

# SIDDHARTH GANDHI

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## Education

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### Carnegie Mellon University - School of Computer Science

Expected Dec. 2024

Master of Science in Intelligent Information Systems (ML & NLP) — GPA: 4.0/4.33

Pittsburgh, PA

- Coursework: Deep Learning, Visual Learning, Multimodal ML, Machine Learning, Advanced NLP, Search Engines

### Vellore Institute of Technology - School of Computer Science & Engineering

July 2023

Bachelor of Technology in Computer Science & Engineering — GPA: 9.69/10

Vellore, India

- Department Rank 3 out of 1000+ students

## Experience

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### Carnegie Mellon University

Sept. 2023 – Present

Research Assistant (Advisor: Dr. Jamie Callan) | [initial report](#)

Pittsburgh, PA

- Researching how to employ neural Information Retrieval methods + LLMs for accurately finding & editing relevant code files in a large Github repository, given a new issue/feature request.

### Technical University of Munich

June 2022 – Aug. 2022

Research Intern (Advisor: Dr. Felix Dietrich) | [talk](#), [report](#)

Munich, Germany

- Investigated if neural nets can learn Stochastic Differential Equations (SDEs) modelling the growth of aerosol clouds.
- Automated Blender simulations of cloud dispersion & preprocessed the simulated images with U-Net (PyTorch).
- Modelled the underlying SDE of cloud trajectories using a neural net (Tensorflow) with a custom loss function based on the Euler Maruyama method for numerical approximation of SDEs (baseline).
- Achieved 80% lower MSE compared to baseline by finetuning neural net hyperparameters & applying Kernel Density Estimator (KDE) to compensate for class imbalance in the dataset.

## Technical Projects

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### QryEval - Search Engine from Scratch

Dec 2023

- Implemented BM25 & Indri rankers to search over 500K documents, and experimented with various multi-stage reranking pipelines using SVMRank (LTR), BERT & Dense rerankers, to achieve 50% higher MAP/P@10 over BM25 baseline.

### Refpred - A Literature Recommender (Bachelor's Thesis) | [github](#), [report](#)

July 2023

- Engineered a research paper recommender which utilizes both semantics & citation history to enhance literature search.
- Collected dense citation graph data by creating an asynchronous crawler to parse Semantic Scholar.
- Utilized SPECTER (a citation-informed transformer model) to generate dense vector embeddings from a paper's title + abstract & employed KNN to create baseline recommendations.
- Improved F1 @ 20 by 70% compared to baseline on test set by incorporating neural reranking on the KNN candidates (based on Learning to Rank), to add additional historical citation context.

### GradeAid - A Short Answer Grader | [github](#)

June 2022

- Built a smart grading assistant to automatically evaluate short essay responses using NLP.
- Utilized Flask, LSTMs & Sentence Transformers (with cosine similarity) in a team effort, to build a web app which grades answers based on grammar, semantics & an answer key, to calculate scores & highlight key missing points.

### PharmaVIT - A Pharmacy Management System | [github](#)

Dec. 2021

- Created a responsive web app with Bootstrap, ExpressJS & MySQL to enhance a pharmacy's efficiency & operations.
- Collaboratively implemented features like inventory management, customer cart, expiry alerts, new medicine request, billing with invoice & AuthN/Z with login/signup, adhering to an incremental SDLC model.

## Skills

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**Languages:** Python, C/C++, Javascript, Java | **Databases:** MySQL, MongoDB | **Certificate:** AWS Cloud Practitioner  
**Frameworks:** PyTorch, SKLearn, NLTK, Tensorflow, AsyncIO, Pandas, Numpy, Matplotlib, Flask, ExpressJS, Git, Optuna

## Awards & Achievements

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**(2019-23) Merit Scholarship & Award:** For being consistently ranked in the top 5 of VIT CS Department securing Rank #1, #5, #3 & #3 respectively for all 4 years out of 1000+ students.

**(2022) DAAD WISE Scholarship:** Selected as one of 130 nationally to pursue a fully-funded internship (by the German Government) at the Technical University of Munich, the top-ranked CS institute in Germany.