Keerthana Purushotham

+1 858-203-8957 [PST] | **Linkedin** | **AUDIO SUMMARY 7m10s**
Papers & Citations | **IEEE Member** | **UCSD Alumni**

Subject: Cover Letter

To,
The Recruiting Manager,

Hello,

I am excited to apply at your esteemed organization, where my expertise in AI-driven security, cloud infrastructure, and large-scale automation aligns with your team's mission. At AWS, I have managed 1,300+ Linux CVEs, led AI-powered security automation, and built privacy-enhanced cloud security solutions, directly contributing to infrastructure security and risk mitigation at scale. I thrive in environments that challenge me to think deeply, adapt quickly, and bridge disciplines to create innovative solutions.

➔ Why I Am a Strong Fit for This Role—

→ 1. Cloud & Infrastructure Security: Experience deploying AI models on AWS Lambda, API Gateway, S3, and building real-time security monitoring with CloudWatch.

→ 2. Security & Vulnerability Management: Specialized in Linux security, threat detection, and FIPS-compliant vulnerability patching for Amazon Linux.

→ 3. AI & ML-Driven Security: Designed AI-based CVE impact analysis algorithms, developed ML-powered automation, and published peer-reviewed research in AI, ML, and NLP (39 citations, IEEE & ACL).

→ 4. Strong Theoretical & Practical Foundation: Expertise in graph algorithms, deep learning, and statistical modeling, with hands-on work in Python (TensorFlow, PyTorch), Rust (for AI applications), and SQL.

➔ Why This Role Aligns With My Goals—

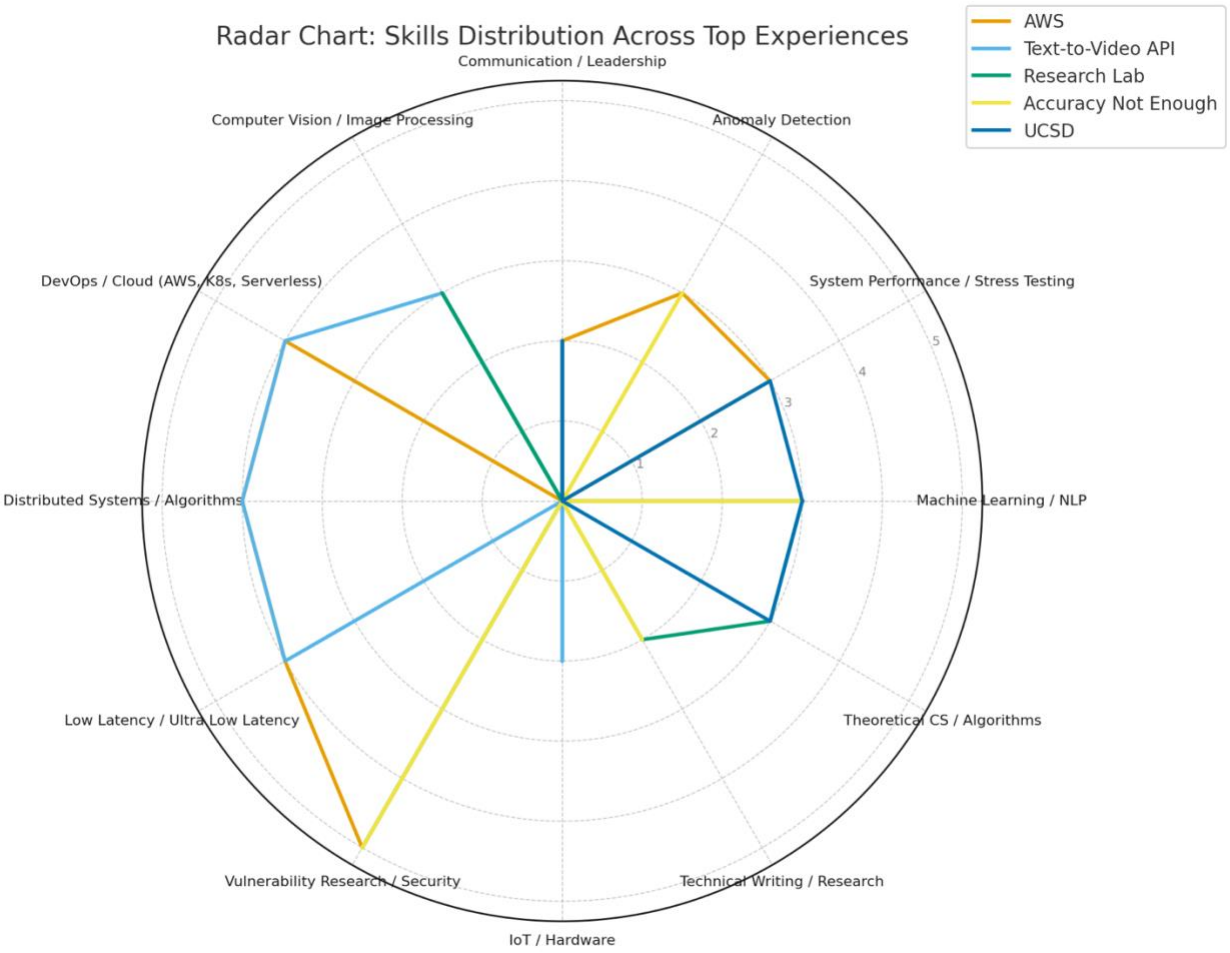
→ I tackle engineering challenges with the same curiosity that drives my pursuits. Debate, coding, and quizzing sharpen my pattern recognition, while art, sports, and music refine adaptability and structure-key to scalable AI and security automation. This interdisciplinary mindset fuels innovative problem-solving in complex systems.

