Nipun Batra

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CURRENT ROLE

Assistant Professor   *July 2018 - Present*
Computer Science and Engineering
IIT Gandhinagar, Gujarat, India

EDUCATION

PhD in Computer Science,   *Jan 2012 - Mar 2017 (submitted Nov 2016, defended Mar 2017)*
IIIT Delhi
Advisor: Amarjeet Singh, Kamin Whitehouse (University of Virginia)
Thesis: Systems and Analytical Techniques Towards Practical Energy Breakdown for Homes
CGPA: 9.3/10.0

B.E. in Computer Engineering,   *Aug 2007 - May 2011*
Delhi College of Engineering, Delhi, India
CGPA: 9/10.0

GRANTS

Summary: 5 sponsored projects, approximately 2.4 crore INR raised

PI: Edge Non-intrusive Load Monitoring   *2020*
Cisco Research (Amount: USD 46,200 $\approx$ Rs. 34 lacs)

PI: Impact of air pollution on COVID-related secondary exacerbations   *2020*
Google (Amount: USD 50,000 $\approx$ Rs. 37 lacs)

PI: AI and Sensor Networks for Air-quality Monitoring   *2020*
SERB (Amount: Rs. 30 lacs)

Co-PI: Physics Guided Data Science Approach for Predictive Understanding of Hydrological Processes   *2019*
DST STARS (INR 84 lacs)

PI: Scalable air-quality estimation using multi-modal data   *2018*
Microsoft AI for Earth Grant (USD 30000 ($\approx$ Rs. 22 lacs) in Azure credits)

PI: Scalable Sensing and Analytics for Sustainability   *2018*
IIT Gandhinagar Internal Grant (Rs. 30 lacs)

PI: Machine Learning Approaches for Scalable Air Quality Sensing in India   *2018*
NVidia GPU grant ($\approx$ Rs. 1.3 lacs)

HONOURS AND AWARDS

Ph.D. student Rishiraj Adhikary awarded Fullbright Nehru Doctoral Fellowship to visit CMU   *2022*

Best video nominee (acceptance rate: 3.1%) at KDD   *2016*

Finalist in UChicago Delhi urban challenge (acceptance rate: 3.6%)   *2016*

3rd position in IoT Hackathon at MSR Summer School   *2016*

Best presentation award at SenSys Doctoral Colloquium   *2015*

Best demo award at Buildsys   *2014*

Last updated: Thursday 15th September, 2022

TCS PhD fellowship	*2012*
Systems engineering prize barrel, AUVSI's student UAS competition	*2010*
Director's award for best effort, AUVSI's student UAS competition	*2009*

Travel grants

> AAAI grant for AAAI 2017; Google, MSR and ACM travel grant for KDD 2016; ACM travel grant for SenSys 2015; ACM travel grant for e-Energy 2014; Young scientist travel grant for AUVSI UAS competition from DST (Govt. of India) 2009.

SELECTED RESEARCH & INDUSTRIAL EXPERIENCE

Postdoctoral Scholar *Mar 2017 - Jun 2018*
University of Virginia, Charlottesville.
Advisors: Kamin Whitehouse, Hongning Wang

Graduate Research Assistant *Jan 2012 - Mar 2017*
IIIT Delhi

Visiting Research Scholar *Jun 2014 - Apr 2015*
University of Virginia (with Kamin Whitehouse)

Software Analyst *Jun 2011 - Nov 2011*
Royal Bank of Scotland, Gurgaon, India

Undergraduate Researcher *Dec 2010 - Jun 2011*
Linux Android Network Systems Lab, Delhi College of Engineering

Software Engineering Intern *Jun 2010 - Aug 2010*
Goldman Sachs, Bangalore

Undergraduate Research Intern *Dec 2008 - Jul 2010*
Unmanned Aircraft Systems Lab, Delhi College of Engineering

TEACHING EXPERIENCE

Probabilistic Machine Learning: 2022

Introduction to Programming: 2020, 2021

Machine Learning: 2019, 2020, 2021, 2022

Advanced Machine Learning: 2019

Operating Systems: 2018, 2019, 2020

Graduate Systems: 2018, 2019, 2020

Ubiquitous Computing: 2021

PUBLICATIONS (GOOGLE SCHOLAR PROFILE)

