Yash Sharma
Computer Science & Engineering
Indian Institute of Technology Bombay
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Roll No. 17D070059
Male
UG Fourth Year (B.Tech.)
DOB: 20.09.1999

Examination	Affiliation	Institute	Year	GPA
Graduation (ongoing)	IIT Bombay	IIT Bombay	2021 (expected)	9.66
Intermediate(+2)	TSBIE	Narayana Junior College	2017	98.1%
Matriculation	CBSE	Delhi Public School, Secunderabad	2015	10.0

Pursuing **Honours** in Computer Science and Engineering, and a **Minor** in **Data Science**.

Academic Achievements

- Currently ranked 10^{th} in the Department, in a batch of 122 students (2021)
- Awarded the **Institute Academic Prize** for academic excellence in the year 2017 - 2018 (2018)
- Granted **Change of Branch** to the Computer Science & Engineering Department, based on CPI (2018)
- Awarded **AP grade** in the Chemistry Lab course for ideal performance (2018)
- Secured an **All India Rank of 46** in JEE (Main) and **345** in JEE (Advanced) among 1.4 million candidates (2017)

Internships

Network Automation & Kubernetes Service Load testing *Summer 2020*
Samsung Electronics Korea *Remote Research Intern*

- Understanding **kubernetes** cluster (**deployment**, **pods** and **services**) and load balancing in detail
- Built an automated testing framework using **Locust**, supporting various **Layer 4** & **Layer 7** protocols to evaluate performance of Samsung's load balancing tools
- As part of enhancing the virtual experience, participated in fun online competitions involving programming questions

Welineation - Crowdsourcing and Consolidation of Medical Segmentation *Summer 2019*
Techniche Universität Braunschweig Guide- *Prof. Thomas Deserno* | *Research Intern*

- Implemented a variant of **STAPLE**, an expectation maximization algorithm, with a custom **Markov Random Field** (MRF) prior to delineate ground-truth like segmentations from crowdsourced data
- Deployed a complete application stack with a **Django** backend and **JS** frontend, **PostgreSQL** DB coupled with **Celery** + **Redis** task management of docker containers on a **kubernetes** cluster
- Leveraged a controlled study to test the system and rank user performance
- Presented **Welineation** in the 2020 **SPIE** Medical Imaging Conference at Houston, TX

Research Experience

Improving Low Resource Code-switched ASR *Winter 2019 to Spring 2021 (Ongoing)*
Microsoft IDC[1] / IIT Bombay[2] *Guides - Basil Abraham[1], Prof. Preethi Jyothi[2]* | *BTech Thesis & RnD Project*

- Developed end-to-end based **Automatic Speech Recognition** models trained on Hindi and English monolingual data to recognize **code-switched** speech, using a targeted approach
- Proposed techniques to leverage code-switched **Text to Speech** (TTS) to improve performance in low-resource settings
- Ideated a new loss function to target underlying distributions and frequency of one language over the other
- Used existing techniques like augmentation and encoder freezing to avoid over-fitting on synthetic artefacts
- Paper accepted for presentation at the **Interspeech 2020** conference.
- Ongoing work to further explore avenues of improvement of code-switched speech recognition models

Debug Tool for GCC Validation Plugin *Autumn 2020, Spring 2021*
IIT Bombay *Guides - Prof. Supratik Chakraborty, Prof. Amitabha Sanyal* | *RnD Project*

- Part of the research team developing a plugin to validate gcc's various optimization passes using equality propagation and leveraging bounded model checkers
- Constructing a **regression testing tool** for the same in order to confirm bug fixes, and identify new bugs
- Expanding coverage of the validator on the `spec2006_cpu` benchmark

Transfer Learning and Speech Representations *Autumn 2019*
IIT Bombay *Guide - Prof. Preethi Jyothi* | *Seminar*

- A learning-based research experience centred around **Automatic Speech Recognition** systems for **low-resource languages** with a resource-rich dialect, focused mainly on Indo-Aryan languages, and an effort to capture dialectal (local) and global representations of these languages

Key Projects

Open-Ended Reinforcement Learning *Spring - 2021 (Ongoing)*
Guide- *Prof. Shivaram Kalyanakrishnan* IIT Bombay

- Using Uber's **POET** algorithm to apply open-ended evolutionary strategies to solve increasingly complex **mazes**

Analysis of Negative Interference in Multilingual Models *Spring - 2021 (Ongoing)*
Guide- *Prof. Sunita Sarawagi* IIT Bombay

