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Parth Kothari

Education

2018–Present **Ph.D in Electrical Engineering**, *EPFL*, *6.0/6.0*.
Affiliated with the Visual Intelligence For Transportation (VITA) Labratory
Currently conducting research in areas of Behavior Prediction, Socially-Aware Agents

2014–2018 **B.Tech in Electrical Engineering**, *IIT Bombay*, *9.74/10*.
Completed with Minor in Computer Science and Honors in Electrical Engineering
Department Rank 2 in a batch of 66 students
Institute Rank 7 in a batch of 880 students

Research Projects

Title **TrajNet++: Trajectory Forecasting Benchmark** [Challenge] [Code] [2020]
Prof. Alexandre Alahi, Visual Intelligence for Transport (VITA), EPFL
*Challenge appearing in **IEEE International Conference on Robotics and Automation (ICRA) 2020 Workshop***

Description Current forecasting methods have been evaluated on different subsets of the available data without proper indexing of trajectories making it difficult to objectively compare the techniques. Our benchmark provides proper indexing of trajectories as well as a unified extensive evaluation system to test the gathered methods for a fair comparison.

Title **Collaborative Sampling in Generative Adversarial Networks** [Paper] [Code] [2019]
Prof. Alexandre Alahi, Visual Intelligence for Transport (VITA), EPFL
*Published in **Association for Advancement of Artificial Intelligence (AAAI) 2020** (20.6% acceptance rate)*

Description Developed a collaborative sampling scheme between the generator and the discriminator for improved data generation during sampling. Proposed a practical discriminator shaping method for effective sample refinement. Experiments on synthetic and image datasets demonstrate the efficacy of our method to improve generated samples both quantitatively and qualitatively, offering a new degree of freedom in GAN sampling.

Title **Adversarial Loss for Human Trajectory Prediction** [Paper] [2019]
Prof. Alexandre Alahi, Visual Intelligence for Transport (VITA), EPFL
*Published in **European Association for Research in Transportation (hEART), 2019***

Description Highlighted an unexpected pitfall in the state-of-the-art architecture for multimodal human prediction via controlled experiments. Proposed a modification to the architecture leveraging the progress in the GAN community. Demonstrate the efficacy of the proposed modification on real world datasets, indicating room for improvement on state-of-the-art.

Title **Improved Trace Gas Plume Detection using Hyperspectral Imaging** [2017]
Prof. Sarang Joshi, Scientific Computing and Imaging Institute, Utah

Description Developed an algorithm for improved trace gas plume detection in collaboration with JPL, NASA in order to find unrecorded sources of these trace gases from hyperspectral images. Implemention based on maximum likelihood estimation technique with weighted covariance matrix update. Detected significantly fewer false positives and lower background radiance without affecting the plume detection ability.

Key Projects

Title **iFood Challenge, CVPR 2018** [Code] [2018]
Fine Grained Visual Classification (FVGC) Workshop

Description Developed a neural network architecture, comprising of weighted ensembles of CNNs, to classify images into 211 fine-grained food categories. Awarded a prize of $200 for securing 3^{rd} position out of 27 participating teams.

Title **ChessOverIP: An autonomous single player chess bot** [Video] [Code] [2014]
Student Technical Activities Body (STAB), IIT-Bombay

Description Developed an image processing algorithm to identify the move played with the help of OpenCV library. Determined the next best move based on Min-Max Algorithm using Alpha-Beta Pruning. Received Best Implementation Award in the TechRnD Expo 2015, selected out of 121 projects

Technical Strengths

Languages Python, C++, C, MATLAB, Embedded C, Latex, HTML, CSS

Softwares Pytorch, Tensorflow, OpenCV, Raspberry Pi, OpenGL, AVR

Academic Achievements

- Recipient of the **Institute Academic Prize** for securing **First Rank** out of 66 students of the Electrical Engineering Department in the second academic year 2015-16.
- Secured **State Rank 1** and **All India Rank 11** in JEE-Mains-2014, national level engineering entrance examination, out of **1.5 million** candidates
- Secured **All India Rank 458** in JEE-Advanced-2014 out of **150,000** candidates
- Awarded **Gold medal** in Indian National Physics Olympiad-2014 and Indian National Chemistry Olympiad-2014 for being among the top 35 students in India

Relevant Courses

CS Courses Machine Learning, Computer Vision, Digital Image Processing, Advanced Image Processing, Medical Image Processing, Data Structures and Algorithms

EE Courses Signals and Systems, Digital Signal Processing, Advanced Topics in Signal Processing, Markov Chains, Control Systems, Probability and Random Processes

Math Courses Linear Algebra, Applied Mathematical Analysis, Complex Analysis, Calculus

Leadership

Spring 2020 **Teaching Assistant for Deep Learning for Autonomous Vehicles**, *EPFL*, [Page].

Autumn 2018 **Teaching Assistant for Calculus**, *IIT Bombay*.

2016–2017 **Manager, Electronics Club**, *IIT Bombay*.
Conducted workshops, institute-wide events, hackathons and group discussions to promote Electronics among the student community
Awarded Technical Organizational Special Mention for exemplary contribution

2017-2018 **Student Mentor, Institute Student Mentorship Programme**.
Responsible for mentoring a group of 12 freshmen to help adjust to the new environment, academically and socially and guide them towards a holistic development ensuring a smooth transition to college life