

Siddharth Singh Solanki

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Education

- Georgia Institute of Technology**, Atlanta, USA [2022 - Present]
 - Master's in Computer Science (Specialisation: Machine Learning)
- Indian Institute of Technology Goa**, Farmagudi, India [2018 - 2022]
 - B.Tech in Computer Science and Engineering (**CPI 9.72/10**) Bronze Medalist, ranked second in the batch

Technical Skills

- Programming:** Python, C++, C, Bash, OpenGL, SQLite, JavaScript
- Softwares/Libraries:** PyTorch, MATLAB, L^AT_EX, Android Studio

Internships

- MathWorks**, Natick, USA [2023]
 - 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 automotive applications.
 - Wrote unit, system tests and customer facing documentation. **Code will be shipped with 2024-a release of MATLAB.**
- MathWorks**, Hyderabad, India [2021]
 - Worked with C++, MATLAB and JavaScript codebases.
 - Optimized automated CNN deployment** feature for Intel architecture GPUs. Performed 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.
 - In another project, worked on **full stack feature development** for a MATLAB application in the signal processing toolbox.
 - Performed testing for deployment, code was **shipped with 2022-b, 2023-a release of MATLAB.**
- Machine Vision Lab - IIT Roorkee**, Roorkee, India [2020]
 - 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

- Data Augmentation using diffusion models** — [Teaser Video](#) [2023]
 - Used diffusion models to substitute image augmentations in the contrastive learning approach used in the paper [SimCLR](#).
 - 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](#) [2023]
 - 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.
 - 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 route.
- Reliable Answer Deduction** — [Project page](#) [2022]
 - 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.
- Distributionally Robust Optimization** — [Report](#) [2022]
 - B.Tech research project; studied mathematical guarantees in making robust decisions under stochastic and adversarial paradigms.
 - Coded computationally tractable formulations using Wasserstein metric for classification applications to achieve better performance than standard scikit-learn functions.
- Building an Assistant bot** [2021]
 - Worked on building a assistant bot in a national robotics competition. Implemented Monte carlo localization using point cloud mapping for autonomous navigation. [Simulation Video](#)
 - Used Octomap and trained a YOLO object detector model for automation of perceiving and picking trash objects using a robotic arm. [Simulation Video](#)
- Trash Classification** — [GitHub](#) [2020]
 - 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.