

Chandram Dutta

Software Engineer | EEE Undergraduate

PROFILE

I am a senior Electrical and Electronics Engineering student at VIT Vellore with a focus on software development and applied technology. Currently a Software Engineering Intern, I work on mobile apps with Flutter, Firebase, TypeScript, GCP, Swift, and Kotlin. I also have experience in web development (React, Next.js, Svelte) and programming in Rust. Passionate about AI and ML, I have hands-on experience with TensorFlow, PyTorch, and Apple MLX, and have authored research papers in electrical engineering. My goal is to create impactful solutions at the intersection of software, AI, and embedded systems.

EXPERIENCE

Software Engineering Intern, Adora Inc; Tokyo, Japan(Remote) — 2024-Present

- Engineered and optimized the Adora Parent and Child App for over 70,000 users.
- Spearheaded performance improvements, resulting in a 20% reduction in app size.
- Developed core features including cross-platform Web Filtering and intuitive Flutter UIs.
- Focused on stability and developer tooling.
- Engineered a custom Dart-based code analyzer to eliminate dead code.
- Overhauled iOS Screen Time functionality to resolve critical bugs and ensure stability.
- Streamlined iOS CI/CD workflows by migrating dependencies to Swift Package Manager (SPM), reducing build complexity.

Flutter Developer Freelancer, Ioninks; India(Remote) — 2022-2023

- Designed and launched Garuda Exams, an EdTech platform, in three months.
- Built the application using Flutter and Firebase.
- The platform serves high school and ITI students.
- Features include an advanced MCQ engine, unlimited mock tests, and real-time performance tracking.
- Led the development of three other internal mobile solutions.
- Managed the complete deployment lifecycle, including app store reviews and publishing.

PUBLICATIONS

Device to Measure Respiratory Rate in Children, in Resource Poor Settings (Published in Springer)

- Co-authored a research paper on a low-cost, Time-of-Flight (ToF) based medical device for pediatric pneumonia detection.
- Validation showed the device could estimate respiratory rate with high accuracy compared to manual counting.
- Published in *Sensing and Imaging*, Vol. 25, 2024

S. K. Rishvanth, M. Sailesh, S. Jain, A. Ghosh, C. Dutta, K. V. Arulalan, K. Selvakumar, and N. Prasanth, "Device to Measure Respiratory Rate in Children, in Resource Poor Settings," *Sensing and Imaging*, vol. 25, no. 1, Art. no. 49, Aug. 2024. DOI: 10.1007/s11220-024-00499-w

Programmable Wireless Adapter for Commercial Electric Drives and Multifunction Meters (Published in IEEE i-PACT 2023)

- Addressed the lack of continuous monitoring and data storage for commercial energy meters and industrial drives.
- Co-developed a low-cost, IoT-enabled programmable adapter to bridge standard Modbus RTU devices with cloud or on-premise servers.
- Interfaced ESP32 microcontrollers with Modbus RS-485 for data retrieval and developed a Flutter-based application for real-time visualization.
- Validated the system on a real-time chiller plant using Danfoss drives, enabling efficient energy utilization and remote equipment health assessment.

I. Mourishwar, C. M. Dutta, and K. Selvakumar, "Programmable Wireless Adapter for Commercial Electric Drives and Multifunction Meters," in *2023 Innovations in Power and Advanced Computing Technologies (i-PACT)*, Kuala Lumpur, Malaysia, 2023, pp. 1–5. DOI: 10.1109/i-PACT59837.2023.10434850

EDUCATION

Vellore Institute of Technology, Vellore, India – Bachelor of Technology in Electrical and Electronics Engineering, 2026

AWARDS

Apple Swift Student Challenge Winner, Cupertino, US – 2024

Won the Swift Student Challenge by developing an app aimed at music producers. This accomplishment demonstrates my proficiency in Swift programming and my ability to create impactful applications for creative professionals.

TECHNICAL PROJECTS

GPT-2 Language Model Implementation – Python, Apple MLX

- Implemented a 124M parameter GPT-2 model from scratch using Apple's MLX framework, optimizing matrix operations for unified memory on Apple Silicon.
- Engineered the complete Transformer architecture (Multi-Head Attention, LayerNorm, Embeddings) manually, without relying on pre-built Torch/TensorFlow blocks.
- Built a custom inference pipeline supporting top-k/top-p sampling for coherent text generation.

Iris: 2D Game Engine — Swift, Metal, Core Graphics

- Architected a minimalist 2D game engine for macOS using a direct Metal rendering pipeline, prioritizing raw frame throughput over heavy abstractions.
- Implemented advanced collision detection algorithms including Convex Hull generation and Pixel Masking for precise hit-box interactions.
- Designed a low-overhead "Update-Draw" loop architecture that explicitly avoids Entity-Component-Systems (ECS) to give developers direct memory control.

Recursive DNS Resolver — Rust, Network Programming

- Built a DNS resolver capable of parsing complex record types (A, AAAA, MX, SOA, SRV) directly from raw UDP byte streams.
- Implemented manual packet serialization/deserialization according to RFC 1035, including custom logic to handle DNS pointer compression for domain names.
- Leveraged Rust's ownership model to ensure memory safety while parsing untrusted network packets and managing record lifetimes.

Hyena: Static Analysis CLI | Dart, Abstract Syntax Trees (AST)

- Engineered a static analysis tool using the `dart:analyzer` package to traverse the AST and calculate Cyclomatic Complexity and Maintainability Index metrics.
- Implemented a dead code detection engine that identifies unused classes, methods, and variables across complex project structures.
- Designed for CI/CD integration with configurable failure thresholds and multi-format reporting (JSON, HTML, Markdown).