures, Graphics, Computer Architecture, Data Science, Discrete Math, Probability, Multivariable Calculus.

INDUSTRY EXPERIENCE

Amazon Robotics | Returning Software Development Engineer Intern (May 2023 – Aug 2023)

- Expanded my previous internship project by connecting augmented reality device to the PC controlling production workflow.
- Built a system that uses DynamoDB to securely send and receive data between the device and Fulfillment Center Station PCs.
- Networking system was extensible and scalable allowing it to be utilized in other projects and parts of the production workflow.

Amazon Robotics | Software Development Engineer Intern (May 2022 – Aug 2022)

- Built an Augmented Reality application for the Microsoft HoloLens 2 to replace current infrastructure in a robotic workcell.
- The augmented reality application replaced a complex network of proprietary cameras, lighting devices, and overhead canopies.
- Research project that involved structuring and defining the research problem from a one-line description, outlining goals for the project, and defining measures of success.
- Developed workcell localization, interaction detection, and a user interface in Augmented Reality using C#.
- Applied for a design patent; This project saves ~ $1 million per Amazon Delivery Center.

Apple (Siri Response Framework Team) | AI/ML Intern (Jan 2022 – April 2022)

- Authored multi-thousand-line Swift programs showcasing the complete set of new APIs for use by Apple internal developers.
- Addressed enhancements and bugs in Siri Response Framework as a part of iOS 16.0.
- Proposed different Machine Learning algorithms for Siri Modes Classification and wrote a research report justifying the changes.

Returning Software Engineer Intern | Nvidia (GPU Network Cloud Infrastructure Team) (June 2021 – Aug 2021)

- Developed secure end-to-end automation of Windows KMS Volume Activation for NVIDIA GeForce Now machines.
- Used Terraform and Python to automate the creation of AWS EC2 instances, VPCs, Subnets, and Security Groups.
- Developed a Jenkins Pipeline to build, deploy, and test the Windows KMS Volume Activation automation.

Nvidia (GPU Network Cloud Infrastructure Team) | Software Engineer Intern (May 2020 – Aug 2020)

- Improved monitoring capabilities for cloud services by writing Golang programs to expose CPU performance and event metrics.
- Scraped exposed metrics for Prometheus to build visual Grafana dashboards for the NVIDIA GPU Network platform.
- Tested and deployed code on Docker containers running under Kubernetes on virtual machines in a Linux environment.

Expedia (Search and Suggest Team) | Software Development Intern (Jun 2018 – Aug 2018)

- Worked on both front-end and back-end capabilities to improve Expedia's homepage search experience.
- Developed inline categorization of the types of search results, a heuristic-based location estimator to tailor search results, and a customer feedback tool to receive feedback regarding the quality of search results.
- About 700,000 customers per week interact with the features I built.

Project Manager | Data Science Society at Berkeley (Sep 2019 – Present)

- Led consulting team that built NLP models for *Fansure* to detect NBA & MLB teams referenced in articles.
- Analyzed past marketing campaigns and built ML models to predict the effectiveness of future campaigns for *Monday.com*.
- Used unsupervised learning and EDA for *Paypal* to analyze their internal company rewards system.
- Developed a chatbot for Oust Labs: Optimized NLP algorithms in a Chatbot integrated with Dialogflow, Rasa X, and GCP.

RESEARCH EXPERIENCE

Columbia University Computer Graphics and User Interfaces Lab | Graduate Researcher (Aug 2023 – Present)

- Developed a VR application for infant lumbar puncture training that provides procedure visualizations and feedback for trainees.
- First author of paper published in 31st IEEE Conference on Virtual Reality and 3D User Interfaces Conference.

UC Berkeley Game Theory (GamesCrafters) Lab | Undergraduate Researcher (Aug 2022 – May 2023)

- Working on a project that combines augmented reality and game theory to aid in optimal play of a physical board game.
- Implemented board game detection, built localization of the board game, and trained a neural network to detect game pieces.

UC Berkeley Algorithms and Computing for Education (ACE) | Lab Undergraduate Researcher (Aug 2021 – Aug 2022)

- Designed and implemented algorithms for cheating detection and computer-based testing.
- Presented a poster of my research at the 53rd ACM Technical Symposium on Computer Science Education (SIGCSE) conference.

University of Washington Personal Robotics Lab | Undergraduate Researcher (May 2020 – Dec 2020)

- Worked with the Assistive Dexterous Arm robot that performs assisted feeding for people with upper-extremity impairments.
- Wrote a Hidden Markov Model (HMM) to predict when a person needs to be fed by the robotic arm.
- Used computer vision algorithms to extract features for the HMM including body pose and facial expressions.

