

Deep Patel

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EDUCATION

University of Wisconsin-Madison (UW-Madison)

Ph.D, Department of Computer Sciences; CGPA: 3.88/4

Madison, WI, USA

Sept 2023 – Present

Indian Institute of Science (IISc)

Ph.D, Department of Electrical Engineering (Discontinued); CGPA: 8.5/10

Bengaluru, India

May 2021 – Aug 2023

Indian Institute of Science (IISc)

M.Tech (Research), Department of Electrical Engineering; CGPA: 7.7/10

Bangalore, India

Aug 2018 – April 2021

Pandit Deendayal Petroleum University

B.Tech in Electrical Engineering; CGPA: 8.29/10

Gandhinagar, India

July 2012 – Jun 2016

RESEARCH EXPERIENCE

Robust Supervised Learning under Label Noise

Thesis Advisor: Prof. P S Sastry

IISc, Bangalore

April 2019 – Present

- Investigated the role of loss functions in reducing the degree of ‘memorisation’ in neural networks for better generalisation under label noise. Published this work in [PAKDD 2021](#).
- 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. (Published extended version of this work in [IEEE/CVF WACV 2023](#))
- Currently working towards a conformal prediction-based theory of the proposed adaptive sample selection scheme.

Disease Onset & Severity Prediction for ALS & Parkinson’s

Project Advisor: Prof. Prasanta Kumar Ghosh

IISc, Bangalore

Sept 2017 – July 2018

- Designed and created a dataset comprising of speech samples from patients with Amyotrophic Lateral Sclerosis (ALS) & Parkinson’s disease (PD)
- Investigated utility of a variety of speech tasks using the corresponding audio & articulatory data for automated disease onset and severity prediction of ALS & PD
- Published two papers based on this work – [ICASSP 2018](#) and [Interspeech 2019](#)

OTHER RECENT PROJECTS

Sparse Signal Estimation by Maximally Sparse Convex Optimization

Course: Compressive Sensing & Sparse Signal Processing

IISc, Bangalore

March 2019 – April 2019

- Studied parametric non-convex penalties to ensure stronger sparsity (than ℓ_1 -norm) of solution and convexity for the problem of denoising
- Compared performance with: *Matching Pursuit*, *Basis Pursuit*, and *Hard Thresholding*. [[code](#)] [[paper](#)]

PUBLICATIONS

Patel, D., and Sastry, P. S., ‘Adaptive Sample Selection for Robust Learning under Label Noise’ in **IEEE/CVF WACV 2023** [[paper](#)] [[video \(old\)](#)] [[video \(new\)](#)]

Patel, D., and Sastry, P. S., ‘Memorization in Deep Neural Networks: Does the Loss Function Matter?’ in **PAKDD 2021** [[paper](#)] [[video](#)]

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’ in **Interspeech 2019** [[paper](#)]

Illa, A., **Patel, D.**, et al., ‘Comparison of speech tasks for automatic classification of patients with amyotrophic lateral sclerosis and healthy subjects’ in **ICASSP 2018** [[paper](#)]

TALKS AND PRESENTATIONS

Adaptive Sample Selection for Robust Learning under Label Noise

EECS Symposium (2021), IISc / Online Asian Machine Learning School, ACML 2022

Oral/Poster

May 2021/December 2022

TEACHING EXPERIENCE

Teaching Assistant for (at UW-Madison): *Basic Statistics for Psychology* (Fall 2023/Spring 2024, Department of Psychology)

Teaching Assistant for (at IISc): *Introduction to Causal Inference* (Spring 2023, EE Department), *Random Processes* (Fall 2022, ECE Department), *Stochastic Modeling & Applications* (Fall 2021/2020/2019, EE Department), *Pattern Recognition & Neural Networks* (Spring 2023, ECE Department; Spring 2020, EE Department). Responsibilities included scribing lectures, conducting tutorial sessions for problem solving; designing and evaluating assignment/exam questions for classes of ≥ 70 students.

WORK EXPERIENCE

Reliance Industries Ltd. (RIL)

Graduate Engineer Trainee

Jamnagar, Gujarat

Aug 2016 – Sept 2017

- Observation of electrical commissioning and maintenance activities at a Low Density Polyethylene Manufacturing (LDPE) Plant, RIL J3 Project

ACADEMIC ACHIEVEMENTS & HONOURS

Prime Minister's Research Fellowship, Government of India (Aug 2022 – Aug 2023; Declined and joined UW-Madison)

Ministry of Education, Government of India, Scholarship Holder (Aug 2018 – Oct 2021)

All India Rank 921 (out of 1,25,859 candidates) in Graduate Aptitude Test in Engineering (2016)

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

RELEVANT COURSEWORK

Optimization & Probability: Stochastic Modelling & Applications, Linear & Non-Linear Optimization, Convex Optimization, Detection & Estimation Theory, Information Theory

Learning & Games: Reinforcement Learning: Theory & Algorithms, Theoretical Foundations of Machine Learning, Algorithmic High-Dimensional Robust Statistics, Machine Learning, Online Prediction & Learning, Game Theory,

Signal Processing: Compressive Sensing & Sparse Signal Processing

Mathematics: Linear Algebra, Real Analysis, Topology, Introduction to Algebraic Topology, Computational Topology

Psychology: Human-Computer Interaction

PROGRAMMING SKILLS

Languages: Python, **Software & Tools:** L^AT_EX, MATLAB, TensorFlow, PyTorch

LEADERSHIP & COMMUNITY SERVICE

EE Summer School

Core Team Member

IISc, Bangalore

May 2022 – July 2022

- Co-organized the inaugural department summer school for outreach about ongoing research.
- Designed the selection process & lecture/lab-visit programmes; and facilitated travel-accommodation reimbursements

EMPATHS

Team Member & Department Representative

IISc, Bangalore

June 2020 – Present

- Organized and moderated events related to mental health awareness and sensitization for the campus community
- Acting as an intermediary between students and mental health professionals for easier access to counselling services

NoteBook Drive (NBD)

Core Team Member

IISc, Bangalore

June 2019 – Present

- Organized annual stationery distribution & door-to-door surveys in rural areas for providing financial support to underprivileged kids from local government schools
- Organized a weekly programme, Science Mentorship, wherein local government school kids are taught science and maths via interactive experiments and to inculcate scientific temperament

- Verified CoViD-19 related resources and maintained a database for the same. (Worked with the team led by [Kumar Manish](#))

LANGUAGES

English, Gujarati, Hindi, and Kannada (beginner proficiency)

REFERENCES

- [Prof. P S Sastry](#), Professor, IISc, Bangalore (mail to: sastry@iisc.ac.in)
- [Prof. Prasanta Kumar Ghosh](#), Associate Professor, IISc, Bangalore (mail to: prasantg@iisc.ac.in)
- [Prof. Muthuvel Arigovindan](#), Associate Professor, IISc, Bangalore (mail to: mvel@iisc.ac.in)