Citation Summary
Total citations - 1635, h-Index - 22, i10-Index: 20

Selected Peer-reviewed articles[1]

1. Vibhuti Bansal, Rohit Khoiwal, Hetvi Shastri, Haikoo Khandor, **Nipun Batra**
   "I do not know": Quantifying Uncertainty in Neural Network Based Approaches for Non-Intrusive Load Monitoring
   * Buildsys 2022

2. Karm Patel, Rishiraj Adhikary, Zeel B Patel, **Nipun Batra**, Sarath Guttikunda
   Samachar: print news media on air pollution in India
   ACM COMPASS 2022

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[1]A* or A conferences as per 2018 CORE CS rankings are highlighted using *****

3. Zeel B Patel, Palak Purohit, Harsh Patel, Shivam Sahni, **Nipun Batra**
Accurate and Scalable Gaussian Processes for Fine-grained Air Quality Inference
* AAAI 2022

4. Hetvi Shastri, Dhruvi Lodhavia, Palak Purohit, Ronak Kaoshik, **Nipun Batra**
Vastr-GAN: versatile apparel synthesised from text using a robust generative adversarial network
CODS COMAD 2022

5. Hetvi Shashtri, **Nipun Batra**
Neural network approaches and dataset parser for NILM toolkit
* Buildsys 2021

6. Rishiraj Adhikary, Zeel Patel, Tanmay Srivasatava, **Nipun Batra**, Mayank Singh, Udit Bhatia
Vartalaap: What Drives #AirQuality Discussions: Politics, Pollution or Pseudo-science?
* CSCW 2021

7. Rithwik Kukunuri, Anup Aglawe, Jainish Chauhan, Kratika Bhagtani, Rohan Patil, Sumit Walia, **Nipun Batra**
EdgeNILM: towards NILM on edge devices
* Buildsys 2020

8. Rishiraj Adhikary, Tanmay Srivastava, Prerna Khanna, Aabhas Asit Senapati, **Nipun Batra**
Naqaab: towards health sensing and persuasion via masks
Ubicomp 2020 Adjunct

9. Apoorv Agnihotri, **Nipun Batra**
Exploring Bayesian Optimization
Distill 2020

10. Yiling Jia, **Nipun Batra**, Hongning Wang, Kamin Whitehouse
Active Collaborative Sensing for Energy Breakdown
* CIKM 2019

11. **Nipun Batra**, Rithwik Kukunuri, Ayush Pandey, Raktim Malakar, Rajat Kumar, Odysseas Krystalakos, Mingjun Zhong, Paulo Meira, Oliver Parson
Towards reproducible state-of-the-art energy disaggregation
* Buildsys 2019

12. Yiling Jia, **Nipun Batra**, Hongning Wang, Kamin Whitehouse
A Tree-Structured Neural Network Model for Household Energy Breakdown
* WWW 2019

13. Haroon Rashid,**Nipun Batra**, Pushpendra Singh
Rimor: Towards Identifying Anomalous Appliances in Buildings
* Buildsys 2018

14. **Nipun Batra**, Yiling Jia, Hongning Wang, Kamin Whitehouse
Transferring Decomposed Tensors for Scalable Energy Breakdown across Regions
* AAAI 2018. New Orleans, USA **(Acceptance rate: 25%)**

15. **Nipun Batra**, Hongning Wang, Amarjeet Singh, Kamin Whitehouse
Matrix Factorisation for Scalable Energy Breakdown
* AAAI 2017. San Francisco, USA **(Acceptance rate: 25%)**

16. **Nipun Batra**, Amarjeet Singh, Kamin Whitehouse
Gemello: Creating a Detailed Energy Breakdown from just the Monthly Electricity Bill
* KDD 2016. San Francisco, USA **(Acceptance rate: 19%)**

17. **Nipun Batra**, Amarjeet Singh, Kamin Whitehouse
If You Measure It, Can You Improve It? Exploring The Value of Energy Disaggregation
* Buildsys 2015. Seoul, Korea **(Acceptance rate: 29%)**

18. **Nipun Batra**, Jack Kelly, Oliver Parson, Haimonti Dutta, William Knottenbelt, Alex Rogers, Amarjeet Singh, and Mani Srivastava
NILMTK: An Open Source Toolkit for Non-intrusive Load Monitoring
ACM eEnergy 2014. Cambridge, UK **(Acceptance rate: 20%, 500+ citations)**

