Hetvi Shastri

Machine Learning · IoT · Edge computing

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Education

University of Massachusetts Amherst — *Amherst, USA*

MS/PhD. Computer Science **(GPA: 4/4)** — *2022 - Present*

Indian Institute of Technology, Gandhinagar — *Gandhinagar, India*

B.Tech. in Electrical with Minors in CSE **(CPI: 8.57/10)** [***transcript***] — *2022*

Publications

"I do not know": Quantifying Uncertainty in Neural Network Based Approaches for Non-Intrusive Load Monitoring ** - **Hetvi Shastri***,Vibhuti Bansal*,Rohit Khoiwal*, Haikoo Khandor, Nipun Batra
ACM Buildsys 2022, Boston (CORE CS Conference Rating: A, Acceptance Rate: 32%) [***Repository***] [***PDF***]

Vastr-GAN: Versatile Apparel Synthesised from Text using a Robust Generative Adversarial Network ** - **Hetvi Shastri***, Dhruvi Loadhavia*, Palak Purohit*, Ronak Kaoshik, Nipun Batra
CODS COMAD 2022, India (Acceptance Rate: 21%) [***Repository***] [***PDF***]

Neural Network approaches and dataset parser for NILM toolkit** - **Hetvi Shastri***, Nipun Batra*
ACM Buildsys 2021, Portugal (CORE CS Conference Rating: A, Acceptance Rate: 27%) [***Repository***] [***PDF***] [***Presentation***]

***** indicates equal contribution ****** Presented at the venue/virtually

Achievements

June 2023	**GHC Scholar,** The GHC Student Scholarship offers women and non-binary students the opportunity to attend the virtual Grace Hopper Celebration 2023.	*GHC, USA*
May 2023	**James Kurose Scholar,** James Kurose Scholarship in Computer Science is to provide support to an outstanding Computer Science graduate student, to be designated as the James Kurose Scholar.	*UMass Amherst, USA*
May 2023	**Awarded David W. Stemple Scholarship,** David W. Stemple Scholarship in Computing is to provide support to a first-year graduate student in Computer Science pursuing a Ph.D. in Systems research.	*UMass Amherst, USA*
Nov 2021	**Conference Grant,** Funded by IIT Gandhinagar for presenting at 8th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (Buildsys 2021)	*IIT Gandhinagar, India*
2018 - 2022	**Deans List,** Academic excellence in Semester-II, V, VI which is awarded to the students scoring more than 8.5 SPI.	*IIT Gandhinagar, India*

Projects

Collaborative systems for IoT devices — *LASS Lab, UMass Amherst*

Mentor: Prof. Prashant Shenoy — *Sep. 2022 - Present*

- Working on secure multitenancy and fast on-device computation for building collaborative system of IoT devices.
- Implementing portable, secure and language agnostic compilation target Webassembly(WASM) on Raspberry pi for performing tasks like inference, model serving.

Quantifying Uncertainty in Neural Network Based Approaches for NILM GitHub — *Sustainability Lab, IIT Gandhinagar*

Mentor: Prof. Nipun Batra — *Jan. 2022 - Jun. 2022*

- Worked on uncertainty quantification of models for energy disaggregation task. Uncertainty quatification is needed because of high number of false positive and false negative predictions in the respective domain.
- Implemented and evaluated 14 deep learning model variants on the publicly available REDD dataset and improved the uncertainty quantification task using using recalibration methods.
- Found that our models can accurately estimate uncertainty without compromising on traditional metric.

Neural network approaches and dataset parser for NILM toolkit GitHub — *Sustainability Lab, IIT Gandhinagar*

Mentor: Prof. Nipun Batra — *May. 2021 - Dec. 2021*

- Worked on decomposing overall power consumption into constituent appliances for efficient usage of energy by different household appliances.
- Created dataset parser for publicly available IDEAL dataset using Non-Intrusive Load Monitoring (NILM) metadata scheme.
- Implemented various models such the residual network (ResNet), RNN with attention model, Regression sub-network with classification sub-network for the task of energy disaggregation on REDD dataset and IDEAL dataset.
- Benchmarked the newly implemented algorithms against existing algorithm such as Seq2point, Seq2Seq.