PATENTS & PUBLICATIONS

31st IEEE Conference on Virtual Reality and 3D User Interfaces Conference (Mar 2023)

- Visual Guidance for Infant Lumbar Puncture Training in XR research demo presented at conference and extended abstract published in conference proceedings.

Design Patent Pending | Amazon.com (Amazon Robotics) (Aug 2022)

- Applied for a design patent through Amazon Robotics for my summer internship project (described in "Industry Experience").
- Patent application made it through the first round of reviews at Amazon.com.

53rd ACM Technical Symposium on Computer Science Education (SIGCSE) Conference (Mar 2022)

- Improved Testing of PrairieLearn Question Generators abstract and poster published on ACM Digital Library.

TEACHING EXPERIENCE

TA for Database Systems (COMS 4111) | Columbia CS Department (Aug 2023 – Dec 2023)

- Debug student code in office hours for project implementing a database application with a web front-end.
- Created and maintained the class PostgreSQL server running in a cloud VM.

TA for Database Systems (CS 186) | UC Berkeley EECS Department (Aug 2022 – Present)

- Teach weekly sections, explaining database management system theory and algorithms from class including B+ Trees, Buffer Management, Query Optimization, Recovery, Parallel Query Processing, Distributed Transactions, and Distributed Systems.
- Debug student code in office hours for Java Project implementing a Database Management System with a B+ tree index, System R query optimizer, concurrency, and an ARIES recovery manager.
- Edit course notes and textbook by adding new content presented in lecture and example problems with solutions.

Reader for Computer Security (CS 161) | UC Berkeley EECS Department (Jan 2022 – May 2022)

- Course topics include: Memory Safety Vulnerabilities, Cryptography, Block Ciphers, Hashes, MACs, Certificates, CSRF, SQL Injection, Networking, DNSSEC, Firewalls, Blockchain.
- Reviewed student design documents for a project building an End-to-End Encrypted File Sharing System in Golang.
- Wrote and graded exam and homework questions.

Academic Intern for Data Structures (CS 61B) | UC Berkeley Department of EECS (Aug 2021 – Dec 2021)

- Taught small sections of five students, reinforcing data structures and algorithms concepts like Object Oriented Programming, Runtime Analysis, Hashing, Trees, Shortest Path, Graph Traversal, Heaps, and Sorts.
- Helped students debug Java projects and homework in labs.

PROGRAMMING PROJECTS OUTSIDE COURSEWORK, RESEARCH, AND INTERNSHIPS

- Mater: An autonomous RC car that explores an unknown environment and performs pick and place tasks with a custom gripper.
- Edify: A Web App for instructors to upload a Zoom video recording and receive an email report of 4 student metrics: attention, emotion, topics of discussion, and common questions. Uses OpenCV, LDA, and IBM Watson to perform analysis.
- Signify: A Voice to ASL (American Sign Language) Translation App that enables enhanced live-lecture for members of the ASL-speaking community by intelligently converting a professor's speech to a sequence of ASL videos for the user to watch.
- RecipieBot: A chat-bot on compatible with Google Assistant that recommends recipes based upon spare ingredients a user inputs. The bot has been trained on more than 1000 ingredients.
- GradeScoper: A chrome extension that scrapes Gradescope for assignment deadlines and adds them to Google Calendar.

AWARDS AND HONORS

- Eta Kappa Nu (HKN) Honor Society: Top 1/3 of senior-standing EECS students. Plan career fairs and company tech talks as a member of the Industry Relations committee.
- Honors to Date distinction for overall GPA in the top 20 percent of the College of Engineering; Dean's Honors List.
- Hack'20 Hosted by DubHacks (2020): Received the Google Cloud COVID-19 Hackathon Fund award for the project Edify.
- Cal Hacks 6.0 Sponsor Award Winner - Best Use of the Weights and Biases API (2019): Won the award, in a competition of 2000 students, for building an ensemble model of existing text-to-speech options for project Signify.
- U.S. Presidential Scholars Semifinalist (2019): One of 620 out of ~3.6M high school seniors selected by the White House Commission on Presidential Scholars and the US Dept. of Education based on academics and perfect standardized test scores.
- Georgia Tech Gold Scholarship (2019): The Georgia Tech Gold Scholarship is offered annually to the top 0.5% percent of high school seniors from across the United States who apply to Georgia Tech.

PROGRAMMING LANGUAGES: Python, C, Java, Go, C#, Swift, JavaScript, HTML/CSS, SQL

TOOLS, TECHNOLOGIES, AND LIBRARIES: Git, Docker, Kubernetes, Terraform, Packer, Jenkins, NumPy, Pandas, PyTorch