



Yash Shah
Computer Science & Engineering
Indian Institute of Technology Bombay

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B.Tech.
Male
DOB: 23/01/1998

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2020	9.24
Intermediate/+2	CBSE	New Era Sr. Sec. School	2016	95.80
Matriculation	CBSE	New Era Sr. Sec. School	2014	10.00

Pursuing Honors in Computer Science and Minor in Applied Statistics and Informatics · Passionate about deep learning as applied to natural language processing, speech and visual recognition.

INTERNSHIPS

- **Verisk | AI, Verisk Analytics** May 2019 - July 2019
Project: Active Learning in Speech Supervisor: Dr. Maneesh Singh
 - Critically analyzed existing architectures for *active learning* and *domain adaptation* in end-to-end ASR
 - Suggested novel variants for *adversarial learning* of *accent invariant speech representations* in *active* and *semi-supervised* settings; continuing to work on it as a part of my undergraduate thesis
- **SINAPSE Lab, National University of Singapore** May 2018 - July 2018
Project: 3D Shape Recognition using Tactile Feedback Supervisor: Prof. Alcimar Soares
 - Developed an *algorithm to construct and normalize* a point cloud using tactile feedback obtained by palpating an object with a sensor-mounted robotic hand
 - Proposed and implemented a *surface reconstruction* and *shape recognition* pipeline using a *multi-view CNN* operating on perspectives of the input point cloud from the enclosing cube's face-centers

MACHINE LEARNING EXPERIENCE

- Member of Prof. Preethi Jyothi's **Computational Speech and Language Technologies (CSALT) Lab** at IIT Bombay since January 2018.
- **Active Learning for Accent Adaptation in End-To-End ASR** July 2019 - present
B.Tech Project - I (CS 492) Advisor: Prof. Preethi Jyothi
 - Building ASR models that adapt to Indian accent after pre-training on US accented data, using *domain adversarial training* (DAT) and *active querying* of unlabelled, informative Indian accent samples
- **Exploring Hybrid Models for Morphologically Rich Languages** July 2018 - May 2019
Seminar (CS 396) + non-credit work Advisor: Prof. Preethi Jyothi
 - Proposed a *factored output model* with *jointly learned mixture weights* that predicted the next word using word and morpheme-level probability distributions
 - Devised a novel, *frequency-based unsupervised algorithm* to get canonical segmentations of words
 - Submitted the work as a *short paper* to *EMNLP 2019*
- **VAEs with Jointly Optimized Latent Dependency Structure** January 2019 - April 2019
Course Project (CS 726) Advisor: Prof. Sunita Sarawagi
 - Provided the *first open-source* PyTorch implementation of the paper (same title as above) that appeared in *ICLR 2019*, to the best of my knowledge
 - Proposed replacing the top-down inference module with a recurrent network to get slightly better empirical results at the cost of latent structure interpretability; also, *extended* the authors' approach to *sequential data* following *Markov assumption* and derived the corresponding ELBO term
- **Modeling 3D Human Dynamics for Motion Forecasting** January 2019 - April 2019
R&D Project - II (CS 485) Advisor: Prof. Arjun Jain
 - Formulated a *latent generative model* for motion synthesis which modeled motion by *decomposing* it into a series of 'bands' and implemented it in the *Neural Ordinary Differential Equations* framework
 - Performed experiments to judge NODE's applicability to the task, and also theoretically *extended* the notion to other *variational recurrent neural network* models
- **Alternate Loss Functions for Neural Language Modeling** January 2018 - April 2018
R&D Project - I (CS 490) Advisor: Prof. Preethi Jyothi
 - Explored and proposed *novel loss functions* for leveraging n-gram statistics in language modeling by (statistical to neural) *transfer learning* and *minimizing divergence* between distributions
 - Suggested simple approaches for *decreasing* overall *training time* and *storage space* (for n-gram model) within this setup with *minimal effect on performance*

- **Handwriting Synthesis and Text Prediction using RNNs** January 2018 - April 2018
Course Project (EE 769) Advisor: Prof. Amit Sethi
 - Used a *mixture of gaussians* over a recurrent (LSTM) network to model variables governing pen's movement
 - Stacked it with a neural language model to build a system for writing sentences on its own given a prior context

