

# UJJAWAL CHUGH

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## ABOUT ME

Staff Engineer at [Samsung R&D](#) in team [Samsung Advanced Institute of Technology \(SAIT\)](#) leading end-to-end Artificial Intelligence (AI) product development while contributing to the research community with published papers.

## EXPERIENCE

### **Samsung Research & Development Institute, Bangalore**

Staff Engineer (ML)

Mar 2024 - Present

Associate Staff Engineer (ML)

Mar 2022 - Feb 2024

Senior Software Engineer (ML)

Mar 2021 - Feb 2022

Software Engineer (ML)

Jun 2019 - Mar 2021

#### **SAIT AI Tools based on Large Language Models (LLMs) for in-house usage**

- Leading a cross-functional team developing AI tools that offers: 1) multi-language code generation - C, C++, Java, Python and Verilog, 2) Document querying using Retrieval-augmented generation (RAG) and 3) prompt-based chat; serving 1500 employees with 620 requests per minute.
- Spearheaded the complete project lifecycle by gathering requirements, designing system architecture, conducting extensive experimentation, implementation and deploying into production.
- Engineered an advanced RAG system for querying JIRA issues, incorporating multi-agent communication, ReAct, and self-reflection techniques; attained 78% answer relevance.

#### **Distributed system environment using Docker Swarm and Redis**

- Led a team of 5 to develop a product enabling users to efficiently schedule and execute various jobs and experiments in a containerized environment across a cluster of nodes.
- The product is currently used by over 500 employees across teams and receives 270 requests per minute.

#### **PIMCompiler, a compiler for PIM (Processing in Memory) Hardware**

- Developed frontend and optimizer of PIMCompiler, generating PIM kernels for user's neural network models.
- The compiler generated code outperformed hand-optimized kernels for GEMM operations by up to 35%.

#### **Handwritten text recognition using Connectionist Temporal Classification (CTC)**

- Implemented a model based on CTC technique. The model had the character error rate (CER) of 6.5%.
- Deployed the model over cloud using docker containers and developed APIs for usage.

#### **QuantTC: Quantization framework for Machine Learning (ML) models**

- Built a framework for quantization of ML libraries and achieved up to 4x speedup in model inference.

### **Samsung Research & Development Institute, Bangalore | Software Engineer Intern**

May 2018 - Jul 2018

- Developed a pipeline to train and test various CNN models on different datasets and various metrics.
- Implemented all the stages - data loading and augmentation, training and testing the models.

## PUBLICATIONS

### **Optimized Convolutional Neural Networks (CNNs) using Reinforcement Learning (RL)**

[Paper Link](#)

Chugh, U., Mitra, et al. in 2021 IEEE International Symposium on Circuits and Systems (ISCAS)

- Devised an RL-based novel approach to accelerate CNN models on edge devices by up to 1.85x (85%).
- Played a key role in the back-end development of DeepC, deep learning compiler framework.

### **Accelerated Long short-term memory (LSTM) models' inference on edge devices**

[Paper Link](#)

Saluja, A., ..., Chugh, U., et al. in 2021 IEEE International Symposium on Circuits and Systems (ISCAS)

- Auto-tuned LSTMs for compiler optimizations via grid search and Bayesian optimization techniques.
- Decreased the inference time of LSTMs on edge devices by up to 3x (200%).

## EDUCATION

Netaji Subhas University of Technology, New Delhi

2015-2019

Bachelor of Engineering in Computer Engineering

CGPA: 8.09/10

## TECHNICAL SKILLS

Python, C++, C, ML, Deep Learning, RL, Generative AI, Tensorflow, Pytorch, Hugging Face, LangGraph, RLib, LangChain, Scikit-learn, Computer Vision, Natural Language, OpenCV, Stable Diffusion, OpenAI APIs, OpenCV Back-end development, AWS, Ray, Docker Swarm, Kubernetes, CI/CD, Git, Pandas

## ACHIEVEMENTS AND LEADERSHIP

**Samsung Excellence Award:** Awarded the Super Tech Award by Samsung R&D Institute in the innovator category for my contribution in research projects and for publishing two research papers in international top tier conferences.

**Samsung Software Competency Test:** Among the 10% of the team to clear the professional level of the test which assesses challenging programming implementation skills, held across Samsung software centres worldwide.