ANANYA GOENKA

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EDUCATION

Cornell University - Ithaca, NY   Expected May 2025
B.A. in Computer Science with a minor in Data Science and Business   **GPA: 3.856**
- Women in Computing at Cornell (Girls Who Code), Rewriting The Code (RTC), Tapia Conference, Cornell Custom Silicon Systems (C2S2), Cornell Venture Capital, Creme De Cornell
- Relevant Coursework: OOP & Data Structures, Algorithms, Database Systems, Distributed Systems, Computer Architecture, Operating Systems, Programming Languages & Logics, Compilers, Machine Learning, Computer Visions, Unix Tools
- Skills: Python, Typescript, JavaScript, Java, HTML/CSS, OCaml, C, Ruby, Unix/Linux, RUST, Git, SQL, MongoDB, RISC-V

WORK EXPERIENCE

Amazon Web Services (AWS) | Software Development Engineer (SDE) Intern   **May - August 2024 | Seattle, WA**
- Migrated non-standard file storage system integrations to AWS SDK standard APIs, reducing infrastructure costs by ∼$20K per month and improving system performance by 30%; wrote comprehensive Jest unit tests to ensure code quality and maintainability
- Refactored the error log view with React.js' virtual rendering and client-side routing to improve performance when handling high volumes of log data, and incorporated seamless pagination, and filtering capabilities reducing error isolation latency by 65%
- Augmented existing search functionality by integrating Node.js query-based regex search patterns to enable command-line query tools like grep, and developed a Bedrock-based error/solution pattern detector, reducing mean time to issue resolution by 40%

Transfix | Full-stack Software Engineering Intern   **May - August 2023 | New York, NY**
- Engineered RAILS RESTful APIs to embed pricing analytics within the automated spot quoting decisions and leveraged GraphQL queries/mutations to manipulate data managed in MongoDB, boosting account manager pricing decisions' profitability by 150%
- Implemented robust containerization with Docker, orchestrated via Kubernetes, and automated deployment workflows through a Jenkins-based CI/CD pipeline, effectively streamlining the software delivery for real-time pricing strategy adjustments

Lokal | Backend Software Engineering Intern   **December 2022 - February 2023 | Bangalore, India**
- Boosted URL click-through-rate by 80% by integrating Firebase's Dynamic Links API with Django to shorten URLs sent to users
- Automated collection, storage, and visualization process of key Ad metrics using Google Ad Manager, Sheets and Data Studio API

Cover Technologies | Frontend Software Engineering Intern   **May - August 2022 | Los Angeles, CA**
- Optimized website UX via lazy-loading, WAI-ARIA accessibility principles compliance and Bootstrap-based responsive design
- Improved website's conversion rate by 30% by developing a reactive web SPA that enabled dynamic user interaction and live calculation of eligibility and total buildable area of a prospective Cover unit, given an address and LA County Zoning Code

RESEARCH EXPERIENCE

Research Assistant, CAPRA Lab   **July 2024 - Current | Cornell University**
- Developing formal verification framework using Alloy to model memory consistency models (MCMs) for buffet storage systems, expressing temporal properties and happens-before relations through first-order logic to detect concurrency bugs
- Extending MCM verification frameworks by modeling pipeline stages, request ordering, and memory operations as relational constraints, with focus on producer-consumer synchronization and buffet-specific properties
- Implementing formal models using relational logic and linear temporal operators to verify memory consistency across cache hierarchies and buffets, capturing stage transitions and capacity constraints through declarative specifications

Research Assistant for Professor Jon Kleinberg and Kate Donohue   **August 2023 - December 2023 | Cornell University**
- Researched hedonic game theoretic resource allocation models under federated learning, incorporating core constraints, envy-freeness, and strategy-proofness; focused on incentivizing high-quality data production, while factoring data acquisition costs
- Simulated multiplayer federated learning experiments using TensorFlow Federated, PySyft, and NetworkX to analyze performance metrics, fairness-utility trade-offs, and model convergence under various threat models and different adversarial attack scenarios

Research Assistant for Professor Michèle Belot and Philipp Kircher   **August 2022 - December 2022| Cornell University**
- Researched algorithmic fairness and bias mitigation techniques for job recommendation systems using Fairlearn, leveraging constrained optimization with CVXPY, adversarial debiasing with TensorFlow, and causal reasoning with EconML
- Architected a scalable job recommendation algorithm using collaborative and content-based filtering, and integrated sentiment analysis pipelines with NLTK, spaCy, and Sentiment.ai to provide real-time feedback on resumes and cover letters

PROJECTS

Type Checker and Interpreter for System F
- Built an OCaml-based type checker and interpreter for System F, with Menhir parser generator and QCheck property-based testing
- Developed an automatic verification tool for Hoare-style annotated programs, integrating abstract interpretation, symbolic execution, and weakest precondition calculus; leveraged Z3 to discharge verification conditions and ensure partial correctness
- Investigated the potential use of SMT solvers, automated theorem provers, and program analysis tools like SLAM, Boogie, and Dafny for enhanced verification capabilities and scalability

Straato (Digital Asset Marketplace, won Best Startup Idea at the 2024 Cornell FinTech Payments Innovation Hackathon)
- Collaborated with team of 4 other developers to build trading bot lambda functions for trade frequency, asset distribution, and price dynamics modulation, ensuring precise cycle resets and non-linear price adjustments for market simulation
- Integrated trading algorithms with AWS services using the boto3 library to fetch and process financial data from S3 buckets, manage EC2 instances for deployment, and interact with other AWS services for scalability and monitoring

Microcredit Fin-Tech Application (Paise to Rupee) | Founder   **May 2019 - Current | India**
- Studied loan delinquency parameters and preprocessed data using R's dplyr and ggplot2, employed caret's logistic regression and random forest models to predict loan eligibility, and evaluated model performance using accuracy, precision, recall, and AUC
- Built a loan eligibility mobile application using Android NDK and distributed among 3000+ micro-loan seekers, resulting in 630 underwritten loans with a 94% collection rate to date and 45% decrease in customer acquisition costs for the microcredit firm

Cornell Custom Silicon Systems | Software Co-Lead   **August 2022 - December 2023 | Cornell University**
- Led the development of an embedded bird call match filter; implementing FFT-based signal processing pipeline and noise reduction algorithms to enable reliable species identification under environmental interference and strict power/compute constraints for Cornell's Lab of Ornithology
- Collaborated with project leads to create hands-on embedded systems curriculum for new members, developing practical exercises in C, Verilog, and Arduino
- Led weekly technical sessions teaching digital design fundamentals and microcontroller programming through FPGA projects and real-time signal processing implementations

TEACHING EXPERIENCE

Teaching Assistant for Introductory Computer Systems (CS 3410)   **August 2024 - Current| Cornell University**
- Led weekly office hours for 200+ students, helping them debug C projects and understand memory management concepts
- Guided students through key concepts in C programming, memory management, and computer architecture during office hours
- Communicated architectural principles to student groups during office hours through hands-on code demonstrations
- Automated course infrastructure by developing Python scripts for student roster management and GitHub integration; making project distribution and grading smoother for both students and course staff

Volunteer for Girls Who Code   **August 2023 - May 2024 | Cornell University**
- Taught Arduino and Scratch programming through weekly workshops to 14 high school students
- Designed engaging hardware-software projects to inspire creative problem-solving and technical curiosity

EXTRA-CURRICULAR

Writer at Creme De Cornell (Cornell's Food Magazine)   **August 2023 - Present**
Analyst for Cornell Venture Capital   **August 2023 - Present**
Vice President of Cornell's Emerging Markets Institute Club   **January 2022 - January 2023**