

ANIRUDH AJITH

Indian Institute of Technology Madras

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Education

Indian Institute of Technology Madras

2018 – 2022

B. Tech, Computer Science and Engineering; CGPA: 9.42

Chennai, India

AECS Maaruthi Magnolia PU College

2016 – 2018

Department Of Pre-University Education, Karnataka; 96%

Bangalore, India

National Public School, Rajajinagar

2004 – 2016

Central Board of Secondary Education; CGPA: 10

Bangalore, India

Research Projects

Tuning sentence-embeddings for high-recall IVFPQ search *Dr. Mitesh Khapra, Dr. Pratyush Kumar* | Aug 2021–present

- Devised a method to improve recall of IVFPQ approximate nearest-neighbour search with the goal of improved bitext mining.
- Adapted an existing differentiable product quantization formulation to create a differentiable formulation of IVFPQ quantization that outputs quantized representations and codes required for IVFPQ search which is e2e trainable in a neural network.
- Devised a training paradigm that allows the model to optimise sentence embeddings it generates to make them more suitable for high-recall bitext mining (when using IVFPQ indexing).

Sample-specific attention-head masks in BERT models *Dr. Pratyush Kumar, Dr. Mitesh Khapra* | Feb – Apr 2021

- Performed experiments testing possible applications of trained sample-specific attention-head masks in BERT models.
- Developed a technique to detect adversarial inputs during test-time using their sample-specific masks using mask-inversion, layer-wise predictions, etc.
- Achieved accuracies of between 0.8055 and 0.9027 accuracy on adversarial input detection on four GLUE datasets.

Internships

Microsoft India (R&D) Pvt Ltd | C#, Python, Microsoft COSMOS, other internal tools

May – Jul 2021

- Created a troubleshooting-snippet disambiguation pipeline for Microsoft's *Bing* search-engine.
- The pipeline takes a set of solution snippets (scraped from various websites using existing *Bing* infrastructure) to a tech-related troubleshooting search query and filters it down to a set of semantically unique solutions for direct display on the *Bing* SERP.

Flutura Decision Sciences & Analytics | Python, TensorFlow, Keras

May – Jul 2020

- Developed computer vision models based on *YOLOv4* and *Retinanet*.
- Created computer-vision products for multiple clients from scratch on problems including 1) autonomous defect detection in die-casted components, 2) autonomous cell-phone usage detection and 3) autonomous defect detection in printed circuit boards.

Professor Rupesh Nasre, IIT Madras | Kotlin, Android Studio

May – Jul 2020

- Researched, scripted and created multiple instructional videos on selected topics in parallel processing.
- Created an Android app from which the videos could be viewed.

Selected Course Projects

automated B/W portrait colorization | PyTorch

Professor Sukhendu Das | Sep – Nov 2021

- Created a pipeline which performs image restoration, colorization and enhancement using multiple published methods for photo-realistically converting B/W historical to color using few training samples.

image2image translation | PyTorch

Professor Anurag Mittal | Dec – Jan 2021

- implemented, tested and benchmarked a unified framework proposed by a [CVPR paper](#) on Image to Image Translation for Domain Adaptation

σ -promoter classification | PyTorch

Professor Manikandan Narayanan | Nov – Dec 2020

- augmented a [SOTA model](#) for σ -promoter classification in *E. coli* by introducing attention layers and residual connections to increase accuracy by 1.6%.

device driver | C, RISC-V

Professor Chester Rebeiro | Nov – Dec 2020

- Wrote a UART device driver for *ZephyrRTOS* for the RISC-V *Shakti E-class Parashu* SOC.
- Performed testing on a physical SOC unit.

C compiler | C, x86 assembly, Lex, Yacc

Professor Rupesh Nasre | Jul – Nov 2020

- Wrote an compiler for a slightly stripped-down version of C using the tools Lex and Yacc.
- Wrote an LR(1) context free grammar for C and encoded it into Yacc, designed logic to carry out code generation and implemented 6 parse-tree level optimizations.