→ I am deeply passionate about scalable, ethical, and high-impact AI-driven solutions and believe my applied research, software engineering, and security expertise make me an ideal fit for this role. Products thrive on curiosity, interdisciplinary thinking, and a willingness to challenge the status quo-values that I have embraced throughout my career and personal pursuits.

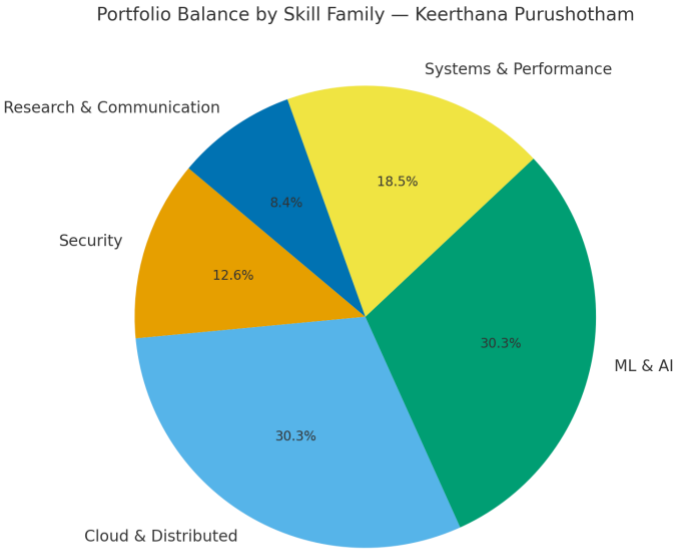
I would love the opportunity to discuss how my skills can contribute to your Company's technical initiatives. Please let me know a convenient time to connect.

Best regards,
Keerthana Purushotham
keerthanap0808@gmail.com | +1 858-203-8957 [PST]
LinkedIn | Google Scholar

