Hetvi Shastri

• Distributed System • Machine Learning • IoT

hetvi-shastri hshastri@umass.edu hetvishastri.github.io hetvishastri 4134068843

Education

2022–present **MS/PhD, Computer Science**, *GPA: 4/4.*
University of Massachusetts Amherst
Awards and Scholarships: James Kurose Scholarship, David W. Stemple Scholarship

2018–2022 : **Bachelor of Technology, Electrical Engineering (Minor in Computer Science)**, *GPA: 8.57/10.*
Indian Institute of Technology Gandhinagar
Awards and Scholarships: Conference Grant (International conference), Deans List (more than 8.5 GPA in three semester)

Research Experience

University of Massachusetts Amherst

Sep. 2022 - Present ***Fine-grained and Secure Access Control for Collaborative IoT Devices***, *Advisor: Prof Prashant Shenoy.*

- Improving cross-device collaboration to address strain on servers caused by surge in IOT devices.
- Working on a scenario where a mobile robot uses resources such as smart locks from an untrusted domain securely and seamlessly without much human involvement.
- Constructing a secure, scalable, and high-performance IoT system comprising of shared sensors, actuators (IAAS), and services (SAAS) across devices.
- Implementing a Capability-based fine-grained access control system with adaptable trust-zone functionalities, enhancing flexibility for deployment in varied IoT environments.

Indian Institute of Technology, Gandhinagar

Jan. 2022 - Jun. 2022 ***Quantifying Uncertainty in Neural Network Based Approaches for Non-Intrusive Load Monitoring (NILM)***, *[Repository] [Paper] [Presentation]*, Advisor: Prof Nipun Batra.

- Addressing false positives and negatives which is crucial for informed decision about energy usage in the realm of energy disaggregation.
- Implemented and evaluated 14 diverse deep learning models on the REDD dataset, we refined uncertainty quantification through recalibration methods.
- Demonstrated the ability of models in accurately measuring uncertainty while improving conventional metrics by 10%, resulting in a paper published at ACM Buildsys 2022 (CORE CS Conference Rating: A, Acceptance Rate: 32%).

May. 2021 - Dec. 2021 ***Neural Network Approaches and Dataset Parser for Non-Intrusive Load Monitoring (NILM)***, *[Repository] [Paper] [Presentation]*, Advisor: Prof Nipun Batra.

- Disaggregating total energy consumption into individual appliances usage to aid households in understanding and curbing energy usage.
- Developed cutting-edge models including Residual Network (ResNet), RNN with attention, and hybrid Regression-Classification networks for precise energy disaggregation on REDD and IDEAL datasets.
- Designed novel algorithms that outperformed existing NILM methods by 5%, resulting in a paper published at ACM Buildsys 2021 (CORE CS Conference Rating: A, Acceptance Rate: 27%)

Jan. 2021 - July. 2021 ***Image Synthesis from Text Using Generative Adversarial Networks***, *[Repository] [Paper]*, Advisor: Prof Nipun Batra.

- Addressed the challenge of harmonizing diverse cultural, geographical, and creative factors in Indian fashion to effectively cater to personalized design demands.
- Curated an extensive Indian fashion dataset and employed GANs for intricate text-to-image synthesis.
- Applied ensemble learning with diverse class divisions and enhanced image synthesis via a YOLO-based classifier-integrated architecture.
- Generated diverse Indian fashion images for descriptive captions (text), resulting in a paper published at CODs-COMAD 2022 (Acceptance Rate: 21%)

Technical Skills

Languages Python, Tensorflow, Pytorch, Pandas, Numpy, Keras, JAX, MATLAB, WebAssembly, C, C++, Verilog

Tools Docker, RestAPI, Remote Procedure Call (RPC), Git, OpenWrt, Amazon Elastic Compute Cloud, Autodesk Inventor, Field II, LTspice, STM32CubeIDE, Keil, LATEX

Hardware Rasberrypi, FPGA, Arduino

Projects

Indian Institute of Technology, Gandhinagar

May. 2020 - Jul. 2020 ***Pustak : Book recommendation system*** , *Advisor: Prof. Shanmuganathan Raman*.

- Engineered a user-friendly tool utilizing image processing to detect books on shelves, leveraging NLP and Optical Character Recognition (OCR) for precise book identification.
- Developed a robust hybrid model combining content and collaborative filtering techniques, culminating in a dynamic and personalized book recommendation system, enhancing user engagement and satisfaction.

May. 2021 - Jul. 2021 ***Numerical simulation of Ultrasound Strain Imaging***, *Advisor: Prof. Himanshu Shekhar*.

- Programmed Field II software to capture ultrasound images and subsequently employed the Normalized Cross Correlation Algorithm on pre and post compression ultrasonic data to quantify applied displacement in the phantom.
- Validated the accuracy of the implemented algorithm by comparing displacement maps obtained from Field II with those from COMSOL.

July. 2020 - Dec. 2020 ***Implementation of Git***, *[Repository]*, Advisor: Prof Nipun Batra.

- Designed and coded a command-line utility in C and C++ to facilitate version control, integrating essential Git functions such as init, commit, add, branch, merge, checkout, log, reflog, reset, stash, and gitignore files.

Publications

2022 **Shastri, Hetvi**, Dhruvi Lodhavia, Palak Purohit, Ronak Kaoshik, and Nipun Batra. Vastr-gan: Versatile apparel synthesised from text using a robust generative adversarial network. In *5th Joint International Conference on Data Science and Management of Data*, CODS-COMAD 2022, 2022.

2022 **Shastri, Hetvi**, Vibhuti Bansal, Rohit Khoiwal, Haikoo Khandor, and Nipun Batra. I do not know: Quantifying uncertainty in neural network based approaches for non-intrusive load monitoring. In *Proceedings of the 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, BuildSys '22, 2022.

2021 **Shastri, Hetvi** and Nipun Batra. Neural network approaches and dataset parser for nilm toolkit. In *Proceedings of the 8th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, BuildSys '21, 2021.

Scholarships and Awards

August 2023 Awarded travel grant for attending ***ACM SIGCOMM 2023*** at New York.

June 2023 Selected for the prestigious ***GHC Student Scholarship***, enabling participation at the virtual Grace Hopper Celebration 2023 (GHC 23)

May 2023 Awarded the distinguished ***James Kurose Scholarship*** at UMass Amherst for exceptional achievements in Computer Science,.

May 2023 Granted the esteemed ***David W. Stemple Scholarship*** at UMass Amherst in recognition of commitment and excellence in pursuing Ph.D. research in Systems.

Nov 2021 Awarded ***Conference Grant*** by IIT Gandhinagar for presenting at 8th ACM Buildsys 2021

2018 - 2022 Achieved placement on the ***Deans List*** for securing more that 8.5 GPA in three semester at IIT Gandhinagar.

Teaching Assistantship

Spring 2022 : **CompSci230: Computer System Principles** , UMass Amherst.

Fall 2022 : **Info190S: Introduction to Programming for Informatic**, UMass Amherst.

Spring 2021 : **ES654: Machine Learning**, IIT Gandhinagar.

Relevant Courses

UMass Amherst **Distributed and Operating system, Machine learning**.

IIT Gandhinagar **Machine learning, Data Structure and Algorithm, Operating System, Probability and Random Processes, Digital Systems, Microprocessors and Embedded Systems, Signal System and Networks, Digital Signal Processing, Analog And Digital Electronics, Analog Circuits**.

Online Courses **Deep Learning Specialization (Coursera)**.