

Gautam Kumar

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Education

Indian Institute of Technology Roorkee, India

B.TECH. IN ELECTRICAL ENGINEERING

GPA: 8.46 / 10

July'11 - May'15

Experience

Qualcomm

MACHINE LEARNING ENGINEER

- Development of Snapdragon Neural Processing Engine SDK.
- Enabling deep neural networks inferences on mobile devices.
- Optimizations for Hardware accelerated inferences on CPU Runtime.
- Worked extensively on deep learning model conversion of Tensorflow/Caffe pre-trained models to Qualcomm Proprietary format.
- Analysis and debugging of performance and power of the neural network.

Hyderabad, India

March'18 - Present

Qualcomm

CHIPSET POWER SYSTEMS ENGINEER

- Drive the roadmap for power management features(HW/SW) in Snapdragon processors.
- Chipset Power Lead of Snapdragon 425 SoC and Snapdragon 632 SoC.
- Designing of Power Grid for attaining best power in minimum cost constraints. Tuning of clock plans of multiple cores/sub-systems.
- Modeling and Projection of Power usage goals for Snapdragon processor.
- Investigation of HW and SW architecture involving analysis of the data flow of important use cases to find novel power optimization solutions.
- Development and exploration of machine learning based solutions for improving power and performance of Snapdragon chipsets.

Hyderabad, India

June'15 - Feb'18

Qualcomm

SOFTWARE ENGINEERING INTERN

- Developed a fully automated Testing Framework(JTF) for testing of Qualcomm-powered Android devices in a simple and time-efficient way.
- Automated NFC Testing using Robotic Arm and later integrated it into JTF.

Hyderabad, India

May'14 - July'14

Projects

Evaluation of Transformer Neural Network Models

DEEP LEARNING

- Evaluated Transformer based models for sequence to sequence learning and comparison with the existing state of the art RNN Models.
- Scoped out the Tensorflow Layers Implementation to support the model in SNPE.

Qualcomm

2019

Active Noise Cancellation using Recurrent Neural Networks

DEEP LEARNING

- Implementation of a Recurrent Neural Network for audio noise suppression based on RnnNoise project by Mozilla.
- Developed an Android application which uses Tensorflow Mobile for execution of the neural networks.

Qualcomm

2018

Power Waveform Analyzer for Energy Residency analysis

POWER SYSTEMS

- Development of a tool for analysis of power waveforms collected on mobile chipsets.
- Improved the methodology of use-case power analysis based on the energy consumption patterns across the available frequency levels for CPU, GPU, Memory, Modem, and, other cores.

Qualcomm

2018

Temperature Prediction using Recurrent Neural Network

DEEP LEARNING

- Developed a Hierarchical Bi-directional Recurrent Neural Network Architecture to predict the future temperatures of the most thermally-sensitive cores inside a Snapdragon Processor, for pro-active thermal mitigation to allow the device to run near the thermal limit.
- Inputs to the network comprised of a sequence of SoC states over the past few seconds, where each state is defined by 44 features consisting of low-level CPU parameters and readings from temperature sensors.
- Improved the robustness of the model by Ensemble Averaging and K-Fold Cross Validation.

Qualcomm

2017

Facial Keypoints Detection using Convolutional Neural Network

DEEP LEARNING

- Implemented a Deep Convolutional Neural Network for prediction of keypoints positions on the human face which could be used for various applications such as Facial Recognition.
- Input consists of thousands of B/W images of 96x96 pixels.

Kaggle

2017

Rainfall Estimation using Recurrent Neural Network

DEEP LEARNING

- Implemented a Recurrent Neural Network for prediction of Hourly Rainfall gauge levels recorded over a few months in 2014 over the US mid-western corn-growing state.
- Inputs consisted of a sequence of multiple polarimetric weather radar observations over the course of an hour, where each measurement consisted of 22 features.
- Employed Ensemble Averaging and K-Fold Cross Validation to improve the prediction accuracy.

Kaggle

2016

Workload Classification using Supervised Learning

Qualcomm

MACHINE LEARNING

2016

- Developed a novel approach for classification of CPU workloads into two disparate classes for improving CPU Governor Algorithm.
- Used k-Nearest Neighbours Algorithm for classifying new workloads.

Lowlevel CPU stats Logger for ARM CPU

IIT Roorkee

CPU ARCHITECTURE

2016

- Developed a logging mechanism for periodically collecting lowlevel CPU stats like Instructions Executed, Cache Accesses, DDR Accesses and Activity in real time on Snapdragon Chipsets having ARM-based Apps Processor.

Implementation of Backpropagation Algorithm in VHDL

IIT Roorkee

HARDWARE PROGRAMMING | MACHINE LEARNING

2015

- The project envisages the performance of FPGA (Field Programmable Gate Array) for applications in machine learning by implementing Backpropagation Algorithm and compare the execution time with the software implementation in python.
- Implemented the Backpropagation algorithm in VHDL. Constructed different modules for the hidden nodes and output nodes which give the flexibility to constructing any network.
- Verified the accuracy and correctness of our implementation by simulating the XOR problem as a small dataset problem and Fisher Iris problem as a large dataset problem.

Letter Image Recognition using Neural Network

Qualcomm

MACHINE LEARNING

2014

- The project involved the development of an artificially intelligent method to recognize the hand-written English alphabets.
- In the development process, 20000+ Character images were used, based on 20+ different fonts and each letter was randomly distorted to produce a file of 20,000+ unique stimuli, each having 15+ primitive numerical attributes which were used to train the neural network.

Coursework

Undergraduate

IIT Roorkee

MACHINE LEARNING | ARTIFICIAL NEURAL NETWORKS | COMPUTER SYSTEMS & PROGRAMMING | DATA STRUCTURES | ADVANCED
SYSTEM ENGINEERING | CONTROL SYSTEM

Independent

DEEP LEARNING | OPERATING SYSTEMS | COMPUTER ARCHITECTURE | ALGORITHMS | INTRODUCTION TO COMPUTER SCIENCE AND
PROGRAMMING

Skills

Programming & Deep Learning Tools

C++ | C | ANDROID | PYTHON | MATLAB | TENSORFLOW | CAFFE | KERAS | ONNX | GIT | GDB

Platforms and Build System

LINUX | OPENEMBEDDED LINUX | ANDROID | CMAKE

Scholarships & Achievements

2019	Patent : Granted , Power and Performance Aware Memory-Controller Voting Mechanism.	Qualcomm
2017	Patent : Submitted , Deep learning based Temperature predictor for Pro-Active Thermal Mitigation.	Qualcomm
2014-16	Recipient , Multiple Qualstar Hall of Fame for exceptional contributions as an Engineer and Intern.	Qualcomm
2011-15	Recipient , Merit-Cum-Means Scholarship for undergraduate studies (INR 25000/year)	IIT Roorkee