

Education

- September 2019–Present **PhD in Machine Learning**, TÉLÉCOM PARIS, Institut Polytechnique de Paris, France
Thesis: [A Flexible Framework for Interpretable Machine Learning: Application to Image and Audio Classification](#)
Advisors: Prof. Florence d'Alché-Buc & Prof. Pavlo Mozharovskyi, Telecom Paris
Committee: Grégoire Montavon, Patrick Pérez, David Alvarez-Melis, Nicolas Thome, Stéphane Canu.
◦ Developing post-hoc/by-design interpretation methods using concept-based representations for deep neural networks, with applications to audio and image classification tasks
- July 2014–19 **Dual Degree (B.Tech + M.Tech)**, IIT Bombay, Electrical Engineering, CPI: 9.05/10
Specialization: Communication & Signal Processing
Thesis: [Audio Style Transfer: Transformations between speech and singing](#)
Advisors: Prof. Preeti Rao, IIT Bombay & Dr. Yi-Hsuan Yang, Academia Sinica, Taiwan
◦ Investigated style transfer techniques for audio signals
◦ Focused on converting spoken audio into sung audio and vice-versa using deep learning

Awards and Achievements

- 2018–15 Awarded **AP grade** for exceptional performance in the course EE763: Science of Information, Statistics and Learning (Spring 17-18), and ES200: Environmental Studies (Autumn 15-16)
- 2016 Awarded **travel grant** and **distinctive mention** for work at MediaEval 2016 Workshop held at Netherlands Institute of Sound and Vision, Hilversum, Netherlands
- 2013 Awarded **Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship** 2013

Publications

- [1] **J. Parekh**, S. Parekh, P. Mozharovskyi, F. d'Alché-Buc and G. Richard (2023). Tackling Interpretability in Audio Classification Networks with Non-negative Matrix Factorization. under submission to **IEEE/ACM TASLP**.
- [2] **J. Parekh**, S. Parekh, P. Mozharovskyi, F. d'Alché-Buc and G. Richard (2022). Listen to Interpret: Post-hoc Interpretability for Audio Networks with NMF. Published in **NeurIPS 2022**.
- [3] **J. Parekh**, P. Mozharovskyi and F. d'Alché-Buc. A Framework to Learn with Interpretation. Published in **NeurIPS 2021**.
- [4] **J. Parekh**, P. Rao, and YH Yang. Speech-to-Singing Conversion in an Encoder-Decoder Framework. Published in **IEEE ICASSP 2020 (Oral)**.
- [5] **J. Parekh**, H. Tibrewal, and S. Parekh. Deep Pairwise Classification and Ranking for Predicting Media Interestingness. Published in **ACM ICMR 2018**.
- [6] V. Beaudouin, I. Bloch, D. Bounie, S. Clemencon, F. d'Alché-Buc, J. Egan, W. Maxwell, P. Mozharovskyi, and **J. Parekh**. Flexible and Context-Specific AI Explainability: A Multidisciplinary Approach. arXiv preprint, shorter version presented at **ECAI 2020** workshop

Projects and Internships

- May–June 2017 **Summer Internship**, TECHNICOLOR R&D France
2D & 3D Human Pose Estimation Networks
Advisors: Pierre Hellier (Principal Scientist) & Louis Chevallier, Technicolor R&D France
◦ Completed internship as part of an industrial project on Motion Synthesis in Animation
◦ Implemented and tested stacked hourglass based deep CNNs for 2D and 3D human pose estimation

2016 & 2017 MediaEval Benchmarking Initiative Participation

Predicting Media Interestingness Task

Organizers: Technicolor, France, ETH Zurich *et al.*

- o Developed novel methods for ranking a set of images/video-shots extracted from movie trailers according to their interestingness to a common viewer
- o Netherlands 2016: achieved a mean average precision (MAP) of 0.23 for images - **Team Rank 3/12**
- o Ireland 2017 (web participation): achieved a MAP of 0.25 for images & 0.19 for videos

Feb–April 2018 Supervised Research Exposition, IIT Bombay

Surface Defect Detection

Advisor: Prof. Subhasis Chaudhuri, Department of Electrical Engineering, IIT Bombay

- o Explored various techniques and studied relevant literature for surface defect detection
- o Applied transfer-learning based methods for plant disease detection

2016–18 Selected Undergraduate Projects

- o **Image Style Transfer using Graph-CNN** – Implemented a unsupervised, graph signal processing based, random shallow CNN for image style transfer (CS726 **Instructor:** Prof. Sunita Sarawagi)
- o **Blind Audio Source Separation** – Implemented a NMF, LPC based error clustering criterion algorithm for blind audio source separation (Python) (EE338 **Instructor:** Prof. Vikram Gadre)
- o **Rank Modulation Codes for Flash Memory** – Attempted proving existence/non-existence of perfect codes in permutation codes with Kendall- τ metric (**Advisor:** Prof. Saravanan Vijayakumaran)
- o **Semantic Labeling** – Developed algorithm for semantic segmentation of outdoor images (Python)
- o **Detection of Moving Objects in Videos** – Studied and implemented simplified version of a paper based on mean-shift and max-flow min-cut algorithms for the same (CS663 **Instructor:** Prof. Suyash Awate)
- o **Q-Learning for TSC** – Implemented Q-Learning based algorithms for traffic signal control on a grid based 9 junction road network using SUMO traffic simulator (EE763 **Instructor:** Prof. Vivek Borkar)
- o **Artificial Synesthesia** – Studied and implemented a simplified CCA-based algorithm for image-audio cross modal retrieval (CS403 **Instructor:** Prof. Ganesh Ramakrishnan)

Services

Reviewing IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Multimedia, NeurIPS 2023

Teaching Served as TA undertaking teaching/practicals/evaluation responsibilities for multiple courses, **Machine Learning** (Telecom Paris, 3 times during 2020–22), **Analytical Signal Processing** (IIT Bombay, Spring 18-19), **Probability & Random Processes** (IIT Bombay, Autumn 18-19) and **Linear Algebra** (IIT Bombay, Autumn 17-18)

Skills

Programming Languages: C/C++, Python (including PyTorch, Keras, Tensorflow), VHDL
Software Tools: AutoCAD, SUMO, Ngspice, Quartus Prime

Courses Advanced courses in ML, CV, Optimization, Signal Processing, Summer schools – MuSTeR 2016 (IISc Bangalore), MLSS 2021 (Virtual), OxML 2022 (University of Oxford)

Extra-Curricular

Sports

2014-18 **Silver medal** in Institute Squash League, **3X finalist** of Squash General Championship

2009 Umed Club District Open Squash Championship (Finalist)

2007-08 **Participated** in Harish Chandra Golcha Memorial Rajasthan Open Squash Championship, Junior National Squash Championship, Otters Open, CCI Open

Cultural

2008-12 Member of Choir group in DPS Jodhpur

2003-10 Won several competitions like Calligraphy, Debate, Drama, Poetry recitation, Best Student Award

2009 & 2005 Samvaad – A personality development program – 45 and 30 days respectively