PALLAV KUMAR DEB

(+91)8436942458 ⋄ pallv.deb@gmail.com ⋄ pallv.deb@iitkgp.ac.in
SWAN Lab, Dept. of Computer Science and Engineering
Indian Institute of Technology, Kharagpur 721302

EDUCATION

Indian Institute of Technology, Kharagpur *August 2017 - Present*
Doctor of Philosophy
Department of Computer Science & Engineering

Tezpur University *August 2015 - August 2017*
Master of Technology CGPA: 9.08
Information Technology

Royal Group of Institutes, Gauhati University *August 2010 - August 2014*
Bachelor of Engineering Overall Percentage: 74.39
Department of Computer Science & Engineering

RESEARCH INTERESTS

Thesis topic: Resource Orchestration in Constrained IoT environments.

Interests (but not limited to): Networking, resource allocation, fog computing, constrained devices, AI/ML-based solutions, Internet of Things, UAVs, Swarm of UAVs, e-health, THz communications, nano-networks.

WORK EXPERIENCE

National Programme on Technology Enhanced Learning (NPTEL) Jun 2020 – Present
Teaching Assistant

· Introduction to Internet of Things (by Prof. Sudip Misra)

SensorDrops Networks Pvt. Ltd., Kharagpur Dec 2018 – Present
R&D Consultant

· Developed multiple Internet of Things (IoT) devices dedicated towards addressing basic societal as well as industrial needs.
· Developed multiple Android applications for interacting with the IoT devices and also for other activities, such as sensing and actuating.
· Worked closely with the founders during the creation of SensorDrops Networks Pvt. Ltd.

Indian Institute of Technology, Kharagpur Jun 2017 – Present
Teaching Assistant

· Programming and Data Structures Lab
· Software Engineering
· Architecture and Protocols for Internet of Things
· Cloud computing

Tezpur University Jun 2015 – Jun 2017
Teaching Assistant

· Information and Communication Technology
· Introductory Computing
· Computer Graphics
· Computer Organization and Architecture

West Coast Frozen Foods Pvt. Ltd., Mumbai Jul 2014 – Dec 2014
In-house Software Developer

· Assisted in creation of websites.
· Developed smart inventory system for incoming and outgoing packages.

WORK VISITS

Tata Consultancy Services, Innovation Laboratory
Kolkata

Demonstration of IoT-based wireless temperature sensing nodes from SensorDrops Networks Pvt. Ltd.

Calcutta Electric Supply Corporation Limited
Kolkata

Demonstration of IoT-based wireless condition monitoring nodes from SensorDrops Networks Pvt. Ltd.

Ceratizit Limited
Uluberia, West Bengal

Discussion for Industrial IoT and Industry 4.0 from SensorDrops Networks Pvt. Ltd.

MAJOR PROJECTS

B.E.: Steganography
In this work, we take textual input from the user, which we convert to a picture of any format. We then use the least significant bit (LSB) routines for hiding the picture containing the textual data into another arbitrary picture. We then forward the superimposed image to designated receivers. On the receiving side, we provide routines for separating the images from one another. My team of 2 other members prepared this project towards the completion of our Bachelor of Engineering degree.

M.Tech: Human Activity Recognition from Video
This project lists the series of activities performed by people in a video. It consists of three steps – 1) Recognition of humans and objects in a video frame, 2) Identify nature of movement based on joint movements and angles, and 3) Finalize activity based on the objects that the human is using. This work involves the use of machine learning routines like Convolution Neural Network (CNN) and Hidden Markov Models (HMM). I prepared this project towards the completion of my Masters of Technology degree.

SkopEdge: A Smart Digital Stethoscope 2019 – Present
In this work, we developed a low-cost and easy-to-use IoT-based digital stethoscope that records heart sounds and automatically counts the number of heartbeats. Due to changing network conditions, the stethoscope changes the quality of the audio files and sends it to remote locations. The results are then made available for analysis by remote doctors along with a visualization for the same. This work has been accepted for presentation at the IEEE International Conference on Communications (ICC) 2020, in Dublin, Ireland. The project is backed by IoT-based protocols such as MQTT (initially we used WebSockets) and is fully dockerized (Django, PostgreSQL, and MongoDB). It is also the recepient of the *Honorary Mention* in the prestigious IEEE ComSoc Student Competition 2020.