- **Radar Chart: Skills Distribution Across Top Experiences**



- **Portfolio Balance by Skill Group**



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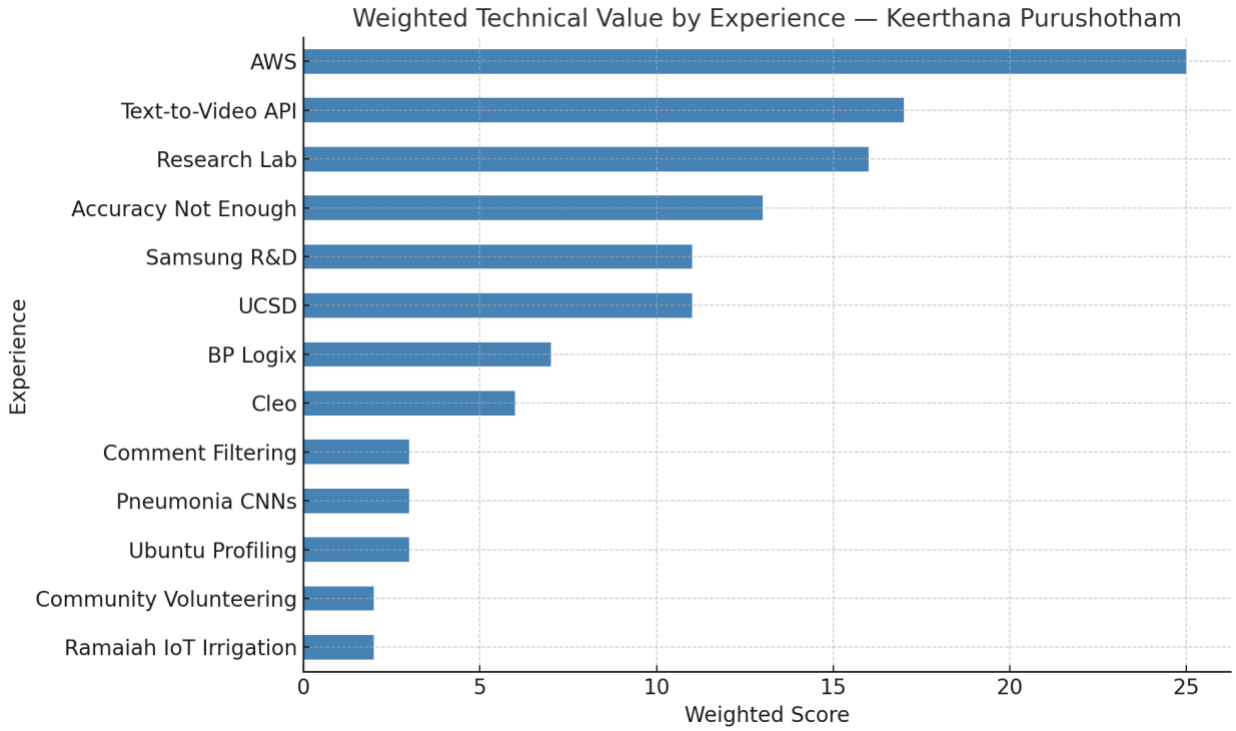
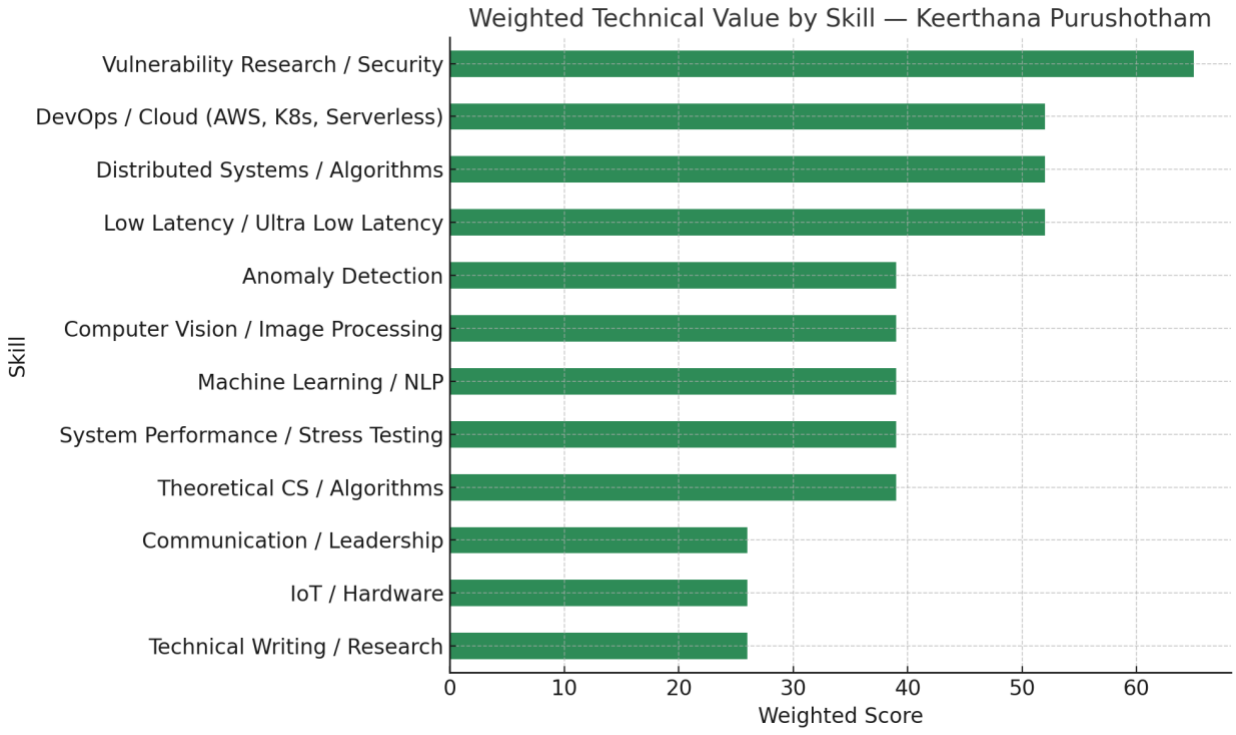
Keerthana's Skills
(as of 2025)
Research
research initiatives
publication process
data-driven research
prototyping
peer review
Math, Statistics & Computational Theory
linear algebra
calculus
optimization
graph theory
probability
time series
anomaly detection
algorithm analysis
experimental design
publications
Data Science
ETL
visualization
data cleansing
feature engineering
exploratory data analysis
time series forecasting
real-time data processing
Soft Skills
leadership
mentoring
communication skills
agile methodologies
documentation
public speaking
AI , ML , NLP & predictive models
supervised learning
algorithms
applications
unsupervised learning
clustering
dimensionality reduction
reinforcement learning
strategies
algorithms
deep learning
CNN
applications
architecture
RNN
applications
architecture
LSTM
GRU
transformers
BERT
GPT
generative AI
autoencoders
GAN
VAE
natural language processing
BiLSTM
CRF
semantic filtering
sentiment analysis
topic classification
dialogue systems
full-stack machine learning
deployment
data pipelines
explainability and fairness
Systems & Network Engineering
latency management
operating systems
disaster recovery
network protocols
linux kernel
device drivers
Programming & Software Development
Rust
Python
JavaScript
TypeScript
C/C++
Java
C#
Bash
REST APIs
serverless architecture
microservices
Git
testing
Algorithm Design, Data Structures & System Design
algorithm design
complexity analysis
search and optimization
numerical methods
parallel algorithms
Cloud & Cluster
AWS
S3
Lambda
API Gateway
CloudWatch
DynamoDB
IAM
CDK
Kubernetes
continuous integration & delivery
infrastructure as code
Computer Security
CVE
patch management
threat modeling
risk assessment
NIST standards
FIPS compliance
adversarial machine learning defenses
software development lifecycle
penetration testing
cloud security
Miscellaneous
certifications
traditional strategies
multilingual capabilities
business acumen
IEEE standards

- **Weighted Technical Value by Experience**



- **Weighted Technical Value by Skill**



I'm a full-stack SDE with expertise in cybersecurity, cloud, NLP & statistics.
At AWS, I build predictive automation tools for CVE evaluation, design scalable cloud infra, & handle threat detection for Amazon Linux.
My niche in AI, NLP & stats helps me apply computational statistics to security, threat modeling & security R&D.

I've integrated AWS CDK, Rust, Python & JavaScript to streamline processes, & became an expert in threat modeling over 1.5k CVEs for multiple Amazon Linux distributions.
I've actively contributed to system design to ensure the use of relevant info for practical security solutions.

With a solid foundation in CS from UCSD, I've built skill in NLP, recommender systems, cloud architectures & have published research.
I seek impactful roles to drive innovation at scale.

Links

- LinkedIn linkedin.com/in/keerthanapurushotham
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- 📱 Phone (Google Voice): +1 360-328-1182
- CV drive.google.com/file/d/1a_1zHHOM0ov5DZ2BYSkryHWbnfuE8AoO/view
- Portfolio drive.google.com/file/d/1y8GQHeCp-zdkxhn_EFUj5T9xcLW7XZiY/view
- GitHub github.com/keerthanap8898
- Google Scholar scholar.google.com/citations?hl=en&user=OhmFGtIAAAAJ
- Medium medium.com/@keerthanapurushotham
- Substack substack.com/@keerthanapurushotham
- ResearchGate researchgate.net/profile/Keerthana-Purushotham
- Google LM Audio Summary (g-Drive) drive.google.com/file/d/1Kfpd49LE9jaoDZ9VL-BmTl9DS8O1-7uR/view
- Scopus Author Profile scopus.com/authid/detail.uri?authorId=57221594595
- ORCiD Author Profile orcid.org/0009-0000-8197-7048
- IEEE Author Profile ieeexplore.ieee.org/author/37088644371
- ACL Anthology Author Profile aclanthology.org/people/keerthana-purushotham
- Art Portfolio - Instagram instagram.com/kp_artses
- YouTube (*coming soon*) youtube.com/channel/UCb7duYCP_dpm4lftWeiz3ow