16-bit computer | C++

Professor V. Kamakoti | Jul – Nov 2019

- Created a functional computer with a simple 16 bit architecture (in a simulator) bottom-up using only NAND gates.
- Wrote an assembler, and a basic compiler for an LL(2) high-level language in C++.

Personal Projects

automated attendance system | *TensorFlow, Keras*

May – Jul 2020

- Created an autonomous attendance system pipeline for classrooms using the popular neural networks *MTCNN* and *FaceNet*.
- Wrote a KNN-like algorithm to match faces from a PTZ camera feed to personal identities using a database containing ~ 4 photographs each of students' faces.

process wallpaper | *Python, Bash*

Aug - Sep 2019

- Wrote a set of Python and bash scripts which periodically set the desktop wallpaper to a wordcloud of the most resource-intensive processes running.
- This project became semipopular on GitHub and was mentioned on an episode of a podcast called *Linux Unplugged*.

miniprojects | *Python, React, Angular, nodeJS, Bash*

Oct – Jan 2020

- **web development** Worked on front-, and back-end development for the official website of *Saarang 2020*, the annual IIT Madras cultural fest.
- **classic games** Created clones of *Snake* and *2048*.
- **gp** Created and implemented a personal multi-platform pseudorandom strong password generation scheme
- **breaking-badify** Wrote a script which creates images of input text using symbols from the periodic table.

Scholastic Achievements

2020 **IAS Fellowship** Recipient of Indian Academy of Sciences Summer Research Fellowship

2020 **Flipkart GRiD 2.0 Hackathon** Declared National level Semi-Finalist

2016 **KVPY** Secured All India Rank 108 in Kishore Vaigyanik Protsahan Yojana (SA)

2016 **NTSE** Secured National Talent Search scholarship

2015-18 **Indian National Olympiads** National Finalist in Computing/Informatics every year from 2015 to 2018, in Astronomy in 2017 & 2018 (State rank 1, National top 1%), Physics in 2018 (State rank 4, National top 1%) and Merit Certificate for State top 1% in Chemistry

2017 **National Mathematics Talent Contest** Secured All India Rank 9 in Ramanujan contest

2016-17 **Regional Mathematics Olympiad** Selected for Indian National Mathematics Olympiad Training Camp

Relevant Coursework

computer science: Introduction to Programming (+ Lab); Discrete Mathematics for Computer Science; Programming and Data Structures (+ Lab); Foundations of Computer Systems Design (+ Lab); Languages, Machines and Computation; Design and Analysis of Algorithms; Computer Organisation and Architecture (+ Lab); Object-Oriented Algorithms Implementation and Analysis Lab; Pattern Recognition and Machine Learning; Compiler Design (+ Lab); Operating Systems (+ Lab); Paradigms of Programming; Algorithmic Approaches to Computational Biology; Foundations of Deep Learning; Reinforcement Learning; Statistical Foundations of Data Science; Computer Vision; Natural Language Processing

mathematics: Multivariable Calculus; Series and Matrices; Basic Graph Theory; Probability, Stochastic Processes and Statistics; Differential Equations; Linear Algebra

online: Machine Learning; Neural Networks and Deep Learning; Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization; Structuring Machine Learning Projects; Convolutional Neural Networks; Sequence Models

Technical Skills

languages: C, C++, Python, Julia, JavaScript, Bash

software: Linux, Git, Docker, GNU Octave, L^AT_EX, GIMP, Google Sketchup

development: HTML, CSS, JavaScript, nodeJS, ReactJS, Angular

operating systems: Linux, Windows

Positions of Responsibility

Computer Vision and Intelligence Group

2019

Project Member

Indian Institute of Technology Madras

Developmental Operations Team, Saarang 2020

2019

Coordinator

Indian Institute of Technology Madras

Computer Science Association

2013 – 2014

President

National Public School, Rajajinagar