

# Naveen Kumar Reddy Somireddy

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## EDUCATION & SKILLS

### Indian Institute of Engineering Science and Technology, Shibpur

B.Tech in Information Technology – CGPA: 8.68

Howrah, India

2021 – 2025

- **Relevant Coursework:** Machine Learning, Artificial Intelligence, Data Structures & Algorithms, Operating Systems, DBMS, Computer Networks, Linear Algebra, and Computer Architecture.
- **Languages/Tools:** Python, C++, SQL, Git, Linux, REST APIs, PostgreSQL, Django ORM, Docker, AWS.
- **Frameworks/Technologies:** PyTorch, TensorFlow, Hugging Face, Federated Learning, Continual Learning, Django REST, React.

## EXPERIENCE

### Research Intern – Continual Federated Learning & ASR

IIIT Delhi

Under the guidance of Prof. Ranjitha Prasad

Dec 2024 – Present

- Developed C-FLAG, a federated continual learning framework integrating AGEM and memory-based gradients, evaluated on Split CIFAR-10/100 and TinyImageNet with high accuracy and low forgetting.
- Adapted OpenAI Whisper-Tiny into a privacy-preserving federated ASR system by decoupling the encoder and training a decoder for multilingual speech recognition on edge devices.

### Research Intern – Federated Learning Optimization

NITK Surathkal

Under the guidance of Prof Annappa.B

May 2024 – Nov 2024

- Trained a ResNet-18 model using FL on the NIH Chest X-ray dataset and proposed a client substitution strategy that improved accuracy by 5–8% in dropout scenarios.
- Designed a dynamic client scheduling approach based on device profiling and data heterogeneity to enhance training efficiency and convergence.

## PROJECTS

### Client Relationship Management System

Full-Stack Web Application — Django + React + PostgreSQL

Apr 2024 – Jul 2024

- Built a CRM web application using Django REST Framework (backend), React (frontend), and PostgreSQL (database).
- Created a role-based access system with three user types: **Organizers** (organization heads), **Agents** (field employees), and **Leads** (clients).
- Organizers can create agents(employees) and leads(clients), assign leads to agents, and classify them into custom categories based on work type or industry.
- Implemented real-time lead tracking and status updates accessible by both organizers and agents via a user-friendly web dashboard.
- Secured all API endpoints with token-based authentication and ensured seamless frontend-backend integration with efficient REST API calls.

### Real-Time Scene Graph Generation using YOLO and Relation Modeling

Computer Vision Research Project under Dr. Arindam Biswas

Jan 2024 – Mar 2024

- Designed a real-time Scene Graph Generation (SGG) framework integrating **YOLOv5** for object detection and **GloVe-based relation classification**.
- Engineered feature fusion using PAN-FPN and spatial encodings to improve object-relation understanding across diverse scenes.
- Implemented Region Of Interest (ROI) Align to extract precise region features and trained a custom relation predictor to classify object-object interactions.
- Achieved **14.5 mR@100** with real-time **30 FPS** throughput on the Panoptic Scene Graph Dataset.
- Applications include autonomous surveillance, robotic interaction, and scene understanding for AR/VR systems.

### Continual Federated Learning for Speech Tasks

IIIT Delhi

Research Project under Prof. Ranjitha Prasad

Dec 2024 – Present

- Proposed and implemented **C-FLAG** – a continual learning strategy combining local memory-based gradient replay and global gradient aggregation.
- Integrated **AGEM** into federated learning setups and tested on Split CIFAR-10, CIFAR-100, and TinyImageNet.
- Customized **OpenAI Whisper-Tiny** ASR model by freezing the encoder on client devices and training a lightweight decoder centrally in FL mode.
- Enabled privacy-preserving, multilingual continual ASR on edge devices without centralizing user speech data.
- Working on convergence proofs and scalability evaluation across heterogeneous client distributions.

## ACHIEVEMENTS

LeetCode Knight (Top 3%) – Solved 1100+ problems and participated in 100+ contests.

Ranked 97 in LeetCode Biweekly Contest 133 (Top 0.5%).

Ranked 337 in CodeChef Starters 90 Division 4 (Top 1%).