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Master Work-History / Resume / CV Log for Keerthana Purushotham — Expanded Technical Deep-Dive with Skill Mapping

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📂 Phase 1: Personal / Professional Profile

- **Name:** Keerthana Purushotham (She/Her)
- **Emails:** keerthanap0808@gmail.com | keep.consult@proton.me | kpurusho@ucsd.edu | kpurusho@ieee.org
- **Phones:** +1 (858) 203-8957 (PST) | +1 (360) 328-1182 (Google Voice)
- **Visa:** H1B FY2026
- **Profiles:** LinkedIn, GitHub, Google Scholar, ResearchGate, Scopus, ORCID, IEEE Author, ACL Anthology, Medium, Substack, Art Portfolio, YouTube.

Summary: Full-stack Software Engineer at AWS with expertise in **Linux security, low-latency distributed systems, and applied ML/NLP**. Blends **deep systems programming, AI-driven automation, and security research** to deliver scalable, correctness-critical software.

📂 Phase 2: Work Experience

Amazon Web Services (AWS) — Software Developer | EC2, Amazon Linux Threat Mgmt. | Seattle, WA

Aug 2022 – Present (3+ yrs)

- **Security & Vulnerability Engineering:**
  - Triaged/remediated **1,300+ Linux & kernel CVEs**, mapping to **Threat & Vulnerability Management, Risk Engineering, Vulnerability Research, CVE Assessment**.
  - Developed exploit reproducibility testing → **Reliability, System Performance, Security Hardening**.
- **Systems & Infrastructure:**

    - Migrated Rust services → Python Lambdas, integrating **Serverless Framework, AWS CloudFormation, CDK**.
    - Engineered nested alarms with CloudWatch → **System Reliability, Load Balancing, Distributed Algorithms**.
    - Built telemetry pipelines → **Analytics, Dashboards, Cloud Development**.
- **Low-Latency & Distributed Workflows:**
    - Designed CVE similarity classifier, SLA breach predictor → **Distributed Systems, Ultra Low Latency, Anomaly Detection, Statistics**.
    - Automated advisories ingestion → **Knowledge Acquisition, Risk Engineering, DevOps Pipelines**.
- **Value:** Demonstrated **multi-domain expertise** in kernel-level security, ML-driven risk modeling, and distributed cloud engineering.

UC San Diego — Graduate Roles | San Diego, CA

2021 – 2022 (1.5 yrs)

- **Research Apprentice (NLP/Finance):**
    - Implemented Transformer sentiment classifiers → **Machine Learning, Statistics, Research Computing**.
    - Combined ML signals with stock-market hedging → **Analytics, Algo Trading, Data Analysis**.
- **Teaching Assistant (Algorithms, Data Structures, Systems Programming):**
    - Created/debugged OS assignments → **Systems Programming, Operating Systems, Scheduling Algorithms, ARM Assembly**.
    - Led review lectures → **Communication, Public Speaking, Theoretical Computer Science**.

BP Logix — Software Engineer Intern | San Diego, CA

Jun 2021 – Sep 2021 (4 mos)

- Migrated **TFVC → Git**, mapping to **Version Control, DevOps, SDLC**.
- Debugged **C# workflow bugs**, validated with stress/load testing → **System Performance, Reliability**.
- Value: **Enterprise migration and resilience analysis**.

Cleo Communications — Software Engineer | Bengaluru, IN

Jul 2018 – Dec 2020 (Internships + Full-time)

- Built RNN-based EDI anomaly detection → **Anomaly Detection, Data Analysis, Python, NLP**.
- Designed pipelines with Logistic Regression, Fuzzy Logic → **Machine Learning, Statistics**.
- Debugged SaaS workflows with Postman → **Cloud Computing, SDLC**.
- Value: **Structured-data ML expertise**.

Samsung R&D India — PRISM Research Intern | Bengaluru, IN

Mar 2019 – Nov 2019 (9 mos)

- Crawlers for conversational data → **Optimized Web Crawling, Low Latency, Distributed Systems**.
- Filtering pipeline (TF-IDF, cosine similarity) → **NLP, Statistics, Scheduling Algorithms**.
- Recognition: **Top-5 project finalist**.

Research Assistant — Dr. Annapurna P. Patil's Lab | Bengaluru, IN

Sep 2018 – Dec 2020 (2+ yrs)

- Contributions:
  - Autoencoder denoising → **Image Processing, Computer Vision, PyTorch, Keras**.
  - Cloud threat survey → **Computer Security, Risk Engineering**.
  - Conversational dataset filtering → **NLP, Optimized Crawling**.
  - Compiler heuristics → **Theoretical CS, Analytics**.

📂 Phase 3: Education

- **UC San Diego — M.S. Computer Science (GPA 3.83/4.0)** (Dec 2020 – Jun 2022)
  - Courses mapped to: Algorithms → **Algo, Data Structures**; OS → **Systems Programming**; ML/NLP → **AI, Statistics, Deep Learning**.
- **Ramaiah Institute of Technology — B.E. CS (GPA 9/10)** (Aug 2016 – Aug 2020)
  - IoT project with Raspberry Pi → **IoT, Computer Hardware, Automation of Irrigation Systems**.
- **Chethana P.U. College** (2014 – 2016) — IMO Silver Medal.
- **Sophia High School** (2001 – 2014) — Olympiads.

