

Sagnik Majumder

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EDUCATION

- MAY 2021 **University of Texas at Austin (UT)-Austin**, Texas, United States
Master of Science in COMPUTER SCIENCE
- 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 2nd in department
- MAY 2014 **South Point High School (SPHS)**
All India Senior School Certificate Examination (AISSCE), CBSE; Aggregate - 94.6%,

INTERNSHIPS AND RESEARCH

- JUL 2018 - MAY 2019 **Research assistant at Goethe University, Germany**
Advisors - [Prof. Visvanathan Ramesh](#), [Mr. Martin Mundt](#)
- Built a continual learning framework by integrating variational autoencoder based deep generative replay and statistical outlier rejection with OpenSet algorithm
 - Curated a novel dataset for multi-target concrete bridge defect identification, meta-learned task specific neural architectures and compared their performance with the baseline deep learning models and transfer learning
 - Investigated a common architectural design practice of monotonically increasing feature amounts with depth in CNNs, through parameterization of feature distribution across layers and obtained results that contradict this practice
- JAN-JUN, 2018 **Bachelor thesis intern at Goethe University, Germany**
Advisors - [Prof. Visvanathan Ramesh](#), [Mr. Martin Mundt](#)
- Worked on Q-learning ([MetaQNN](#)) and REINFORCE ([ENAS](#)) based neural architecture search algorithms for image classification
 - Proposed a greedy alternative to the Q-learning update rule in MetaQNN for improving convergence with shorter search schedules
 - Worked on reward design and loss reformulation for extending architecture search to deep generative models
- MAY 2017 - May 2019 **Research intern through DAAD WISE scholarship program**
Advisor - [Prof. Christoph Malsburg](#), senior fellow at [Frankfurt Institute for Advanced Studies](#)
- Created a distortion invariant handwritten digit recognition system
 - Used Gabor filters for feature (intensity, orientation and frequency) extraction
 - Used elastic matching between graphs with dynamic links, for recognition
 - Worked on motion parameter estimation and prediction with Reichardt velocity detection mechanism and self-organizing neural fields

INTERNSHIPS AND RESEARCH CONTINUED...

MAY-JUL, 2016	<p>Research intern at Indian Institute of Remote Sensing, Dehradun, India Advisors - <i>Ms. Shefali Agarwal, Mr. Raghavendra S.</i></p> <ul style="list-style-type: none">• Implemented software based synchronization of terrestrial laser scanner (TLS) and global positioning system in mobile mapping system using network communication protocols• Processed scan data from TLS and extracted it to human readable format
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MAJOR ACADEMIC PROJECTS

JAN-DEC, 2017	<p>Project member at Multimedia Laboratory, BITS Pilani, India Advisors - <i>Prof. Surekha Bhanot, Prof. Kamlesh Tiwari</i></p> <ul style="list-style-type: none">• Worked on face recognition with baseline CNNs and transfer learning; used OpenFace toolkit for affine transformation based face alignment as a data pre-processing step• Implemented a system for image grounded text generation using primer text produced from sign language images; used fine-tuned CNN models for sign language image classification and LSTM for text generation
JAN-MAY, 2017	<p>Project member at Nano Bio Sensors Group, CSIR-CEERI Pilani, India Advisor - <i>Mr. Soumendu Sinha</i></p> <ul style="list-style-type: none">• Designed an ISFET based pH-meter; collected 'pH-sensitivity vs temperature' data and applied feature normalization• Temperature-compensated the pH-meter through ML by using diverse regression models like neural networks, support vector regression, random forest and polynomial regression

PEER-REVIEWED PUBLICATIONS AND SUBMISSIONS

- Martin Mundt, **Sagnik Majumder**, Iuliia Pliushch, Visvanathan Ramesh. *"Unified Probabilistic Deep Continual Learning through Generative Replay and Open Set Recognition"*. To be submitted to a **tier-1 conference**.
[\[Preprint\]](#), [\[Codebase\]](#)
- 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**.
[\[Publication\]](#)

- **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]

TEACHING EXPERIENCE

SEMESTER 1, 2017-18: Teaching assistant for “Neural Networks and Fuzzy Logic” at BITS Pilani

COURSEWORK

Graduate: Deep Learning Seminar; Natural Language Processing; Reinforcement Learning; Theory & Practice

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

MOOC: Data Structures ([certificate](#)); Algorithms ([certificate](#));
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

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: L^AT_EX; MS Word

ACADEMIC HONORS AND ACHIEVEMENTS

AUGUST 2018 TOEFL iBT: 116 (READING: 30, LISTENING: 29 SPEAKING: 27, 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

AUGUST 2017 Offered full-time role as machine learning engineer (software development) by the technology division of Goldman Sachs India

MARCH 2017 Secured 2nd 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

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