AARYAN GUSAIN

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EDUCATION

University of Illinois at Urbana-Champaign   Expected May 2027
Bachelor of Science in Computer Science, *James Scholar, Dean's List*   **GPA:3.84/4.00**

Related Coursework:

Database Systems,   Discrete Math,   Linear Algebra w Computational Appl,   Data Structures,
Algorithms and Models of Computation,   Artificial Intelligence, Computer Architecture

TECHNICAL SKILLS

Languages/Frameworks: Java, C++, Python, SQL, Rust, Javascript, NodeJS, ReactJS, Docker, Pandas, scikit, Keysight PathWave, MATLAB, Pytorch, HTML, CSS, HTML5, Flask

WORK EXPERIENCE

UL Solutions   **Fremont, CA**
Engineer Intern   *May 2025- Aug 2025*

- Leveraged Python frameworks (e.g., **PySerial, PyVISA**) to control Chimp-driven test fixtures and DUTs over SCPI/LXI, seamlessly orchestrating communication with Keysight UXA analyzers and calibration equipment, reducing configuration time by **~50%** and improving consistency for a new product launch for a **Fortune 50 client**, while enabling real-time monitoring of key metrics (e.g. OBW, SEM, CSE) to surface emissions anomalies early.
- Accelerated high-volume testing validation by **200%** by harnessing software to automate spectrum capture and report generation pipelines, transforming a error-prone workflow into a streamlined, repeatable process.

Lumiere Education, *Research Assistant*

- Utilized over **170+ years** of NOAA historical data alongside **100+ web-scraped** records of major hurricanes from Wikipedia and other diverse online repositories to conduct a comprehensive statistical analysis. Identified a **strong (85%) correlation** between tropical cyclone intensity, frequency, wind speed, and average temperature through various machine learning techniques, underscoring temperature as a primary driver of hurricane development and escalation.

PROJECT HIGHLIGHTS

<u>Beehive Queen-Presence Classifier</u> **(Audio DSP, scikit-learn, LightGBM)**   *January 2025 – May 2025*

- Engineered a full labeling pipeline that time-syncs **20 k+ Urban-Beehive recordings** with hive-inspection logs producing a richly annotated dataset in **< 5 min/run.**
- Designed a 308-dim acoustic feature stack (128-band Mel stats + MFCC & Δ-MFCC summaries) and automated caching to cut extraction time by **70 %;** trained and benchmarked KNN, RF, XGBoost, MLP and LightGBM models.
- Delivered queen-presence detection at **98.4 % accuracy (LightGBM, imbalanced-aware)** while boosting minority-class recall **2x** with MFCC augmentation and targeted SMOTE, providing the Robinson Lab at UIUC a deploy-ready tool for live hive health monitoring.

<u>Conversational AI Avatar Platform</u> **(Python, Llama-3 8B, DeepSpeed, Docker, WebRTC)**   *January 2025 – May 2025*

- **Fine-tuned a LoRA-adapted Llama-3 8B** model on **500K Reddit/CharacterAI** lines using **DeepSpeed ZeRO-2 on H100s,** cutting epoch time by **~3×** and optimizing inference for real-time responsiveness.
- Collaborated with full-stack, audio, and frontend teams to integrate the model into a production-grade **WebRTC-driven** Kurisu VTuber demo with **Live2D animation**, **CosyVoice TTS, and Whisper ASR**.
- Contributed to Docker-based deployment by aligning model outputs with audio-visual sync targets (**<120ms drift**), supporting prompt iteration and debugging tools across microservices.
- Helped design and analyze feedback loops to improve perceived naturalness (**~30% gain**), working alongside the conversational and UI teams to guide prompt engineering and user testing.

<u>American Sign Language Detection </u>**(React, Django, Python, ML)**   *Aug 2024 – Dec 2024*

- Developed a real-time ASL translator using **MediaPipe Hands** and a custom **CNN model**, achieving **over 70% accuracy** in dynamic letter prediction.
- Engineered a seamless React-powered interface with low-latency WebSocket integration, enabling real-time predictions and an interactive ASL learning experience.

<u>Job-Genie Job-Matching Platform</u> **(React, Node.js, MySQL, NLP)**   *February – Apr 2025*

- Delivered a full-stack resume-to-job pipeline using intelligent PDF parsing and **TF-IDF similarity search** to rank best job matches and one-click apply, all exposed through a Tailwind/React interface and REST API (**< 100 ms median latency**).
- Developed MySQL stored procedures, triggers, and transaction logic in the backend that deduplicate applications and auto-notify users, boosting data integrity and **cutting manual review time to zero.**

EXTRACURRICULAR ACTIVITIES & LEADERSHIP

<u>**Treasurer**, OpenSource@Illinois</u>   *August 2024 - Present*

Directed budgeting to fund open-source initiatives, empowering developers to contribute and share resources. Promoted accessible technology and sustained collaborative projects benefiting the broader community.