

Mrinaal Dogra

LEAD ENGINEER · SAMSUNG R&D INSTITUTE INDIA - BANGALORE

☎ (+91) 91498 06473 | ✉ mrinaal.dogra19@gmail.com | 🌐 mrinaald.github.io | 📷 [mrinaald](#) | 🌐 [mrinaald](#)

Education

Year	Degree	Institute	CPI/%
2015-2019	B.Tech Computer Science and Engineering	IIT Kanpur	9.0/10.0
2015	All India Senior School Certificate Exam (CBSE)	KV No.2 Jammu Cantt.	94%
2013	All India Secondary School Exam (CBSE)	KV No.2 Jammu Cantt.	10.0/10.0

Work Experience

Samsung R&D Institute India - Bangalore

Bangalore, India

LEAD ENGINEER, MACHINE LEARNING

Mar. 2023 - Present

- Working on identifying bottlenecks and enhancing the Android graphics rendering pipeline by adding improvements in the Android framework
- Developing an in-house Android profiling tool to benchmark Android rendering uniformly across various Samsung apps and devices

SENIOR SOFTWARE ENGINEER, MACHINE LEARNING

Mar. 2021 - Feb. 2023

- Developed on-device machine learning (ML) model that uses phone usage data to **detect boredom** while a user is using their phone
- Developed an end-to-end Android application to demonstrate the effectiveness of the boredom ML model to the stakeholders
- Worked on developing a deep neural network (DNN) model that uses phone usage data to **predict demographic age and gender**
- Developed the above model using TensorFlow Federated and Flower libraries to train it in a **Federated Learning (FL)** environment
- Developed a **differential privacy-based** ML solution for the problem of **Privacy Protected Semantic Location Tagging**

SOFTWARE ENGINEER, MACHINE LEARNING

Jun. 2019 - Feb. 2021

- Developed Android application for visualizing depth maps and 3D Point-cloud from Time-of-Flight (ToF) camera feed in real-time
- Developed gesture-based UI features such as Zoom, Pan, and Rotation for the point-cloud visualization module in the Android app
- Worked on developing an **on-device privacy-preserving** DNN model-based solution for the problem of **Next App Recommendation**
- Above DNN model was designed under strict memory constraints to minimize network bandwidth costs during various **FL** execution steps
- Developed and trained the DNN model in Java using the **DL4J** library so that it can be trained and used on-device on Android
- Developed an Android User Trial (UT) application that supported FL, model training, and inference on-device for the DNN model

Samsung R&D Institute India - Bangalore

Bangalore, India

UNDERGRADUATE SOFTWARE DEVELOPER INTERNSHIP

May 2018 - Jul. 2018

- Developed Neural Network (NN) model to predict the current location of a user based on their recent locations and time of the day
- Developed a **simulation environment in Python** for replicating which cell tower in a given area a user would be connected to while in transit
- Developed an **ML classification model** to predict which cell tower a user is most likely connected to at any time of the day
- Top-1 and Top-3 prediction accuracies for the final model were 85-90% and 90-95% respectively on the in-house evaluation dataset

Hike Private Limited

New Delhi, India

UNDERGRADUATE SOFTWARE DEVELOPER INTERNSHIP

May 2017 - Jul. 2017

- Implemented **Convolutional Neural Network (CNN)** models using Python and TensorFlow for an image classification problem
- Used Google ML-Engine APIs to train various CNN models on the Google Cloud for accelerated experimentations and training
- Developed Server-Client support using TensorFlow Serving for exposing REST APIs to generate predictions from the trained models

Patents and Publications

PUBLICATIONS

Memory Efficient Federated Recommendation Model [\[link\]](#)

2022

2022 IEEE 16TH INTERNATIONAL CONFERENCE ON SEMANTIC COMPUTING (ICSC)

PATENTS

System and Method for Distributed Learning of Universal Vector Representations on Edge Devices [\[link\]](#)

2023

US 17/946349

Methods and Electronic Devices for Behavior Detection using Federated Learning [\[link\]](#)