📂 Phase 4: Skills

- **Languages:** Rust, Python, JavaScript, TypeScript, C, C++, C#, Java, Bash, SQL, Ruby, ARM Assembly, YAML.
- **Cloud & Infra:** AWS stack (EC2, S3, API GW, DynamoDB, CloudWatch, IAM, CDK, CloudFormation, Lambda), Kubernetes (ingress, load balancing), Docker, Serverless Framework.
- **Distributed Systems & Performance:** Low Latency, Ultra Low Latency, Distributed Systems, Distributed Algorithms, Network Load Balancing, Load Balancing, Reliability, System Performance, Stress Testing, Scheduling Algorithms.
- **AI/ML & Data:** PyTorch, TensorFlow, Keras, scikit-learn; NLP (Transformers, RNNs, CRFs, BERT, Attention), CV (CNNs, Image Processing, Autoencoders), Statistics, Data Science, Anomaly Detection.
- **Security:** Linux kernel debugging, CVE triage, Threat & Vulnerability Management, Vulnerability Assessment, Vulnerability Research, Risk Engineering, Computer Security.
- **Tools & Frameworks:** Redis, Celery, DevOps pipelines, Git/Version Control, SDLC workflows, Dashboards & Analytics.
- **Systems:** Operating Systems (Linux, Unix, Ubuntu System Measurement), Systems Programming, Computer Architecture, Theoretical CS.
- **IoT & Hardware:** IoT (Arduino, Raspberry Pi), Computer Hardware, Automation of Irrigation Systems.
- **Professional & Research Skills:** Technical Writing, Research Computing, Knowledge Acquisition, Communication, Public Speaking, Leadership, Project Management, Coding Standards, Attention to Detail.

📂 Phase 5: Projects

- **Text-to-Video API Orchestrator (Aug 2025 – Present) — GitHub:**
  - Skills: **Low Latency, Ultra Low Latency, Distributed Systems, Redis, Distributed Algorithms, Load Balancing, Kubernetes, Ingress, Celery, Stress Testing, Computer Vision, Image Processing, Computer Hardware**.

    - Architecture: Rust async workers, Python FastAPI orchestration, Redis messaging, K8s cluster with Prometheus telemetry.
- **Accuracy Is Not Enough (2025) — GitHub:**
    - Skills: **Statistics, Analytics, Machine Learning, Anomaly Detection, Technical Writing**.
- **NER & Parsing (UCSD 2021):**
    - Skills: **PyTorch, CRF, NLP, Statistics, Research Computing**.
- **Ubuntu System Profiling:**
    - Skills: **System Measurement, Stress Testing, Reliability**.
- **IoT Irrigation (2017):**
    - Skills: **IoT, Automation of Irrigation Systems, Raspberry Pi/Arduino, Organic Chemistry integration (soil moisture)**.

🗀 Phase 6: Publications

- IEEE/ACL/IJRESM papers mapped to: **Cloud Security, NLP, Image Processing, Compiler Optimization, Anomaly Detection**.
- **Citations (Sept 2025):** 49 | **h-index:** 2 | **i10-index:** 1

🗀 Phase 7: Honors, Awards & Tests

- Best Final Year Project (2020), Samsung PRISM Finalist (2019), Olympiad Medals (Math/Science/English).
- GRE 323 | TOEFL 114 | CodeSignal GCA 534/600.

🗀 Phase 8: Organizations & Volunteering

- Member: CWE.org, IEEE Reviewer, GHC/AnitaB.org.
- Core Member: Debate Society, Quiz Club, College Magazine.
- Athletics: Football (state/university), track/field.

🗀 Phase 9: Project Deep Dives — Niche, Novelty, Challenges, and Value

9.1 Text-to-Video API Orchestrator — Niche & Novelty

[GitHub]

Recap: MVP asynchronous **Text→Video** API around **Genmo Mochi-1**, designed for **Kubernetes** GPU clusters. Supports REST prompt submission, job tracking, and artifact retrieval. **Hybrid Rust + Python**: Rust workers for GPU inference; Python (FastAPI) for orchestration, queues, retries. Success metrics pre-defined (P95 latency, throughput, job success, cluster utilization, API availability). Clear **non-goals** (e.g., RBAC, advanced schedulers) for scoped MVP.

Why it's novel:

- Wraps video generation into a **production-style, horizontally scalable, asynchronous multi-GPU API**, not a single-node demo.
- **Rust+Python split** leverages memory safety + deterministic workers with agile control plane.
- Formal **complexity & correctness thinking** (NP-hard scheduling, idempotency, determinism) uncommon in side projects.
- **Metrics-first design** and explicit non-goals show product and reliability maturity.

Key challenges addressed / flagged:

1. **Scheduling & load balancing (NP-hard):** heuristics, queue policies, preemption, retries, batching.
2. **Concurrency & idempotency:** async workers across nodes without races; deterministic Rust modules.
3. **Prompt variability & VRAM estimation:** workload contours, load prediction.
4. **Reliability:** DLQ, fallback nodes, alarms on long-running jobs.
5. **Latency guarantees:** target **P95 ≤ 10 min** (MVP) across queueing→inference→transfer.
6. **Cost/utilization:** aim **70–90% GPU** without over-provisioning.
7. **Security (future):** tokens, presigned URLs, rate limits, sandboxing.
8. **Cross-language contracts:** schema versioning, backward compatibility.
9. **Model non-determinism & noisy neighbors:** outlier detection, reproducibility checks.
10. **Rollouts & cluster mgmt:** canaries, autoscaling, regionalization, RBAC (future).

