

# Siddharth Singh Solanki

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## Education

- Georgia Institute of Technology**, Atlanta, USA [Aug'22 - May'24(expected)]
  - Master's in Computer Science (Specialization: Machine Learning)
- Indian Institute of Technology Goa**, Farmagudi, India [Aug'18 - Jun'22]
  - B.Tech in Computer Science and Engineering (**CPI 9.72/10**) Bronze Medalist, ranked second in the batch

## Technical Skills

- Programming:** Python, C++, CUDA, Bash, SQLite
- Softwares/Libraries:** PyTorch, MATLAB, React

## Internships

- MathWorks**, Natick, USA [May'23 - Aug'23]
  - Worked with MATLAB and C++ codebase along with Simulink's parallel compute library.
  - Developed a function that allows users to define and execute custom progress trackers and plots for parallelized simulations without compromising the simulation speed.
  - It **reduces the execution time for a typical user workflow upto 10X** for simulations involving 3-D plots in aerospace and robotics applications.
  - Wrote unit, system tests and customer facing documentation. **Code will be shipped with 2024-a release of MATLAB.**
- MathWorks**, Hyderabad, India [Jun'21 - Nov'21]
  - Worked with C++, MATLAB and JavaScript codebases.
  - Optimized automated CNN deployment** feature in Deep Learning Toolbox for Intel architecture GPUs. Coded memory optimizations through techniques such as buffer reuse, layer fusion, and minimized data transfer between CPU and GPU.
  - Achieved 2X speedup in training popular CNNs** such as ResNet, VGG-16 and AlexNet.
  - Performed testing for deployment, code was **shipped with 2022-b, 2023-a release of MATLAB.**
- Machine Vision Lab - IIT Roorkee**, Roorkee, India [May'20 - Jul'20]
  - Computer Vision research under Prof. Balasubramanian Raman. Worked on moving hand sign recognition problem.
  - Used optical flow for sampling frames and extracted features by detecting keypoints and finetuning Resnet-50 and Inception-V3 on sign language datasets.
  - Developed a novel Recurrent Neural Network architecture** for sequence learning and **implemented an optimized version** of the developed proof of concept using PyTorch.

## Projects

- Master's Project — CollabNext** [Aug'23 - Present]
  - Working on backend data pipeline and predictive features for the CollabNext tool with Prof. Kexin Rong at [D2i Lab](#).
  - The raw data sources for this work include full scale OpenAlex and Web of Science datasets.
  - Handled SQL tables consisting more than ten million rows and wrote server side pyspark scripts for data processing.
  - Trained neural network based classifiers on top of LLM embeddings for a recommendation feature to predict top research keywords associated to a research paper, and recommend related research papers.
- Data Augmentation using diffusion models — Teaser Video** [Sep'23 - Nov'23]
  - Used diffusion models to substitute image augmentations in the contrastive learning approach used in the paper [SimCLR](#).
  - Wrote Bash scripts for training and configured Azure compute instances to streamline the model training process
  - Increased Top-1 accuracy by 9 percent on the imagenet dataset along with better compute efficiency on training.
- Stay Alive Think and Drive App — GitHub** [Feb'23 - Apr'23]
  - A web application which helps users to plan their journey by providing safety features based on past accident data, and live current weather conditions on the route.
  - Applied bayesian inferencing to compute a live risk score and warn the users of historically bad routes.
  - The app has a React frontend and Mongo DB backend. Integrated with google maps API and weather APIs that work live with geolocation after the user inputs a travel destination.
- Reliable Answer Deduction — Project page** [Sep'22 - Nov'22]
  - Worked with Stanford question answer Dataset on MRC task.
  - Experimented with different tokenizers and performed feature engineering to improve identification of unanswerable questions.
  - Fine tuned BERT based LLMs and experimented with different attention mechanisms to develop a model which gives answers to the questions asked from a given comprehension.
- Trash Classification — GitHub** [Nov'20 - Dec'20]
  - Cleaned and augmented TACO trash dataset. Modified the convolutional layers of a lightweight SSD7 object detector.
  - The developed model is edge deployable and can identify and classify upto 7 different trash categories and outputs bounding boxes over all the instances of trash in an image.