Sagnik Majumder

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Education

May 2025 **University of Texas at Austin (UT)-Austin**, Texas, United States
Doctor of Philosophy and Master of Science in Computer Science; **GPA: 3.96/4.0**

July 2018 **Birla Institute of Technology and Science (BITS)-Pilani**, Pilani, Rajasthan, India
Bachelor of Engineering (Hons.) in Electronics and Instrumentation
Thesis: "Neural Architecture Meta-learning via Reinforcement" | Advisor: Prof. V. Ramesh
GPA: 9.55/10, Distinction and ranked 2^{nd} out of 100 students

Internships and Research

Jan 2020 - present **Research assistant at UT Austin Vision Lab**
Advisor - Prof. Kristen Grauman

- Introduced the new task of active audio-visual source separation and proposed a novel deep RL based method to solve it
- Built an RL based hierarchical audio-visual navigation system that combined a novel end-to-end waypoint prediction model and an geometric motion planner, and also leveraged a novel acoustic map design

Aug 20219 - Dec 2019 **Student in Graduate Natural Language Processing course at UT Austin**
Advisor - Prof. Greg Durrett

- Built a novel state-of-the-art adversarial defense for question answering that uses a model-agnostic answer reranking mechanism by computing named entity overlap between questions and candidate answers

Jan 2018 - May 2019 **Research assistant at Goethe University**
Advisor - Prof. Visvanathan Ramesh

- Built a continual learning framework by integrating a variational autoencoder based deep generative replay model and a statistical outlier rejection technique (OpenSet) that outperformed the state-of-the-art
- Curated a novel concrete defect dataset; meta-learned task specific neural architectures that outperformed strong baselines and transfer-learned models

May 2017 - *May* 2019 **Research intern at Frankfurt Institute for Advanced Studies**
Advisor - Prof. Christoph Malsburg

- Created a distortion invariant handwritten digit recognition system with Gabor filters and an elastic graph matching algorithm
- Worked on motion parameter estimation and prediction of rigid rotating objects and implemented a neural version of the Kalman filter

Peer-reviewed Publications and Submissions

- **Sagnik Majumder**, Ziad Al-Halah, Kristen Grauman. *"Move2Hear: Active Audio-Visual Source Separation"*. Under Review. [arXiv], [Project Page]
- Changan Chen, **Sagnik Majumder**, Ziad Al-Halah, Ruohan Gao, Santhosh K. Ramakrishnan, Kristen Grauman. *"Learning to Set Waypoints for Audio-Visual Navigation"*. **ICLR 2021**.
  [Publication], [Project Page]
- **Sagnik Majumder**, Chinmoy Samant, Greg Durrett. *"Model Agnostic Answer Reranking System for Adversarial Question Answering"*. **EACL 2021** Student Research Workshop. [Publication].
- Martin Mundt, **Sagnik Majumder**, Iuliia Pliushch, Yong Won Hong, Visvanathan Ramesh. *"Unified Probabilistic Deep Continual Learning through Generative Replay and Open Set Recognition"*.
  Under review. [Preprint], [Codebase]
- Martin Mundt, **Sagnik Majumder**, Sreenivas Narasimha Murali, Panagiotis Panetsos, Visvanathan Ramesh. *"Meta-learning Convolutional Neural Architectures for Multi-target Concrete Defect Classification with the COncrete DEfect BRidge IMage Dataset"*. **CVPR 2019**.
  [Main body], [Supplementary], [Codebase]
- Martin Mundt, **Sagnik Majumder**, Tobias Weis, Visvanathan Ramesh. *"Rethinking Layer-wise Feature Amounts in Convolutional Neural Network Architectures"*. **NeurIPS 2018** Workshop: Critiquing and Correcting Trends in Machine Learning.
  [Workshop web-page with link to publication], [Publication], [Codebase]
- Martin Mundt, Iuliia Pliushch, **Sagnik Majumder**, Visvanathan Ramesh. *"Open Set Recognition Through Deep Neural Network Uncertainty: Does Out-of-Distribution Detection Require Generative Classifiers?"*. **ICCV 2019** Workshop: Statistical Deep Learning for Computer Vision (SDLCV).
  [Publication]
- **Sagnik Majumder**, C. von der Malsburg, Aashish Richhariya, Surekha Bhanot, "*Handwritten Digit Recognition by Elastic Matching"* Journal of Computers vol. 13, no. 9, pp. 1067-1074, 2018.
  [Publication], [Codebase]
- Rishabh Bhardwaj, **Sagnik Majumder**, Pawan K. Ajmera, Soumendu Sinha, Rishi Sharma, R. Mukhiya, Pratik Narang. "*Temperature compensation of ISFET based pH sensor using artificial neural networks*" . In: Micro and Nanoelectronics (RSM), 2017 IEEE Regional Symposium on. IEEE. 2017, pp. 155–158.
  [Publication]
- Rishabh Bhardwaj, Soumendu Sinha, Nishad Sahu, **Sagnik Majumder**, Pratik Narang, Ravindra Mukhiya. *"Modeling and Simulation of Temperature Drift for ISFET based pH Sensor and its Compensation through Machine Learning Techniques "*. International Journal of Circuit Theory and Applications 2019.
  [Publication]