How to frame (value statements):

- Built a **production-grade async text-to-video API** on K8s with **multi-GPU orchestration**.
- **Hybrid Rust+Python** architecture for safety, performance, agility.
- Defined & enforced **P95 latency/throughput** targets; designed for failure under **NP-hard constraints**.
- Modular design balancing **latency, cost, correctness**, with hooks for advanced scheduling & auth.

9.2 "Accuracy Is Not Enough — Confusion-Matrix Metrics for CVE Impact Prediction" — Niche & Novelty

[GitHub]

Recap: Technical write-up + visuals arguing **accuracy is insufficient** for cyber-risk modeling. Proposes **Leveled Metrics Framework (L0–L6)**: from counts → Precision/Recall → **FOR/NLR** → **MCC/Youden's J**, with guidance for asymmetric error costs (FN vs FP) in security.

Why it's novel:

- **Domain-specific metric guidance** for **CVE/vulnerability prediction** where FN and FP have very different costs.
- **Hierarchical (L0–L6)** scaffolding improves interpretability and adoption.
- **Actionable recommendations** (lead with Recall/FNR; monitor FOR/NLR; use MCC/J; treat accuracy as sanity check).
- Cheat-sheets & trade-off diagrams translate stats → operational decision-making.

Challenges handled: class imbalance; thresholding; interpretability of advanced metrics; mapping metrics → domain costs; communicating to non-statisticians.

How to frame (value statements):

- Authored a **metric framework** for cyber risk under **class imbalance & asymmetric error**.
- Connected statistical metrics to **real-world security costs** (missed exploits vs alert fatigue).

- Produced **diagrams & cheat sheets** enabling security/ML teams to select appropriate metrics.

9.3 Context-Based Comment Filtering — Niche & Novelty

[GitHub]

Recap: Context-conditioned semantic filter that, given a **seed context** (query/article/prompt), filters **relevant** comments from web-scraped social data using **semantic similarity** (beyond keyword matching). Includes notebook + analysis PDF.

Why it's novel:

- Moves beyond per-comment classification (sentiment/toxicity) to **context-aware relevance**.
- Bridges **IR + NLP embeddings** to reduce noise in social datasets.
- Backed by experiments & error analysis (precision/recall trade-offs).

Key challenges: semantic matching under paraphrase & topic drift; thresholding (FN/FP balance); noisy/imbalanced data; scalability (ANN/ batching); domain robustness; labeled evaluation & error analysis.

How to frame (value statements):

- Built **context-conditioned semantic filters** to surface signal from noisy social data.
- Tuned similarity thresholds; evaluated **precision/recall/ROC**; documented failures & mitigations.
- Reusable for **data curation, conversational systems, IR pipelines**.

9.4 Detecting Pneumonia from Chest X-rays — Niche & Novelty

[GitHub]

Recap: Comparative study of **CNN depth** for medical imaging—**3/4/5-layer CNNs vs VGG16**—to analyze performance, overfitting, and generalization on chest X-rays (pneumonia detection). Multiple Jupyter notebooks document experiments.

Why it's novel:

- Focus on **architecture depth trade-offs** in **low-data medical regimes** (where deeper ≠ always better).
- Analytical lens on variation factors: augmentation, regularization, LR schedules, capacity control.
- Educational clarity via parallel notebooks for reproducibility.

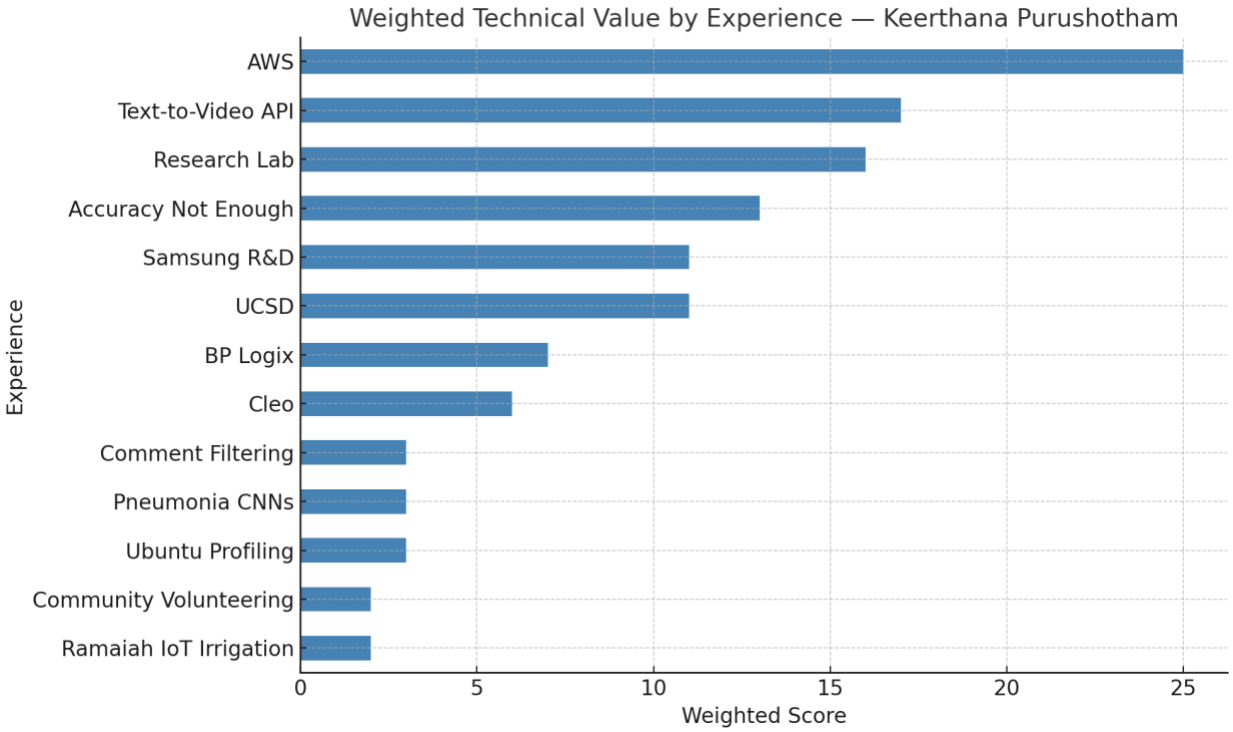
Key challenges: class imbalance & scarcity; fair comparisons (seeds/splits); medical-grade metrics (**sensitivity/specificity/ROC AUC**); preprocessing variance; compute limits.

