SAPTARSHI DAS

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PROFESSIONAL OBJECTIVE

ECE Ph.D. candidate looking for challenging **Full-Time** opportunities (**Research Scientist / Applied Scientist / Machine Learning Engineer / Senior Data Scientist**) starting **late 2019 (Nov - Dec)**.

RESEARCH INTERESTS

Wireless Networking, Embedded Systems, **Energy-Efficient** and **Energy-Harvesting**-Aware **Network Protocol Design** (Medium Access Control, Routing), **Machine Learning, Neural Networks** (Deep Recurrent / Reinforcement Learning, Spiking Neural Networks) for **Prediction / Pattern Recognition**, **Evolutionary Multi-Objective Optimization**, Autonomous / Continuous **Structural Health Monitoring**

EDUCATION

Michigan State University (MSU), East Lansing, MI, USA   Aug 2013 – Present
Ph.D. Student, Electrical and Computer Engineering   **GPA: 3.75 / 4.0**
Advisor: **Prof. Subir K. Biswas**   **Tentative Graduation**: **Nov 2019**
Thesis Title: *"Towards Energy-Efficient and Harvesting-Aware Networking Protocol and Event Detection Architectures for Energy-Harvesting-Powered Structural Health Monitoring Systems"*

Heritage Institute of Technology (HITK), Kolkata, WB, India   2007 - 2011
Bachelor of Technology, Electronics and Communication Engineering   **GPA: 8.88 / 10.0**

TECHNICAL SKILLS / PLATFORM EXPERIENCE

Languages: **C / C++ / Java / Python / Scala** (*General Purpose*), **MATLAB / R** (*Computational / Statistics*), Awk / **Bash** / Groovy / **JavaScript** (*Scripting*), NesC / **Arduino / Assembly** (*Embedded Systems*)
Platforms: **Keras / TensorFlow** / Torch / **Google Cloud** (*Machine Learning*), Nest (*Spiking Neural Nets*), **NS3** / ONE (*Network Simulation*), Avida / **NSGA** (*Genetic Algorithms*), **Android SDKs / AngularJS / HTML5 / CSS3** (*Mobile / Web App Design*), **Blender** (*3D Printing / Design*), **D3.js** (*Data Visualization*), OracleDB / **SQLite** / MongoDB / **PL-SQL / Firebase** (*Database Systems*), **Spark / Pandas** (*Big Data*)

WORK EXPERIENCE

NETWORKED EMBEDDED AND WIRELESS SYSTEMS (NEEWS) LAB, MSU (East Lansing, USA)   Aug 2013 – Present
Graduate Research Assistant / Teaching Assistant
Worked in a number of projects funded by NASA, NSF etc. involving design / implementation of networked, embedded sensing devices / systems for varied applications and energy-efficient network communication protocols / architectures for these, in collaboration with diverse teams, Instructed two ECE undergrad labs (Digital Control and Electronic Instrumentation) and mentored two undergrad researchers in NeEWS lab
RESEARCH OUTPUT
15 peer-reviewed publications (89 citations, h-index: 6, i-10 index: 4, Google Scholar: https://scholar.google.com/citations?user=BL1ZY88AAAAJ), 3 conference presentations, 1 U.S. Patent granted (2018), 1 applied (2019), Multiple Research / Travel Fellowships (Domestic / International) received
SELECTED PROJECTS

1) ***Energy-Aware Through-Substrate Ultrasonic Pulse Communication for Structural Health Monitoring Systems*** – Novel energy-efficient communication protocol (pulse time-based encoding) and structural anomaly detection (binary event data-based) paradigms. System architecture and protocols development, event-driven simulation (C++) and evaluation, hardware prototype.

2) ***Energy-Efficient Event Pattern Recognition using Spiking Neuron-Based Learning and Pulse Networking*** – Novel learning and networking paradigm. Brain-inspired Spiking Neuron-based (Nest simulator) Learning Adaption with energy-light Pulse Networking.

3) ***Wearable Networked Multi-Modal Sensing System for Cost-Effective and Privacy-Friendly Detection and Measurement of Meaningful Behavioural Interactions in Limited Space Environments (Space Station / Space Settlement analogues for team cohesion studies – NASA HERA / HI-SEAS projects, Early childhood classrooms for detection of early childhood social development and autism indicators – MSU Child Development Lab)*** – Novel System Architecture and Application Paradigm (Indoor Behavioural Tracking using infrastructure-free ultrasonic sensing). Sensing and communication Software / Hardware (Embedded) development, 3D Case Design (Blender), Realtime GUI (Visual Basic) design.

4) ***Ultra-Energy-Efficient Solar-Harvesting-Powered Distributed Wireless Sensing System for Greenhouse Environment Monitoring and Control*** – Novel communication paradigm (pulse interval encoding), completely maintenance-free operation, end-to-end system dev (greenhouse to cloud), Long Short-Term Memory (LSTM) Neural Network-based prediction of harvesting availability for communication protocol adaptation, Realtime Online GUI (Firebase / AngularJS)

TECHNICAL EXPOSURE

Substantial experience in systems / architecture / communication protocol design and programming on various software (full-stack) and hardware (embedded devices such as Mica2, IRIS, Cricket, Arduino Uno / Yun / Pro Mini etc.) platforms. Development familiarity with a large variety of sensors (piezoelectric, IR, audio, temperature, CO_2 detection, Photosynthetically Active Radiation measure etc.) and embedded sensor communication interfaces (I2C, SPI, UART)

INFOSYS LTD. (Chennai / Bangalore / Mysore, India) Aug 2011 – Aug 2013

Systems Engineer (2011-13) and **Systems Engineer Trainee** (2011)

Worked as a developer in the Financial Services (banking) domain, delivering projects for a Big-4 U.S. Bank

PROJECTS

1) ***Automatic Check Image Processing and Handling***
2) ***Customer Information, Risk and Offers Management***

Involved in all phases of the software development life cycle (design, coding, testing, maintenance) across multiple projects

Handled the responsibilities of Configuration Controller for a multi-city project team (20-30 members)

TECHNICAL EXPOSURE

Extensive full-stack development experience on the Java platform, Oracle / IBM Database systems, SOAP / REST Web Services etc. and wide exposure to a range of established programming frameworks, tools and design patterns

SELECTED PUBLICATIONS / PATENTS

1) **S. Das**, H. Salehi, Y. Shi, S. Chakrabartty, R. Burgueño, and S. Biswas, **"Towards Packet-less Ultrasonic Sensor Networks for Energy-harvesting Structures"**, **Computer Communications Journal, 2016**
2) H. Salehi, **S. Das**, S. Chakrabartty, S. Biswas, and R. Burgueño, **"Structural damage identification using image-based pattern recognition on event-based binary data generated from self-powered sensor networks"**, Structural Control and Health Monitoring Journal, 2017
3) S. Biswas, D. Feng, F. H. Memar, **S. Das**, "**Method and Device for Transmitting Data using Inter-Pulse Interval Modulation Technique**", **U.S. Patent, US 10051663 B2, 2018**

SELECTED PH.D. COURSEWORK

Neural Networks and Deep Learning, Advanced Computer Architecture, **Advanced Operating Systems**, **Stochastic Processes and Applications**, Evolutionary Computation, Evolutionary Multi-Criterion Optimization and Decision-Making, **Design and Theory of Algorithms**, Algorithmic Graph Theory

LEADERSHIP / AFFILIATIONS

Secretary for League of Electrical Engineering Graduate Students (LEEGS) 2014 - 2016

Organized monthly meetings, peer-help sessions, technical workshops and social gatherings to help the ECE community in MSU and fostering collaboration and camaraderie among them