- Target to analyse negative interference and improve performance in various NLP tasks on the **GLUECoS** dataset using the proposed meta learning approach in [Wang et al, EMNLP 2020]

Morphological Inflection *Spring - 2021 (Ongoing)*
Guide- *Prof. Pushpak Bhattacharya* IIT Bombay

- Target to implement Low-Resource **Morphological Inflection** in PyTorch, following [Anastasopoulos et al, ACL 2019]

Parallel and Concurrent Programming in Haskell *Spring - 2021 (Ongoing)*
Guide- *Prof. Amitabha Sanyal* IIT Bombay

- Implementing a **Hackage** that exposes an API to parallelize functional programs written in Haskell with ease

Self Load-Balancing Server *Spring - 2020*
Guide- *Prof. Mythili Vutukuru* IIT Bombay

- Made a server-manager using the **libvirt API** to manage connections from multiple nodes, failure due to timeouts

VQA - Inferring and executing programs *Autumn - 2019*
Guide- *Prof. Ganesh Ramakrishnan* IIT Bombay

- Using parallel forward propagation and hard parameter sharing to optimize existing architectures for Visual Question Answering without loss in performance

What's NE(x)T - a content-based music recommendation system *Autumn - 2019*
Guide- *Prof. Preethi Jyothi* IIT Bombay

- Followed [Oord et al, NeurIPS 2013] to implement a recommendation system based on audio signals, feedback of user likings and bag-of-word lyrics, using **CNNs**.

Medical Segmentation using Deep Learning *Spring - 2019*
Guide- *Prof. Suyash Awate* IIT Bombay

- Implemented state-of-the-art **UNet** models and a modified **attention UNet** for the task of segmentation

Complete Implementation of Open Shortest Path First *Spring - 2019*
Guide- *Prof. Ashwin Gumaste* IIT Bombay

- Implemented an end-to-end routing protocol using the **OSPF** version 2, with reference to [**rfc 2328**]

Secure Personal Cloud *Autumn - 2018*
Guide- *Prof. Soumen Chakrabarti* IIT Bombay

- Constructed a **'zero-knowledge' cloud** server and client with end-to-end encryption using **AES, Triple DES and RC4 encryption** techniques, following industrial standards, with keys stored locally
- Developed a linux desktop and web client for local decryption and viewing compatibility on multiple platforms

Technical Skills

Programming	**Fluent** in C++/C, Python, BASH, MATLAB, Haskell, Racket, NuSMV **Familiar** with Prolog, Answer Set Programming, Java, JavaScript, HTML, django
ML Toolkits	PyTorch, kaldi, Keras, TensorFlow
Softwares	Docker, Git, LaTeX, Android Studio, AutoCAD, SolidWorks, Xilinx ISE

Positions of Responsibility

Teaching Assistant
CS 251 - *Software Systems Lab*, **Fall 2019 & Fall 2020** Course Instructor - *Prof. Amitabha Sanyal*

- Orchestrating and preparing assignments for the lab course of "SSL" for second year students of CSE department.

MA 105 - *Calculus*, Fall 2018 Course Instructors- *Prof. Shripad Garge, Prof. Sourav Pal, Prof. Saurav Bhaumik*

- Selected to teach a class of **50 freshmen**, evaluated exam papers and volunteered to help beyond class hours

Courses Undertaken

Computer Science	Advances in Intelligent & Learning Agents[1], Theoretical ML, Adv. ML[1], Automatic Speech Recognition, Concurrent Programming[1], Functional Programming[1], Deep Learning for NLP[1], Operating Systems, Medical Image Computing, Computer Networks, Software Systems Lab
Mathematics	Discrete Structures, Calculus, Linear Algebra, Differential Equations, Systems and Control
Others	Environment Sciences, Psychology, Quantum Physics, Biology, Chemistry, Economics

[1]to be completed in May 2021

Extracurriculars

- Qualified for the final round of **Microsoft AI Challenge** *Winter - 2018*
- Secured 321^{st} rank globally in **picoCTF** conducted by **Carnegie Mellon University** *Autumn - 2018*
- Completed a semester in **French** Language Course, offered by the International Relations Office *Autumn - 2018*
- Hosted speaker sessions and organized shows as an organizer in **E-Summit**, a two-day business event conducted by **Entrepreneurship Cell**, IIT Bombay *Spring - 2018*
- Successfully completed an year long course in **Indian Classical Vocals** under the **NSO programme** *2017 – 18*
- Stood **first** in a Shakespearan themed Inter-School Dramatics competition *2015*
- Participated in the Jr. Model United Nations conducted by Indus World School in Hyderabad, India *2013*