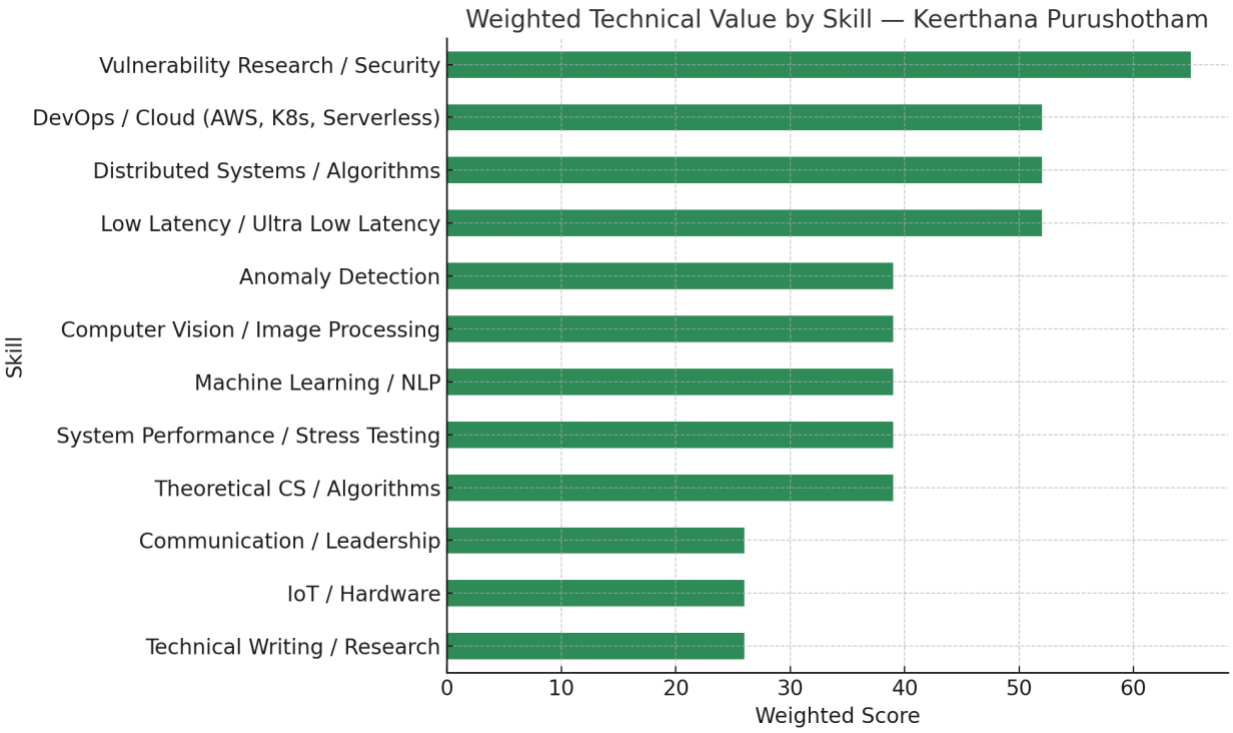
How to frame (value statements):

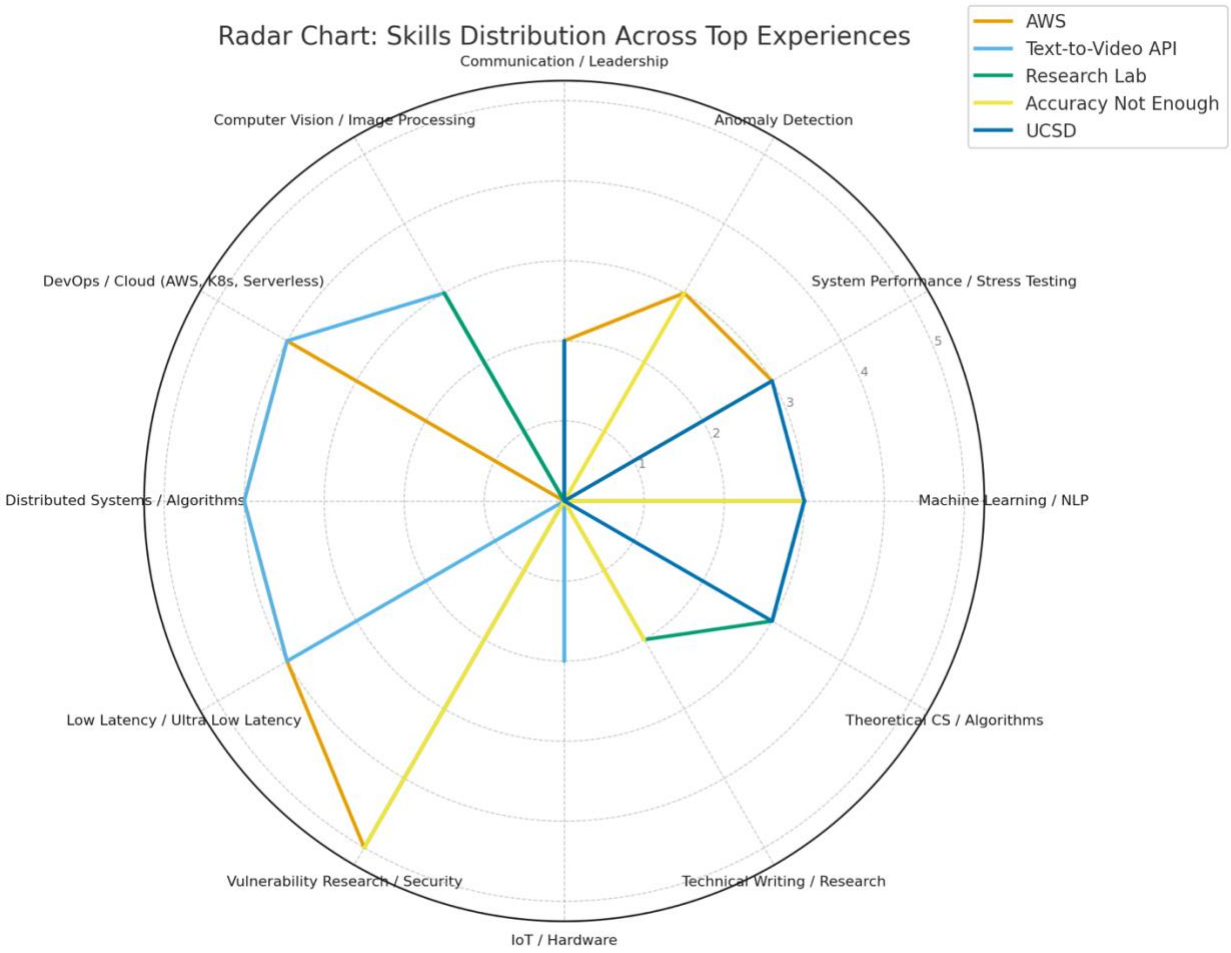
- Designed reproducible **comparative CNN experiments** (shallow vs VGG16) for medical imaging.
- Evaluated **generalization vs overfitting** with domain-appropriate metrics; documented trade-offs.

