Zeel B Patel

Date of Birth: 04 Aug 1996 (27 years old)
Nationality: Indian
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Education

- **PhD in Computer Science**, *Jan 2020 - Present*
  Research Topic: Probabilistic Machine Learning for fine-grained air quality inference and active sensor placement.
  Advisor: Nipun Batra
  CGPA: 9.65/10.0
  IIT Gandhinagar, Gujarat, India
- **M.Tech (Specialization: Smart Manufacturing)**, *Aug 2017 - May 2019*
  CGPA: 9.17/10.0
  IIITDM Kancheepuram, Chennai, India

Publications (Google Scholar profile)

Selected Peer-reviewed articles

1. **Zeel B Patel**, Palak Purohit, Harsh Patel, Shivam Sahni, Nipun Batra
   Accurate and Scalable Gaussian Processes for Fine-grained Air Quality Inference
   AAAI 2022 (CORE A* - 15% acceptance rate)
   GitHub repo: https://github.com/patel-zeel/AAAI22
2. Sachin Chauhan, **Zeel B Patel**, Sayan Ranu, Rijurekha Sen, Nipun Batra
   Fine-Grained Spatio-Temporal Particulate Matter Dataset From Delhi For ML based Modeling
   In NeurIPS 2023 Datasets and Benchmarks (CORE A* - 32.7% acceptance rate)
3. Rishiraj Adhikary, **Zeel B Patel**, Tanmay Srivasatava, Nipun Batra, Mayank Singh, Udit Bhatia, Sarath Guttikunda
   Vartalaap: What Drives #AirQuality Discussions: Politics, Pollution or Pseudo-science?
   CSCW Journal 2021 (CORE A)
   GitHub repo: https://github.com/rishi-a/Vartalaap
4. Karm Patel, Rishiraj Adhikary, **Zeel B Patel**, Nipun Batra, Sarath Guttikunda
   Samachar: News Media on Air Pollution in India
   COMPASS 2022
   GitHub repo: https://github.com/karm-patel/Samachar-News-media-on-air-pollution

Symposium, Workshop papers and Posters

1. **Zeel B Patel**, Nipun Batra, Kevin Murphy
   Uncertainty Disentanglement with Non-stationary Heteroscedastic Gaussian Processes for Active Learning
   NeurIPS Workshop on Gaussian Processes, Spatiotemporal Modeling, and Decision-making Systems 2022 (CORE A*)
2. Aadesh Desai, Eshan Gujarathi, Saagar Parikh, Sachin Yadav, **Zeel B Patel**, Nipun Batra
   Deep Gaussian Processes for Air Quality Inference
   Young Researchers' Symposium, CODS-COMAD 2023
3. Aadesh Desai, Gautam Vashishtha, **Zeel B Patel**, Nipun Batra
   Challenges in Gaussian Processes for Non Intrusive Load Monitoring
   NeurIPS Workshop on Gaussian Processes, Spatiotemporal Modeling, and Decision-making Systems 2022 (CORE A*)
4. **Zeel B Patel**, Nipun Batra
   Towards Active Air Quality Station Deployment
   SubSetML Workshop, ICML 2021 (CORE A*)
5. **Zeel B Patel***, S Deepak Narayanan*, Apoorv Agnihotri, Nipun Batra
   Poster: A toolkit for spatial interpolation and sensor placement
   ACM SenSys 2020 (CORE A*)
   GitHub repo: https://github.com/sustainability-lab/polire
6. **Zeel B Patel**, Nipun Batra
   Active Learning: A Visual Tour
   3rd Workshop on Visualization for AI Explainability, IEEE VIS 2020 (CORE A)
   Weblink: https://patel-zeel.github.io/active-learning-visualization/

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Books Contributions

- **Probabilistic Machine Learning: Advanced Topics:** https://probml.github.io/pml-book/book2.html
  I co-authored Section 34.7 (Active learning) with Dr. Kevin Murphy

- **Code-First-ML:** https://code-first-ml.github.io/
  This book is a joint effort with my advisor and Prof. Ashish Tendulkar to pragmatically explain ML concepts with interactive codes and visualizations. Currently, we are refactoring it as a mirror copy of probabilistic machine learning book by Dr. Kevin Murphy.

Internships

- **Google Summer of Code** *Jun 2022 - Sep 2022*
  Organization: TensorFlow
  Mentor: Kevin P Murphy
  Project: Develop JAX examples and demos for an ML upcoming textbook
  GitHub repo: https://github.com/probml/pyprobml
  Final report: https://patel-zeel.github.io/gsoc22

Invited Talks

- **Air Sensors International Conference** *26th Aug, 2022*
  Topic: Accurate and Scalable Gaussian Processes for Fine-grained Air Quality Inference
  Organized by CSTEP, India and UC DAVIS
  Bengaluru, India

Open Source Libraries

- **BIJAX:** https://github.com/patel-zeel/bijax
  Bayesian Inference in JAX

- **GPAX:** https://github.com/patel-zeel/gpax
  Gaussian processes in JAX

- **skgpytorch:** https://github.com/patel-zeel/skgpytorch
  Scikit-learn like interface for GPyTorch

Selected Open Source Contributions

Stheno: https://github.com/wesselb/stheno

- Added a sparse Gaussian process method called FITC[1]
  https://github.com/wesselb/stheno/pull/17

GPyTorch: https://github.com/cornellius-gp/gpytorch

- Added metrics module to GPyTorch
  https://github.com/cornellius-gp/gpytorch/pull/1870
- Added Type hints and exceptions in kernels
  https://github.com/cornellius-gp/gpytorch/pull/1802

Scikit-learn: https://github.com/scikit-learn/scikit-learn

- Accelerated a slow example in scikit-learn
  https://github.com/scikit-learn/scikit-learn/pull/21673

[1] Edward Snelson and Zoubin Ghahramani. Sparse Gaussian processes using pseudo-inputs. In Y. Weiss, B. Schölkopf, and J. Platt,editors,Advances in Neural Information Processing Systems, volume 18. MIT Press, 2006

Awards

Awards

- Outstanding Graduate Teaching Fellow award in Probabilistic Machine Learning course.
  IIT Gandhinagar

Registration grants

- NeurIPS 2022
- GPSS 2022
- AAAI 2022
- ICML 2021
- IEEE VIS 2020

Helped advisor with

- Google Compute grant 2021 ($5000 credits in Google Cloud Platform)

Industrial Experience

Data Scientist in R&D team *Jun 2019 - Dec 2019*
Inspirisys Solutions Ltd., Chennai, India

Teaching Experience

Graduate Teaching Fellow (teaching a course along with the instructor)

- **Probabilistic Machine Learning**
  IIT Gandhinagar *Fall 2022*

Teaching Assistant

- **Probabilistic Machine Learning**
  IIT Gandhinagar *Fall 2023*
- **Machine Learning**
  IIT Gandhinagar *Spring 2023*
- **Machine Learning**
  IIT Gandhinagar *Spring 2022*

Guest lectures

- **Introduction to Active Learning**
  Ubiquitous computing, IIT Gandhinagar *Fall 2021*
- **Introduction to Bayesian Machine Learning**
  Machine Learning, IIT Gandhinagar *Spring 2021*

Service

Reviewer

- Association for the Advancement of Artificial Intelligence (AAAI) (CORE A*) *2024*
- Artificial Intelligence and Statistics (AISTATS) (CORE A) *2023*
- ACM COMPASS Posters and Demos *2021*
- The ReScience C journal