Image synthesis from text using Adversarial networks GitHub — *IIT Gandhinagar*

Mentor: Prof. Nipun Batra — *Jan. 2021 - July. 2021*

- Worked on Generative Adversarial network (GAN) based text-to-image synthesis model for fabricating intricate Indian apparel design.
- Curated one of the largest available Indian fashion dataset and applied the concept of ensemble learning by dividing dataset into different classes based on diverse characteristics of Indian fashion.
- Designed an architecture that combines multiple trained GAN models through YOLO algorithm based classifier for a streamlined text-to-image generation.

Implementation of Git GitHub — *IIT Gandhinagar*

Mentor: Prof.Nipun Batra — *July. 2020 - Dec. 2020*

- Built a command-line utility in C and C++ for version control implementing Git functions.
- Included the basic features as init, commit, add, branch, merge, checkout, log, reflog, reset, stash and support for gitignore file.

Internships

Pustak : Book recommendation system Certificate

Indian Institute of Technology, Gandhinagar - SSOP 2020 — *India*

Advisor : Prof. Shanmuganathan Raman — *May. 2020 - Jul. 2020*

- Developed a tool for helping users to detect books from book shelves and get genre based recommendation of books.
- Applied image processing techniques to detect multiple books from shelves and used Natural Language Processing and OCR to identify the book's specifics.
- Constructed a hybrid model based on content and collaborative based filtering which resulted into tailor-made recommendation of books.

Numerical simulation of Ultrasound Strain Imaging Certificate

Indian Institute of Technology, Gandhinagar - Research Internship, SRIP 2021 — *MUSE Lab, India*

Advisor : Prof. Himanshu Shekhar — *May. 2021 - Jul. 2021*

- Programmed in Field II software to obtain ultrasound images by setting the transducer frequency, focus and required parameters of a numerically created phantom.
- Applied Normalized Cross Correlation Algorithm on pre and post compression of Ultrasonic data to measure the applied displacement.
- Compared the displacement map obtained from Field II with the displacement map obtained from COMSOL to test the accuracy of the implemented algorithm.

Open Source Contributions

Nilmtk Reposistory (600 stars)
Contributed dataset parser for largest publicly available IDEAL dataset. [*GitHub*]

Nilmtk-Contrib Reposistory
Contributed five new neural network approaches for NILM [*GitHub*]

Technical Knowledge

Programming Languages: Python, C, C++, WebAssembly, Verilog

Tools: Git, Tensorflow, Pytorch, Pandas, Numpy, Keras, JAX, MATLAB, Autodesk Inventor, Field II, LTspice, STM32CubeIDE, Keil , LaTeX, Octave

Hardware: Rasberrypi, FPGA, Arduino UNO, Arduino Mega

Relevant Coursework

At UMass Amherst: ● Distributed and Operating system ● Machine learning

At IIT Gandhinagar:● Machine learning ● Data Structure and Algorithm - II ● Data Structures and Algorithms - I ● Advanced Computing ● Operating System ● Probability and Random Processes ● Digital Systems ● Microprocessors and Embedded Systems ● Signal System and Networks ● Digital Signal Processing ● Electromagnetic waves ● Power Systems ● Power Electronics ● Electrical Machines ● Electronic Devices ● Electrical and Electronics Lab ● Introduction To Analog And Digital Electronics ● Linear Algebra ● Analog Circuits

Massive open online courses (MOOCs): Deep Learning Specialization (Coursera)

Teaching Assistant

CompSci 230 :- Computer System Principles — Jan. 2023 - Present
UMass, Amherst

Info 190S :- Introduction to programming for informatics — Sep. 2022 - Dec. 2022
UMass, Amherst

ES 654:- Machine Learning — Jan. 2022 - May 2022
IIT Gandhinagar