2023

US 18/191403

One more patent has been filed and is in the publication process

2023

Skills

Programming	Python, JAVA, C/C++, Shell Script(Bash), Go, LaTeX
Libraries	Tensorflow, Scikit-learn, DeepLearning4Java(DL4J), Flask, MPICH C++, OpenCV, CUDA C/C++
Software & Tools	Git, Perforce Helix Core, GDB, ROS
OS and Platforms	Linux, Windows, Raspberry-Pi, Arduino
Languages	English(Fluent), Hindi(Native Speaker)

Projects

HealthCare DApp

IIT Kanpur

COURSE PROJECT: BLOCKCHAIN TECHNOLOGY AND APPLICATIONS, PROF. SANDEEP SHUKLA

Jan. 2019 - Apr. 2019

- Decentralized Application (DApp) implemented using Ethereum Blockchain platform to keep patients' and doctors' data at a health center.
- Application allows a patient to maintain their medical data and reports securely using blockchain technology.
- Patients were given full control over their data, and only they had the power to grant access of their data to any doctor.
- Application also supported appointment bookings, where a patient can book an appointment with a doctor one-week in advance.

Multi-user P2P Video Conferencing Web Application

IIT Kanpur

COURSE PROJECT: COMPUTER NETWORKS, PROF. DHEERAJ SANGHI

Aug. 2018 - Nov. 2018

- Implemented a video conferencing web application capable of handling multi-stream video feeds of many users.
- Application supported peer-to-peer communication and multiple conference rooms, each room capable to run an independent conference.
- Used WebRTC communication technology to enable real-time media communication between peers connected in a conference room.

One-Shot Learning

IIT Kanpur

COURSE PROJECT: DATA MINING, PROF. ARNAB BHATTACHARYA

Aug. 2018 - Nov. 2018

- One-Shot learning tries to solve the object categorization problem while using one, or only a few, samples of each of the output category/class.
- Studied and implemented the state-of-the-art methods of one shot learning, specifically Siamese networks and Matching Networks.
- Used the Omniglot and MNIST datasets for analyzing the effectiveness of implemented methods.

Neural Network Based Modelling and Control of Quadrotor

IIT Kanpur

UNDERGRADUATE PROJECT, PROF. INDRANIL SAHA

Jan. 2018 - Apr. 2018

- Implemented Neural networks to learn a quadrotor model and its dynamics, and used them to synthesize its controller.
- Simulation environment was set up comprising of Mavros, PX4 and Gazebo which was used to fly a virtual quadrotor and to collect data.
- Collected data for multiple trajectories involving straight lines, sinusoidal, and random trajectories, for training the models.
- Models were tested against circular trajectory which was not part of the training data, and satisfactory results were obtained.

Detecting Semantically Similar Questions on Quora Dataset

IIT Kanpur

COURSE PROJECT: NATURAL LANGUAGE PROCESSING, PROF. HARISH KARNICK

Jan. 2018 - Apr. 2018

- Performed literature review on the existing work for detecting semantically equivalent questions from any publicly available corpora.
- Implemented a state-of-the-art work and conducted hyper-parameter tuning for training the model on Quora dataset.
- Implemented another model using Siamese neural network architecture and achieved near state-of-the-art accuracy.
- Proposed and tested few variations of the Siamese network approach while trying to improve the test accuracy.
- Analyzed the effect of including few linguistic constraints in order to improve performance and analyzed the results.

Ada to MIPS Compiler implemented in C++

IIT Kanpur

COURSE PROJECT: COMPILER DESIGN, PROF. SUBHAJIT ROY

Jan. 2018 - Apr. 2018

- Implemented an Ada to MIPS compiler using C++ as the source language of the compiler.
- Implemented language features include Basic Arithmetic operations, Range Operator, Constant Variables, Fixed size Arrays with upto two dimension support, If-Else and If-Else-Else conditionals, Switch cases, Simple for, while, and do-while loops, Procedures(Functions) and Recursions, Packages(Classes) supporting any number of data members as well as objects of other packages, and Package level Methods.
- Basic Integer and Character data types were supported for all implemented features.

