Kartik Khandelwal

+82 10-9613-5862 • kartikkhandelwal1998@gmail.com
kartik14.github.io • kartik14 • kartik14

Education

Indian Institute of Technology, Bombay **2016-2020**
Bachelors of Technology in Computer Science with Honours *GPA : 9.44/10.0*

Bachelor's Thesis: Black-Box Adaptation of ASR for accented Speech with Prof. Preethi Jyothi & Prof. Sunita Sarawagi. Part of work published as a full paper at InterSpeech 2020, Shanghai, China
Teaching Assistant(TA): CS 101 Introduction to Programming (Autumn 2019) , Data Structures and Algorithms, BodhiTree, IIT Bombay (Autumn 2018)
Coursework include Data Structures and Algorithms; Operating Systems; Computer Networks; Computer Architecture; Relational Databases; Machine Learning; Computer Vision; Reinforcement Learning; Programming Paradigms; Calculus; Probability Theory; Statistical Inference

Jayshree Periwal High School, Jaipur **2014-2016**
Central Board of Secondary Education *GPA : 92.6%*

Work Experience

Research & Development Engineer **Oct 2020 - Present**
AI R&D Team, Mobile Division *Samsung Electronics HQ, South Korea*

Worked on development of Deep CNN based models for Samsung's voice assistant, Bixby (Voice Assistant) for applications in device wakeup and user voice verification.

Bixby Voice Matching Team

- Worked on improving robustness of speaker verification engine for use in inter-device auto-enrollment and verification for different locales, devices and SNRs
- Implemented MLOps workflows using Kubeflow, AWS and GitHub Action for streamlined data processing, model training, evaluation and deployment
- Worked on development of a personalised speaker verification model which incrementally improves performance using on-device training on user data

Bixby Wakeup Team

- Worked on development of low-footprint light-weight Multi-Keyword Spotting engines for applications in Mobile camera and earbuds hand-less control
- Worked on development of easy-to-tune keyword model using Model Agnostic Meta Learning which can be quickly fine-tuned for user-defined wake words under few shot on-device setting
- Explored model quantisation and network pruning techniques for reducing model parameters and FLOP's

ML Research Intern **May-July 2019**
Guide: Dr. Hyunson Seo *Samsung Electronics HQ, South Korea*

Analyzed and evaluated model frameworks and training techniques proposed in recent Deep Learning literature for Keyword Spotting(KWS) with focus on reducing model size and latency while maintaining performance

Robotics Research Intern **May-July 2018**
Guide: Prof. Arantza Aldea *Oxford Brookes University, UK*

Involved in ideation, design and development of robots for teaching STEM concepts to school students

Honors & Awards

- Awarded S/W Professional certification in Samsung internal coding test, receiving monetary benefits (2021)
- Received Institute Academic Award, IIT Bombay for exceptional Academic Performance (2017)
- Achieved All India Rank 210 in IIT JEE-Advanced among 1.2 million candidates (2016)
- Awarded the KVPY Fellowship by DST, Govt. of India with All India Rank 98 (2014)
- Awarded National Talent Search Examination scholarship(NTSE) by NCERT, Govt. of India (2012)

Notable Projects

Prostrate Cancer Grade Assessment | Medical Image Processing Spring 2020
Used DNNs(EfficientNet) for ISUP grade assessment of prostate cancer from gigapixel WSI of prostrate biopsy employing Tiling, Segmentation and Attention based Multi-Instance Learning approaches

Adversarial Examples for Keyword spotting | Automatic Speech Recognition Autumn 2019
Used AdvGAN to generate Adversarial examples for keyword spotting achieving a reduction in accuracy of the KWS from 94% to 71% using the generated adversarial examples

Chinese Checkers AI | Functional Programming Spring 2018
Designed a GUI-based application for Chinese Checkers using functional programming in Racket, using minimax algorithm with alpha-beta pruning to develop AI for Chinese Checkers

Meltdown, Analysis and Experiments | Computer Architecture Autumn 2018
Demonstrated meltdown vulnerability on Linux machines without KAISER (Kernel Address Isolation) support, exploiting out-of-order execution and Flush+Reload side channel attack to read arbitrary kernel-memory addresses

Artistic Style Transfer using Image Processing | Digital Image Processing Autumn 2018
Implemented style transfer algorithm for transferring style of given image to context of another image based on paper by elad et al which formulated the task as an expectation-maximization optimisation

Toonify - A Cartoonifying App | Software Systems Lab Autumn 2017
Developed a Mobile Android App for photo editing features including cartoonifying, pencil sketch generation and other image transformation features.

Landmark Recognition | Deep Learning Autumn 2019
Implemented Siamese Network based NN for the task of landmark recognition over an extremely noisy and per-class-sparse dataset using GEM pooling and Batch Hard Triplet loss for training

Technical Skills

Languages: Python, C/C++, Bash, Java, Matlab, Racket
Tools: Git, Github Actions, PostgreSQL, Tensorflow, Pytorch, Docker, AWS, Kubernetes, Kubeflow

Miscellaneous

Languages: Hindi (Native), English (Proficient), Korean (Intermediate)
Citizenship: Indian