Deep Patel

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Education

May 2021 – Present
Ph.D, *Indian Institute of Science (IISc)*, Bangalore, *CGPA: 8.5/10.*
Department of Electrical Engineering
Advisor: Prof. P.S. Sastry

Aug. 2018 – April 2021
M.Tech (Research), *Indian Institute of Science (IISc)*, Bangalore, *CGPA: 7.7/10.*
Department of Electrical Engineering
Thesis: A Study of Robust Learning under Label Noise with Neural Networks [link]
Advisor: Prof. P.S. Sastry

July 2012 –July 2016
B.Tech, *PDPU*, Gandhinagar, *CGPA: 8.29/10.*
Department of Electrical Engineering

Work Experience

Sept. 2017 –July 2018
Project Assistant, *EE Department*, IISc, Bangalore.
Advisor: Prof. Prasanta Kumar Ghosh
Funding Agencies: DST India & Pratiksha Trust

Aug. 2016 –Sept. 2017
Graduate Engineer Trainee, *Reliance Industries Ltd. (RIL)*, Jamnagar, Gujarat.
- Observation of electrical commissioning and maintenance activities at a Low Density Polyethylene Manufacturing (LDPE) Plant, RIL J3 Project

Teaching Experience

Sept. 2020 –Jan. 2021
Teaching Assistant, *EE Department*, IISc, Bangalore.
Course: Stochastic Models and Applications

Jan. 2020 –June 2020
Teaching Assistant, *EE Department*, IISc, Bangalore.
Course: Pattern Recognition and Neural Networks (PRNN)

Publications (Related to Thesis)

PAKDD 2021 **Patel, D.** et al., '*Memorization in Deep Neural Networks: Does the Loss Function Matter?*' [paper] [video]

arXiv Preprint (2021) **Patel, D.** et al., '*Adaptive Sample Selection for Robust Learning under Label Noise*' [paper] [video]

Other Publications

Interspeech 2019 B. N., Suhas, **Patel, D**, et al., '*Comparison of Speech Tasks and Recording Devices for Voice Based Automatic Classification of Healthy Subjects and Patients with Amyotrophic Lateral Sclerosis*' [link]

ICASSP 2018 Illa, A., **Patel, D**, et al., '*Comparison of speech tasks for automatic classification of patients with amyotrophic lateral sclerosis and healthy subjects*' [link]

Research Experience

Aug. 2019 – April 2021 **Robust Supervised Learning under Label Noise**, *Masters Thesis*, IISc, Bangalore.
Advisor: Prof. P S Sastry

- Investigated the role of loss functions in reducing the degree of 'memorisation' in neural networks for better generalisation under label noise. [Chapter 4 – Thesis]
- Devised a novel sample reweighting scheme that relies on mini-batch statistics alone for robustness to label noise. These statistics capture the learning dynamics to control the degree of memorisation for better generalisation under label noise. [Chapter 3 – Thesis]
- This work has led to one publication – PAKDD 2021 and one arXiv preprint.
- Currently working towards a curriculum learning-based theory of the proposed adaptive sample selection scheme.

Sept. 2017 –July 2018 **Disease Onset & Severity Prediction for ALS**, *EE Department*, IISc, Bangalore.
Advisor: Prof. Prasanta Kumar Ghosh

- Design and creation of a dataset comprising of speech samples from patients with Amyotrophic Lateral Sclerosis (ALS)
- Investigated utility of a variety of speech tasks along with corresponding articulatory data for automated disease onset and severity prediction of ALS
- This work has led to two publications – ICASSP 2018 and Interspeech 2019

Recent Projects

March 2019 –April 2019 **Sparse Signal Estimation by Maximally Sparse Convex Optimization**.
Course: Compressive Sensing & Sparse Signal Processing .

- For the problem of denoising, an optimization problem that induces strong sparsity (than ℓ_1-norm) is studied.
- Parametric non-convex penalties are proposed to ensure stronger sparsity of solution and convexity of the optimization problem
- Performance comparison was done with these baselines: *Matching Pursuit*, *Basis Pursuit*, and *Hard Thresholding* methods. [code] [paper]

Extracurricular Activities

June 2020 –Present **Team Member**, *EMPATHS*, IISc, Bangalore.
- Helping organize and moderate events related to mental health awareness and sensitization for the campus community

June 2019 –Present **Team Member**, *NoteBook Drive (NBD)*, IISc, Bangalore.
- Helping organize annual events such as *Children's Day Celebration*, *Note Book Distribution*, and *Scholarship Distribution* which are carried out across 25 government schools in and around Bangalore ($\sim$ 4000 students).
- Helped organize a weekly programme, *Science Mentorship*, wherein government school kids get to study science and maths via interactive experiments and inculcate scientific temperament

April 2021 – July 2021 **Volunteer**, *GujaratCovidSupport.org*, Ahmedabad.
- Carried out verification for CoViD-19 related resources and maintaining a database for the same. (Worked with the team led by Kumar Manish)

Relevant Courses

- Stochastic Modelling & Applications
- Analysis-I
- Linear Algebra
- Topology
- Detection & Estimation Theory
- Information Theory
- Compressive Sensing & Sparse Signal Processing
- Convex Optimization
- Linear & Non-Linear Optimization
- Machine Learning
- Online Prediction & Learning
- Game Theory

Academic Achievements & Honours

May 2021 – Present Ministry of Human Resources Development (MHRD), Government of India, Scholarship Holder

Aug. 2018 – Oct. 2020 Ministry of Human Resources Development (MHRD), Government of India, Scholarship Holder

2016 AIR 921 in Graduate Aptitude Test in Engineering (GATE)

2016 Silver Medal (University rank 2 out of 60 students) for academic performance in undergraduate program

Programming Skills

Languages Python

Software & Tools LaTeX, MATLAB, TensorFlow, PyTorch

Languages

- English
- Hindi
- Gujarati
- Kannada (Ongoing effort)

References

IISc, Bangalore
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website: http://www.ee.iisc.ac.in/faculty/sastry/index.php

IISc, Bangalore
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