Dhruti Shah

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Education

2019–2022 **Masters in Data Science**, *EPFL, 5.34/6.0*.
Master Thesis at **IBM Research**
Advised by Prof. Rudiger Urbanke (EPFL) and Cristiano Malossi (IBM Research)
Conducting research in areas of Computer Vision and Signal Processing.

2014–2019 **Bachelors + Masters in Electrical Engineering**, *IIT Bombay, 9.30/10*.
Shankar Dayal Sharma **Institute Gold Medalist** – awarded for general proficiency
Master Thesis in '*Top-m entity resolution*' advised by Prof. Nikhil Karamchandani
Completed with Minor in Computer Science

Experience

Title **Apple Zurich, Machine Learning Engineer** [May'22-Present]
Apple Zurich

Description Machine learning engineer at AI/ML Apple Zurich. Working on scalable Machine learning models and data pipelines for real world problems in Vision and Text space.

Title **Interactive Fast Annotation Method for Machine Learning pipelines** [2021-22]
Master Thesis, AI Automation Team, IBM Research

Description Deep learning has achieved remarkable performance in computer vision due to the availability of large, well-curated data sets (e.g. ImageNet, COCO). However, there still exist several application scenarios where either the amount or quality of annotations is limited. Further, existing annotation tools present several limitations like operating with application-specific labels like cracks on Civil Engineering structures. To address these issues, we are working towards developing a method for auto-annotation.

Title **Improved Image Stitching for Defect and Anomaly Detection [Patent]** [2020-21]
Research Internship, AI Automation Team, IBM Research

Description Current image stitching algorithms suffer from scalability, low speed and distort component images for a smooth output. We develop a fast image stitching method that works for a large number of planar images. Our algorithm runs on the GPU providing a speed-up of 30x, and stitches more than 100 images in under 5 min. It is integrated with state-of-the-art detection methods, to localize defects on high-end civil engineering infrastructure. Further, we utilized image registration techniques to study the evolution of defects over time.

Technical Strengths

Languages Python, Go, C++, C, Spark, SQL
Frameworks Jax, Pytorch, Tensorflow

Key Projects

Title   **Long-term motion prediction using keyposes**   **[2021]**
Computer Vision (CV) Lab, EPFL

Description   The problem of human pose motion forecasting can be tackled by decomposing the input sequence into few essential 'keyposes' and performing prediction over these keyposes. Current works determine the key poses using traditional k-Means clustering and perform sequence prediction using RNN-based architectures. In natural language processing and vision, transformers are becoming the de-facto model for sequence prediction. Therefore, we replace the RNNs with the transformer architecture. Additionally, we explore the use of VQ-VAE based models to obtain a better set of keyposes.

Title   **Top-m entity resolution**   **[2018-19]**
Master Thesis, Signal Processing Lab, IIT bombay
Published in **AAAI 2020** (20.6% acceptance rate)

Description   We developed information theoretic bounds and algorithms to identify the top clusters for entity resolution in presence of an oracle. We considered two cases, one with a noisy oracle and the second with noisy side information matrix. Provided a theoretical proof and supporting empirical study (on Amazon Purchase Dataset) that our algorithm reduces the query complexity from $O(n^2)$ to $O(n \log n)$ in both cases.

Academic Achievements

- Recipient of the Shankar Dayal Sharma **Institute Gold Medal** out of more than 900 graduating students for general proficiency, both academic and extra-curricular.
- Secured **State Rank 1** among girls in JEE-Mains-2014, national level engineering entrance examination, out of **1.5 million** candidates
- Secured **All India Rank 328** in JEE-Advanced-2014 out of **150,000** candidates

Leadership and Volunteering

Fall 2017   **Contingent Leader, Inter IIT sports meet**, *IIT Bombay*.
First ever female contingent leader to lead the IIT Bombay contingent at Inter IIT sports meet
Led 150-member strong IIT Bombay contingent to victory, winning the overall General Championship trophy. Fostered team spirit by interacting with captains, coordinating practice sessions, team selections of all sports

2017-19   **Institute Student Mentor**, *IIT Bombay*.
Part of 80 member team to help freshmen students; ensure their smooth transition to college life
Selected from over 350 applicants based on peer review, academic, and mentoring skills. Mentoring 12 freshmen students to guide them for overcoming academic & personal difficulties

2016-19   **Volunteer, Abhiyasika Social Services**, *IIT Bombay*.
Abhiyasika – Student initiative of IIT Bombay to tutor underprivileged students in a slum
Volunteering to teach English and Science to grade 11 and 12 students from underprivileged families twice a week. Conducted career counselling sessions to inculcate the value of higher education among low-income families