Girish Kulathumani

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Research Interests

Decoding non-invasive biosignals (EEG and wrist surface EMG) so that models trained on some people work on new ones with little or no calibration; personalising shared models without pooling each person's data, using federated learning; and evaluation with subject-wise splits that rules out data leakage.

Education

Vellore Institute of Technology, Chennai Aug 2021 – May 2025
B.Tech., Computer Science and Engineering. CGPA 8.69/10

Publications

[1] **G. Kulathumani**, S. V. Madangarli, J. Ullas, I. Agarwal, et al. "JIGS: a modular parallel encryption and authentication pipeline for secure messaging." *Engineering Research Express* 7(2), 025276, 2025. doi:10.1088/2631-8695/addd67

[2] A. Samhruth, **K. Girish**, N. Ganesh. "Siren: Advancing cybersecurity through deception and adaptive analysis." In *Intelligent Computing: Proceedings of the Computing Conference*, pp. 506–519, Springer LNNS, 2025. arXiv:2406.06225

Research Experience

Research Assistant, Federated Learning Jan 2025 – May 2025
Vellore Institute of Technology, Chennai (on the university's NVIDIA DGX)

- Led a three-person team building HabitatFL, a federated framework for classifying wildlife audio and images across separate clients, with Flower and Docker on multi-GPU infrastructure.
- Trained lightweight edge models (MobileNetV3, SqueezeNet, under 2 MB): 87.65% accuracy on 18.2K spectrograms (27 classes) and 69.92% on 50K images (82 classes). [code]

Research Assistant, Secure Systems and AI Jan 2024 – May 2024
Vellore Institute of Technology, Chennai

- Designed and implemented JIGS [1], a secure-messaging pipeline combining ECDH key exchange with nonce-based AES-128 and parallelised stages, with its protocol verified in ProVerif. [code]
- Contributed to Siren [2], a deception-based defence pairing honeypots and simulated user activity with ML classification of attacker behaviour.

Current Work

EEG/EMG Foundation Challenge, NeurIPS 2026 (Track 2: EEG decoding) Nov 2026

- Independent entry: a covariance-based EEG decoder (Riemannian tangent space with logistic regression), written without AI-generated code and evaluated on held-out participants.

Writing and Outreach

Founder and writer, GreyLattice Feb 2025 – present
Independent publication on brain–computer interfaces and computational neuroscience

- Around ten posts, including long technical deep dives; e.g. a breakdown of real-time MEG decoding of visual perception (arXiv:2310.19812) and an explainer on the limits of non-invasive brain recording.
- Built and run the publication's own site (Astro, TypeScript, Keystatic CMS).

Talk: introduction to CUDA programming, VIT Chennai (50+ attendees)

Other Experience

Application Engineer, Accenture, Chennai Oct 2025 – Oct 2026

- Built Salesforce Life Sciences Cloud features (Apex, Lightning Web Components, Flows) for a global pharmaceutical client.
- Evaluated GitHub Copilot on real user stories, reporting over 80% average time savings, which fed into the licence decision; wrote a 60-page onboarding guide adopted by teams in India and the Philippines.

Data Science and ML Extern, Google Developers × SmartBridge (remote) Aug 2023 – Nov 2023

- Built a real-time weapon-detection system on live video with YOLO and Flask, in a team of three.

Project: GPU-accelerated financial news sentiment Jan 2024 – Apr 2024

- Streamed news through Kafka and scored it with FinBERT, using RAPIDS cuDF on an RTX 2060 to cut end-to-end latency from about 8 minutes to 10 seconds. [code]

Skills

Programming and ML: Python, PyTorch, scikit-learn, NumPy, pandas, Flower (federated learning)
Systems: Linux, Docker, Git, CUDA, RAPIDS, Apache Kafka
Currently learning: MNE-Python and biosignal processing
Languages: English, Tamil