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Colby Duke

Engineering @ Applied Intuition
https://colby.codes

Education

Georgia Institute of Technology – Atlanta, GA *August 2019 – May 2023*
Bachelor of Science in Computer Science, GPA 3.92 Faculty Honors, Dean's List, Zell Miller Scholar

Work Experience

Software Engineer **Applied Intuition** *June 2023 – Present*

- Developing Basis, Applied's cloud-based autonomous vehicle and ADAS verification & validation platform.

Software Engineer Intern **Snap Inc.** *May – August 2022*

- Researched in Snap's R&D division, SnapLab, on Spectacles - Snap's next generation wearable smartglasses.
- Improved computer vision models for hand tracking and pose estimation using Spectacles' camera system.
- Generated over three million frames of fully synthetic training data which reduced CV model error by 20%.
- Built and deployed load distributed Kubernetes machine learning pipelines for CV training and validation.

Software Engineer Intern **Uber** *May – August 2021*

- Worked on algorithmically modelling order costs (Core Pricing team) for Uber Eats' 80 million monthly users.
- Developed a pricing microservice which calculates delivery fees based on restaurant and customer location.
- Coded the back-end for the service with Go, Python, Hive, and Docstore (Uber's distributed SQL database).

Software Engineer Intern **The Home Depot** *January – May 2021*

- Designed and programmed an ARKit-based iOS app to scan 3D models of customers' furniture with LiDAR.
- Enabled the app to generate and save high fidelity meshes from the scans with ~2cm-wide polygon faces.
- Merged the meshes with AR to create real-time virtual visualizations of the customers' furniture and rooms.

Software Engineer Intern **JANUS Research Group** *June – August 2020*

- Constructed a line of computer vision sensors to monitor meters on water pumps at local farms.
- Integrated the sensors into the Google Cloud Platform, connected via LoRaWAN and cellular data.
- Created a monitoring UI with Django, InfluxDB, and Grafana for the Georgia counties managing the sensors.

University Projects & Organizations

CopyCat – Computer Vision and HCI research project which utilizes pose-estimators paired with Hidden Markov Models to translate American Sign Language (ASL) signs to aid deaf children learning ASL.

PopSign – Primary project manager of PopSign, a published iOS and Android mobile game which teaches adults ASL on their phones. PopSign is backed by Google's Accessibility Research Team and was presented at Google I/O 2023. Visit PopSign.org for links to the app store pages and recent news about the project.

GT CS Careers Club – Founder and President of the Georgia Tech Computer Science Careers Club, a registered student organization and online community of over 2,400 GT CS students. The club offers mentorship, resume workshops, mock interviews, technical interview prep, and other career-related services.

Awards

1st Place Paper – ACM CHI Conference 2021, Undergraduate Student Research Competition – May 2021.
Best Overall Presentation – Georgia Tech CoC, Undergraduate Research Symposium – April 2021.

Skills

Languages – *Python, Java, Go, C++, C, C#, Swift, Bash, x86 Assembly*
Technologies – *TensorFlow, OpenCV, MediaPipe, SQL, Hive, InfluxDB, React, Docker, Kubernetes, Terraform*
Concepts – *Machine Learning, Computer Vision, Pose Estimation, Microservice Architecture, Distributed Systems, Scalable Containerization, Cloud Computing, Human Computer Interaction, Augmented Reality, Git*

Software Engineer Intern JANUS Research Group *June – August 2019*

- Worked on a pair of night vision binoculars which were purchased and militarized by the U.S. Army.
- Developed the drivers necessary to integrate IR cameras into a Variscite IMX6 board.
- Utilized Yocto to create a custom Linux-based OS for the board so it could load the camera drivers.

Data Science Intern JANUS Research Group *June – August 2020*

- Constructed a line of computer vision sensors to monitor meters on water pumps at local farms.
- Integrated the sensors into the Google Cloud Platform, connected via LoRaWAN and cellular data.
- Created a monitoring UI with Django, InfluxDB, and Grafana for the Georgia counties managing the sensors.

Software Engineer Intern JANUS Research Group *June – August 2019*

- Worked on a pair of night vision binoculars which were purchased and militarized by the U.S. Army.
- Developed the drivers necessary to integrate IR cameras into a Variscite IMX6 board.
- Utilized Yocto to create a custom Linux-based OS for the board so it could load the camera drivers.

Software Engineer Intern The Home Depot *January – May 2021*

- Designed and programmed ARKit-based iOS apps to scan 3D models of customers' furniture with LiDAR.
- Generated high fidelity mesh scans with ~2cm-wide polygon faces utilizing said apps.
- Merged the models with AR to create virtual visualizations of the customers' furniture and rooms.
- Programmed the back-end functionality for future teams to implement these features into THD's mobile app.

- Current stack includes Python (SQLAlchemy, GraphQL, Postgres), React, Kubernetes, and Terraform.

Publications

D Bansal, P Ravi, M So, P Agrawal, I Chadha, G Murugappan, and C Duke.
2021. CopyCat: Using Sign Language Recognition to Help Deaf Children Acquire Language Skills. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems* (*CHI EA '21*). ACM, Article 481, 1–10. https://doi.org/10.1145/3411763.3451523

RoboJackets – Programmer for my team's collegiate-level 3 lb. Battle Bot, Varsiti. Awards and placements will go here after we actually attend some competitions later this year.

Penny.ds – Python-based Discord bot which utilizes Natural Language Processing to translate English sentences into Bash commands. Integrated with a wide variety of public API's to pull various data from webservers.

GT CS Careers Club – Founder and President of the Georgia Tech Computer Science Careers Club, a registered student organization and online community of over 1,200 GT CS students. The club offers mentorship, resume workshops, mock interviews, technical interview prep, and other career-related services.

CopyCat – Computer Vision and HCI research project which utilizes various pose-estimators (such as MediaPipe, Kinect, and AlphaPose) paired with Hidden Markov Models to translate American Sign Language (ASL) signs to aid deaf children learning ASL. Developed in Dr. Thad Starner's Contextual Computing Group.

Co-authored Publication at 2021 ACM CHI: https://dl.acm.org/doi/abs/10.1145/3411763.3451523