IndustryEdge: An IoT-Based Temperature & Humidity Monitor 2020 – 2021

In this work, we developed an IoT-based temperature and humidity monitor for industrial spaces. We developed this using off-the-shelf low-cost devices such as NodeMCUs and Raspberry Pi. This is backed up by deployments over the cloud using Amazon EC2 for real-time monitoring.IndustryEdge has the potential to detect emergencies and informs the concerned personnel using SMS and mailing services. This work has been procured by Ceratizit (West Bengal division), India, a manufacturer of hard material products for wear protection and cutting tools. TCS has also procured a similar project from us.

Other Ongoing Funded Projects 2020 – Present

- TribeConnect: Integrated Smart Tribal Eco-Platform – A Proof of Concept in Chhattisgarh, Ministry of Electronics and Information Technology (MeitY).
- Remote Monitoring and Real Time Control of Defects in Friction Stir Welding Process and Preventive Health Monitoring of Friction Stir Welding Machine, Tata Consultancy Services.

Other Projects in the Form of Publications.

TECHNICAL STRENGTHS

Programming	C/C++, Java, Python, Android, HTML/PHP, Matlab
Tools	Django, Tensorflow, OpenCV, Keras, and other machine learning frameworks
Software & Tools	MS Office, Latex, Docker, Kubernetes, OpenFaaS, Grafana, Prometheus
Databases	MySQL, PostgreSQL, InfluxDB, MongoDB
Hardwares	Raspberry Pi (3B+, 4, Zero), NodeMCU, Arduino

PROFESSIONAL AFFILIATIONS

2020 - Present	IEEE, Graduate Student Member
2020 - Present	IEEE Communications Society (ComSoc), Student Member

TEACHING ASSISTANTSHIPS

National Programme on Technology Enhanced Learning (NPTEL) 2020 – Present

- Introduction to Internet of Things

Indian Institute of Technology, Kharagpur 2017 – Present

- Introduction to Internet of Things
- Cloud Computing
- Software Engineering
- Programming and Data Structures Lab

Tezpur University Jun 2015 – Jun 2017

- Information and Communication Technology
- Introductory Computing
- Computer Graphics
- Computer Organization and Architecture

WORKSHOPS AND TALKS

SGRIP-Sponsored Short Term Course on Modern Wireless Networks and IoT October 2019
IIT Kharagpur

Hands-on Session on IoT devices and Android programming.

Guest Lecture: Online Mode June 2020
Jorhat Engineering College

Invited talk on *Introduction to Fog Computing.*

PUBLICATIONS

JOURNALS

1. A. Mukherjee, **P. K. Deb**, and S. Misra, "Timed Loops for Distributed Storage in Wireless Networks" *in* ***IEEE Transactions on Parallel and Distributed Systems.***
2. **P. K. Deb**, A. Mukherjee, and S. Misra, "XiA: Send-it-Anyway Q-Routing for 6G-Enabled UAV-LEO Communications", *in* ***IEEE Transactions on Network Science and Engineering.***
3. **P. K. Deb**, S. Misra, and A. Mukherjee, "Latency-Aware Horizontal Computation Offloading for Parallel Processing in Fog-Enabled IoT" *in* ***IEEE Systems Journal.***
4. S. Misra, A. Mukherjee, and **P. K. Deb**, "Channel Modeling of IoT Phantom Networks: Communications in the THz Band." *in* ***Transactions of the Indian National Academy of Engineering.***
5. N. Pathak, **P. K. Deb**, A. Mukherjee and S. Misra, "IoT-to-the-Rescue: A Survey of IoT Solutions for COVID-19-like Pandemics," *in* ***IEEE Internet of Things Journal***.
6. S. Misra, **P. K. Deb**, N. Koppala, A. Mukherjee and S. Mao, "S-Nav: Safety-Aware IoT Navigation Tool for Avoiding COVID-19 Hotspots", *in* ***IEEE Internet of Things Journal***.
7. S. Misra, S. P. Rachuri, **P. K. Deb** and A. Mukherjee, "Multi-Armed Bandit-based Decentralized Computation Offloading in Fog-Enabled IoT," *in* ***IEEE Internet of Things Journal***.
8. **P. K. Deb**, S. Misra, T. Sarkar and A. Mukherjee, "Magnum: A Distributed Framework for Enabling Transfer Learning in B5G-Enabled Industrial-IoT," *in* ***IEEE Transactions on Industrial Informatics***.
9. R. Saha, S. Misra and **P. K. Deb**, "FogFL: Fog Assisted Federated Learning for Resource-Constrained IoT Devices," *in* ***IEEE Internet of Things Journal***.
10. **P. K. Deb**, C. Roy, A. Roy and S. Misra, "DEFT: Decentralized Multiuser Computation Offloading in a Fog-Enabled IoV Environment", *in* ***IEEE Transactions on Vehicular Technology***.