KEY ACHIEVEMENTS

- Adjudged the **Campus Winner** at **Microsoft's code.fun.do** Hackathon '16; made it to the **finals** of **code.fun.do Showcase** at MS-IDC, Hyderabad in May '17.
- Recipient of the **Institute Academic Prize** for academic excellence for the year 2016-17.
- Awarded **AP Grades** in Linear Algebra, Quantum Physics & its Applications and Physical Chemistry.
- Secured **All India Rank 47** in **JEE Advanced '16** and **All India Rank 66** in **JEE Mains '16**.
- Recipient of the **National Talent Search Scholarship** by Govt. of India since 2012.

OTHER PROJECTS

- **SPSIM - Superscalar Processor Simulator** July 2018 - November 2018
Course Project (CS 305 + CS 341) Advisor: Prof. Bernard Menezes
 - Designed a *simulator* in C++ for a **7-stage pipelined superscalar processor** with dynamic branch prediction and speculative execution, and data, control and branch hazards appropriately dealt with
 - Implemented algorithms for register renaming and remapping, out-of-order instruction issuance and in-order instruction graduation
- **Efficient Digital Grading Environment** July 2018 - November 2018
Course Project (CS 387) Advisor: Prof. S. Sudarshan
 - Designed a Flutter-based Android app for *simplifying* the **grading and feedback process** of examinations for instructors, students and TAs, using PostgreSQL and Java servlets as backend
 - Key features included splitting of answersheets according to questions, distribution of splits to assigned TAs, and displaying aggregated grades and corrected answers back to students
- **Wirespace** July 2017 - November 2017
Course Project (CS 251) Advisor: Prof. Kavi Arya
 - Developed a Django/Python based utility to **facilitate disk-space sharing** amongst users over the same network with features such as access/visibility levels, shareable links and time slots
 - **One of the four** projects showcased online on Web and Coding Club, IIT Bombay's **Hall of Fame**
- **CheerBot** November 2016
Microsoft's code.fun.do Hackathon Team CodeX
 - Developed a chatbot to tackle anxiety and depression using **Microsoft's Bot Framework** that interacted with the user using predefined questions and **analyzed sentiment** based on the responses
 - Implemented **keyphrase detection** on user responses to motivate them using relevant quotes fetched from the internet using **Bing Search APIs**
 - Adjudged the **winner** out of **36 submissions** made by teams from across the IIT Bombay campus

TECHNICAL SKILLS

Python (PyTorch, TensorFlow), C/C++, MATLAB/Octave, Java, HTML, CSS, JavaScript, Git, Bash

KEY COURSES UNDERTAKEN

A.I./M.L. & Computer Science Automatic Speech Recognition* · Speech Processing[†]* · Foundations of Intelligence and Learning Agents* · Artificial Intelligence and Machine Learning · Advanced Machine Learning · Introduction to Machine Learning[†] · Data Analysis and Interpretation · Data Structures and Algorithms · Discrete Structures · Design and Analysis of Algorithms · Computer Graphics · Fundamentals of Digital Image Processing

Statistics & Mathematics Applied Stochastic Processes · Statistical Inference · Introduction to Probability Theory · Linear Algebra · Numerical Analysis · Calculus (*to be completed by Nov' 19, [†]offered by EE department)

POSITIONS OF RESPONSIBILITY

- **Teaching Assistant**, Artificial Intelligence and Machine Learning (CS 337) + Lab (CS 335)
Duration: August 2019 - present, *Instructor:* Prof. Ganesh Ramakrishnan
- **Teaching Assistant**, Abstractions and Paradigms in Programming (CS 152) + Lab (CS 154)
Duration: January 2018 - April 2018, *Instructor:* Prof. Amitabha Sanyal
- **Department Web Secretary**, Computer Science and Engineering Association
Duration: April 2017 - April 2018

EXTRACURRICULARS

- Secured **3rd** position overall in Web Development General Championship held at IIT Bombay. (2018)
- Selected for the in-semester preparatory basketball camp for **52nd Inter-IIT Sports Meet**. (2017)
- Completed a year long course offered by **National Sports Organization** in **Basketball**. (2016)