Real-time Sentiment Analysis of Video Feed

IIT Kanpur

COURSE PROJECT: INTRODUCTION TO MACHINE LEARNING, PROF. PURUSHOTTAM KAR

Aug. 2017 - Nov. 2017

- Analyzed performance of existing standard CNN networks like LeNet and MobileNet to classify user sentiment from real-time video feed.
- Proposed and implemented a smaller version of AlexNet in order to reduce model complexity.

Humanoid Robotics Project

IIT Kanpur

CORE MEMBER, ROBOTICS CLUB

Oct. 2015 - Apr. 2017

- Implemented various algorithms such as Line Following, Object Detection and Object Tracking using OpenCV C++.
- Implemented the Speech Recognition, Chat-bot and the Integration System modules for the project HURO in the SnT Summer Camp 2016.
- Actively worked with team on Computer Vision problem statements required for participation in the competition HuroCup Fira, a robotic game and robotics benchmark problem for humanoid robots.
- Implemented Histogram Backprojection algorithm using OpenCV for improving object detection module of the robot.

N-Body Simulation in CUDA

IIT Kanpur

PROJECT UNDER ACA (ASSOCIATION OF COMPUTER ACTIVITIES)

Jan. 2016 - Apr. 2016

- Implemented a simulation of dynamical system consisting of a large number of particles, moving under the influence of gravity
- Used the C++ CUDA APIs for parallel implementation of the simulation on a Nvidia GPU
- Implemented the visual realization of the simulation using the OpenCV library in C++

Relevant Coursework

ONLINE COURSES

Machine Learning	Generative Adversarial Networks (GANs) Specialization - DeepLearning.AI (3 Courses)
	Reinforcement Learning Specialization - University of Alberta (4 Courses)
	Machine Learning Engineering for Production (MLOps) Specialization - DeepLearning.AI (4 Courses)
	Convolutional Neural Networks - DeepLearning.AI
	Sequence Models - DeepLearning.AI
	Hyperparameter Tuning, Regularization and Optimization - DeepLearning.AI
Robotics	Robotics Specialization - University of Pennsylvania (6 Courses)

UNDERGRADUATE

Machine Learning	Introduction to Machine Learning, Natural Language Processing, Data Mining, Computational Cognitive Science
Computer Science	Operating Systems, Computer Networks, Parallel Computing, Data Structure & Algorithm, Advanced Algorithms, Compiler Design, Computer Systems Security, Introduction to Software Engineering, Blockchain Technology
Others	Introduction to Electronics, Introduction to Electrical Engineering, Neurobiology

Awards and Achievements

2023	Key Talent Recognition Program , Samsung R&D Institute India - Bangalore	Bengaluru, India
2022	SPOT Award , Samsung R&D Institute India - Bangalore	Bengaluru, India
2021	SPOT Award , Samsung R&D Institute India - Bangalore	Bengaluru, India
2020	Clean Code Culture Award , Samsung R&D Institute India - Bangalore	Bengaluru, India
2020	Samsung Citizenship Award , People & Process - Commitment, Samsung R&D Institute India - Bangalore	Bengaluru, India
2018	Academic Excellence Award , 2017-18 Academic Year, Dept. of Computer Science and Engineering	IIT Kanpur

Positions of Responsibility

2022	Project Mentor , Mentored multiple Interns at Samsung R&D Institute India - Bangalore	IIT Kanpur
2019	Project Mentor , Project under Association of Computer Activities (ACA)	IIT Kanpur
2018	Teaching Assistant , Course: Data Structures and Algorithms	IIT Kanpur
2017-18	Event Manager , Robogames Techkriti'18	IIT Kanpur
2016-17	Student Guide , Counselling Service	IIT Kanpur
2016-17	Secretary , Robotics Club	IIT Kanpur