19. **Nipun Batra**, Manoj Gulati, Amarjeet Singh, and Mani Srivastava
It's Different: Insights into home energy consumption in India
* Buildsys 2013, Rome, Italy **(180+ citations)**

20. Pandarasamy Arjunan, **Nipun Batra**, Haksoo Choi, Amarjeet Singh, Pushpendra Singh, and Mani Srivastava
SensorAct: A Privacy and Security Aware Federated Middleware for Building Management
* Buildsys 2012, Waterloo, Canada, **(60+ citations)**

Other Peer-reviewed articles

1. Oliver Parson, Grant Fisher, April Hersey, **Nipun Batra**, Jack Kelly, Amarjeet Singh, William Knottenbelt, Alex Rogers
Dataport and NILMTK: A Building Data Set Designed for Non-intrusive Load Monitoring
GlobalSip, Orlando, FL, USA **(60+ citations)**

2. **Nipun Batra**, Haimonti Dutta and Amarjeet Singh
INDiC: Improved Non-Intrusive load monitoring using load Division and Calibration
ICMLA 2013, Miami, USA

3. **Nipun Batra**, Pandarasamy Arjunan, Amarjeet Singh and Pushpendra Singh
Experiences with Occupancy Based Building Management Systems
ISSNIP 2013, Melbourne, Australia

Posters, Demos, and Doctoral Colloquiums

1. Rishiraj Adhikary, Aryan Varshney, **Nipun Batra**
Towards Continuous Respiration Rate Detection While Walking
ACM Ubicomp 2022

2. **Nipun Batra**
Non Intrusive Load Monitoring: Systems, Metrics and Use Cases
🏆 Sensys 2015 **(Best presentation award)**

3. Jack Kelly, **Nipun Batra**, Oliver Parson, Haimonti Dutta, William Knottenbelt, Alex Rogers, Amarjeet Singh, and Mani Srivastava
NILMTK v0. 2: A Non-intrusive Load Monitoring Toolkit for Large Scale Data Sets
🏆 Buildsys 2014 **(Best demo award)**

4. **Nipun Batra**, Manoj Gulati, Puneet Jain, Kamin Whitehouse and Amarjeet Singh
Bits and watts: improving energy disaggregation performance using power line communication modems
Buildsys 2014

Technical Reports

1. **Nipun Batra**, Rishi Baijal, Amarjeet Singh, Kamin Whitehouse
How good is good enough? Re-evaluating the bar for energy disaggregation

2. **Nipun Batra**, Amarjeet Singh, Kamin Whitehouse
Neighbourhood NILM: A Big-data Approach to Household Energy Disaggregation

3. **Nipun Batra**, Oliver Parson, Mario Berges, Amarjeet Singh, Alex Rogers
A comparison of non-intrusive load monitoring methods for commercial and residential buildings
(70+ citations)

4. **Nipun Batra**, Amarjeet Singh, Pushpendra Singh, Haimonti Dutta, Venkatesh Sarangan, and Mani Srivastava
Data Driven Energy Efficiency in Buildings

SERVICE

I have served in the program committee of various conferences such as: AAAI, Buildsys, COMPASS, or review committee of various journals such as Nature Scientific Data, Nature Scientific Reports, Energy and Buildings. In the interest of space, I am listing only selected services:

Track Chair

– ACM COMPASS 2022

Publications Chair

– ACM CODS COMAD 2022
– Buildsys 2018

PC Chair

- 4th International NILM workshop 2018

Steering Committee

- 3rd International NILM workshop 2016

SELECTED INVITED TALKS

IIT Gandhinagar, Chaitanya Khoj *AI for school children (300+ students from multiple schools attended)*   *2018*

IIT Gandhinagar, Delhi, Bombay, Kanpur; IIIT Hyd; IISC, MSR India *The Billion Building Challenge*   *2018*

Aspiring Minds Research, Delhi *The Billion Building Challenge*   *2016*

IBM Research, Delhi *Towards practical energy breakdown*   *2016*

Stanford University *Towards energy disaggregation for a 100 million homes*   *2016*

University of Pennsylvania *If you can measure it, can you improve it?*   *2015*

Carnegie Mellon University *If you can measure it, can you improve it?*   *2015*