Coursework

Graduate:	**Deep Learning Seminar**; **Reinforcement Learning: Theory** & **Practice**; **Robot Learning**; **Natural Language Processing**; **Math in Deep Learning**; **Statistical Models for Health and Behavioral Sciences**; Algorithms: Techniques and Theory; Programming Languages;
Undergraduate:	Neural Networks & Fuzzy Logic; Machine Learning; Advanced Calculus; Linear Algebra and Complex Variables; Probability and Statistics; Computer Programming; Operating Systems; Object Oriented Programming; Advanced Computer Architecture; Algorithms and Complexity; Data Structures; Discrete Mathematics
MOOC:	Stanford's CS231n: Convolutional Neural Networks for Visual Recognition; Stanford's CS224n:Natural Language Processing with Deep Learning; UC Berkeley's CS294: Deep Reinforcement Learning

Professional Service

Reviewer: RA-L '21; ICRA '21

Software Skills

Programming Language:	Python; C; C++; Java; Matlab
Autodifferentiation Framework:	PyTorch; Tensorflow; Caffe
Python Package:	Numpy; Scipy; SK-learn; Matplotlib; Seaborn; Plotly
Operating System:	Linux (Debian, Ubuntu); MS Windows
Distributed Version Control:	Git
Document Preparation:	LaTeX; MS Word

Academic Honors and Achievements

November 2020	TOEFL iBT: 118 (Reading: 29, Listening: 30 Speaking: 29, Writing: 30)
July 2018	GRE: 334 (Quantitative: 170, Verbal: 164, AWA: 5.0)
Jan 2016 - Jun 2018	Received merit scholarship for academic excellence from BITS Pilani for 5 consecutive semesters
March 2017	Secured 2^{nd} place in paper presentation at APOGEE, BITS Pilani technical festival
December 2016	Received DAAD WISE scholarship 2017 for research internship in Germany
June 2014	Ranked in top 0.50% in IIT-JEE and 64 in WBJEE
February 2014	Offered KVPY fellowship by the Department of Science and Technology, Govt. of India

Teaching Experience

Semester 1, 2017-18: Teaching assistant for "Neural Networks and Fuzzy Logic" at BITS Pilani

Co-curricular Activities

2016-17: Project coordinator of Instrumentation Forum, BITS Pilani
2014-17: Member of BITS Firefox Community, Google Developers' Group and Instrumentation Forum at BITS PIlani

Extra-curricular Activities

2016-17: Cultural secretary of Moruchhaya, the Bengali cultural association at BITS Pilani
2014-18: Member of Moruchhaya