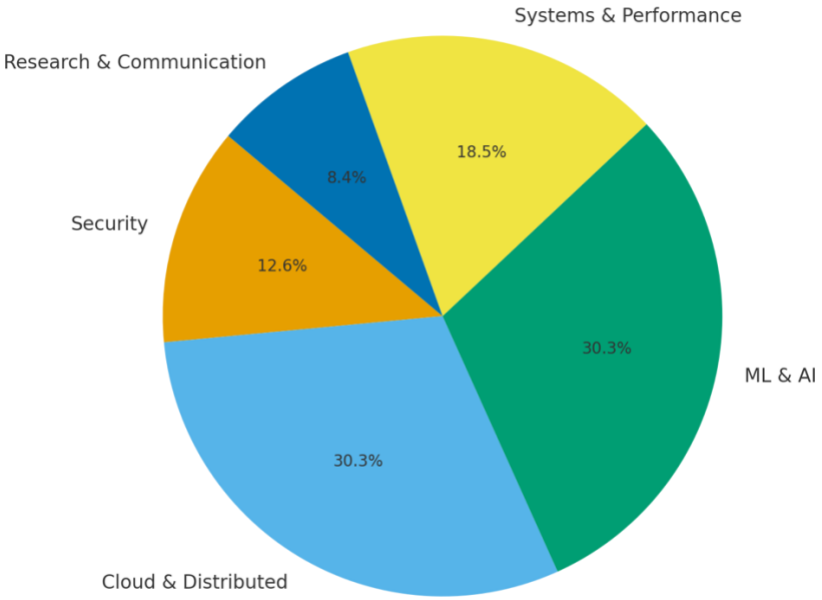
Cross-Project Themes (What this portfolio proves)

- **Systems rigor:** metrics-first design, explicit failure modes, idempotency, and scheduling trade-offs.
- **Security + ML fusion:** applying **statistical rigor** to operational security decisions (CVE, risk).
- **IR/NLP practicality:** context-aware filters for real-world noisy data.
- **Scientific mindset:** controlled comparisons, clear non-goals, and transparent experimentation.


Weighted Technical Value by Experience — Keerthana Purushotham
AWS
Text-to-Video API
Research Lab
Accuracy Not Enough
Samsung R&D
UCSD
BP Logix
Cleo
Comment Filtering
Pneumonia CNNs
Ubuntu Profiling
Community Volunteering
Ramaiah IoT Irrigation
Experience
0
5
10
15
20
25
Weighted Score


Weighted Technical Value by Skill — Keerthana Purushotham
Vulnerability Research / Security
DevOps / Cloud (AWS, K8s, Serverless)
Distributed Systems / Algorithms
Low Latency / Ultra Low Latency
Anomaly Detection
Computer Vision / Image Processing
Machine Learning / NLP
System Performance / Stress Testing
Theoretical CS / Algorithms
Communication / Leadership
IoT / Hardware
Technical Writing / Research
Skill
0
10
20
30
40
50
60
Weighted Score


Radar Chart: Skills Distribution Across Top Experiences
AWS
Text-to-Video API
Research Lab
Accuracy Not Enough
UCSD
Communication / Leadership
Anomaly Detection
System Performance / Stress Testing
Machine Learning / NLP
Theoretical CS / Algorithms
Technical Writing / Research
IoT / Hardware
Vulnerability Research / Security
Low Latency / Ultra Low Latency
Distributed Systems / Algorithms
DevOps / Cloud (AWS, K8s, Serverless)
Computer Vision / Image Processing
1
2
3
4
5


Portfolio Balance by Skill Family — Keerthana Purushotham
Systems & Performance
18.5%
ML & AI
30.3%
Cloud & Distributed
30.3%
Security
12.6%
Research & Communication
8.4%