Alekhya Duba

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SUMMARY

Experienced **Software Engineer** with 8+ years in complex systems, specializing in **Physical AI validation, automation, Python, BigQuery, and scalable infrastructure** to improve system performance and reliability.

EXPERIENCE

Senior Software Engineer

Cruise   **September 2024 - Present，Sunnyvale, CA, USA**

- **Lead a team driving validation of the embodied AI autonomy stack** by defining scalable simulation infrastructure and automation strategies.
- **Designed and deployed a robust end-to-end pipeline processing 3,000+ records weekly**, transforming road data into targeted simulations. Utilized *Jupyter notebooks*, *Google Pub/Sub*, and an in-house *Airflow* alternative.
- **Designed and implemented a centralized Python library for simulation data classification, aggregation, and metrics generation**, employing *Pandera* for validation and *Pytest* for unit testing. Refactored tools to standardize and reuse core logic.
- **Developed CLI tools with the Click framework automating ProtoBuf CRUD operations**, enhancing SDK accessibility and increasing engineering productivity by 15%.
- **Authored DBT SQL queries for data processing, filtering, and aggregation** to support risk evaluation and event detection.
- **Engineered modular YAML templates reducing simulation analysis time by 40%**. Acted as a proof-of-concept adopted by 6+ teams, enabling faster onboarding and consistent configuration.

Software Engineer

Cruise   **May 2023 - September 2024，Sunnyvale, CA, USA**

- **Migrated legacy toolin**g to a scalable framework, saving **~6 hrs/week** and onboarding **20+ engineers**; improved reproducibility **by 20%**.
- Delivered **10+ automated pipelines** using *Python and ML-infra tooling*, **increasing simulation throughput by 70%**.
- Built a scalable *optimization loo*p using road data to generate **8K+ scenarios,** uncovering AV failure modes and validating performance under **edge conditions**.
- Identified and **fixed bugs** in the *ML based tuning tool*, added safety checks, and **enabled checkpoint features** in **resource-heavy optimization loops**.
- Led **on-call support for critical deliveries**, earning **L7+ recognition**. Identified process gaps and created a workflow guide **onboarding 15+ engineers**.
- Authored *DBT SQL queries* to automate data extraction & timestamp engineering, **improving simulation quality by 80%** for time-sensitive events.

Software Engineer in Test (Intern)

Cruise   **May 2022 - December 2022，San Francisco, CA, USA**

- Devised **stability metrics** using *time series analysis* and built a pipeline with automated notifications, **improving response time** to anomalies by **25%**.
- Developed a **interactive dashboard** coverage tool using *Looker* & *SQL*, **improved coverage visibility** and reduced manual **analysis time by 30%**.
- Engineered **search functionality** to query simulation segments by intent, identifying invalid and atrophied scenarios **for improved analysis.**
- Designed a *Python* script for map-based feature coverage visualization, creating **interactive visualizations that provided actionable insights.**

Senior Software Engineer

Siemens Advanta   **May 2017 - June 2021，Bangalore, KA, IND**

- **Led team to ensure quality** in pilot desktop/web app deployments, aligning release strategies with business goals.
- Designed and implemented *C# automation frameworks* to streamline sprint testing and **reduce legacy issues by 90%.**
- Partnered with scrum teams for **cross-platform analysis**, achieving a **40% reduction in issues**.

EDUCATION

MS Computer Science

Texas A&M University • College Station, TX • 3.9

SKILLS

Languages: *Python*, *C#*, *SQL/BigQuery*

Automation, DevOps & ML Frameworks: *Pytest*, *Pandera*, *Click*, *DBT*, *Bazel*, *Airflow*, *Google Pub/Sub*, *GitHub*, *Jupyter*, YAML, ProtoBuf, Linux/Unix, *PyTorch*, *TensorFlow*

Soft Skills: Communication, leadership, collaboration, problem-solving