CONFERENCES

1. S. Misra, **P. K. Deb**, and K. Saini, "Dynamic Leader Selection in a Master-Slave Architecture-Based Micro UAV Swarm", ***IEEE Global Communications Conference (GLOBECOM)***, Madrid, Spain, 2021
2. S. Misra, **P. K. Deb**, N. Pathak and A. Mukherjee, "Blockchain-Enabled SDN for Securing Fog-Based Resource-Constrained IoT", ***IEEE INFOCOM Workshop***, Toronto, Canada, July 6-9 2020.

3. **P. K. Deb**, S. Misra, A. Mukherjee and A. Jamalipour, "SkopEdge: A Traffic-Aware Edge-Based Remote Auscultation Monitor", ***IEEE International Conference on Communications (ICC)*** 2020, Dublin, Ireland, June 7-11, 2020.

MAGAZINES

1. **P. K. Deb**, S. Misra, A. Mukherjee and S. Shaw, "Eaves: An IoT-Based Acoustic Social Distancing Assistant for Pandemic-Like Situations", ***IEEE IoT Magazine***
2. **P. K. Deb**, A. Mukherjee and S. Misra, "CovChain: Blockchain-Enabled Identity Preservation and Anti-Infodemics for COVID-19", ***IEEE Network Magazine***

BOOK CHAPTERS

1. **P. K. Deb**, S. Misra, A. Mukherjee and A. Bandyopadhyay, "Containing the Spread of COVID-19 with IoT: A Visual Tracing Approach", **Computational Modelling and Data Analysis in COVID-19 Research**, CRC Press, USA.

PATENTS FILED

1. S. C. Misra, D. Das, V. Udutalapally, V. Kotiyal, and **P. K. Deb**, "Paridhi: An Edge-based Autonomous Student Conduct-cum- Screening Regulatory System", India, 2021. (Under review)
2. S. Misra, D. Das, V. Udutalapally, A. Ghosh, and **P. K. Deb**, "MDHYM: A secured Edge-based automated power control and communication system for legacy IoT infrastructures", India, 2021. (Under review)

ACADEMIC ACHIEVEMENTS

1. Secured national rank in GATE 2015 for securing admission into M.Tech.
2. Received a ***Honorary Mention*** in the 2020 IEEE Communications Society Student Project Competition "*Communications Technology Changing the World*".

ACADEMIC REFEREE SERVICE

IEEE	IEEE Transactions on Vehicular Technology
IEEE	IEEE Transactions on Mobile Computing
IEEE	IEEE Transactions on Industrial Informatics
IEEE	IEEE Internet of Things Journal
IEEE	IEEE Systems Journal
IEEE	IEEE Journal on Selected Areas of Communications
IEEE	IEEE Internet of Things Magazine
IEEE	IEEE International Conference on Communications
IEEE	IEEE International IOT, Electronics, and Mechatronics Conference
Springer	Springer Nature Scientific Reports

EXTRA-CIRRUCULAR

Co-Organized Counter Strike 2013 - a gaming event in Royal Group of Institutions.

Ranked 1660 in NIIT 8^{th} national aptitude test.

Secured second position in movie making competition 2015 at Tezpur University.

Secured first position in movie making competition 2016 at Tezpur University.

Might find me pretending to play the guitar sometimes.

PERSONAL TRAITS

Highly motivated and eager to learn new things.

Strong motivational and leadership skills.

Ability to work as an individual as well as in group.

REFERENCES

Prof. Sudip Misra
Professor
Dept. of Computer Science and Engineering
IIT Kharagpur
Email: smisra@cse.iitkgp.ac.in, smisra.editor@gmail.com

Dr. Anandarup Mukherjee
Research Assistant
Dept. of Engineering
University of Cambridge, U.K.
Email: am2910@cam.ac.uk

Dr. Shobhanjana Kalita
Assistant Professor
Dept. of Computer Science and Engineering
Tezpur University
Email: kalitas@tezu.ernet.in

Dr. Arindam Karmakar
Assistant Professor
Dept. of Computer Science and Engineering
Tezpur University
Email: arindam@tezu.ernet.in