

DEBAJIT SARMA

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PERSONAL INFORMATION:

Faculty Fellow
TIH Division of IITG TIDF
4th Floor, R&D Building
IIT Guwahati, Assam-781039



EDUCATIONAL QUALIFICATION:

Degree	Institute/University	Board/University	Year	Percentage/CGPA
Ph.D.	IIT Guwahati	IIT Guwahati	2022	-
M.E.	IEST, Shibpur	IEST, Shibpur	2014	85%
B. Tech	Tezpur University, Tezpur	Tezpur University	2010	8.64 (81.40%)
HSSLC	Cotton College, Guwahati	AHSEC	2006	81.20%
HSLC	Bajali H. S. School (Assam)	SEBA	2004	88.00%

RESEARCH INTERESTS AND SKILLS:

- **Computer Vision, Image Processing and Machine Learning Applications.**
- **Software languages:** Python, C, C++, Assembly Language
- **Numerical Analysis:** Matlab, Simulink
- **Embedded skills:** 8085, 8086 microprocessors & 8051, AVR, ARM microcontrollers.
- **Simulation skills:** KEIL, MIKRO C Pro, DSP6713 DSK Processing Kit.
- **Type-setting skill:** Latex, Microsoft Word

PROFESSIONAL EXPERIENCE:

- **Institute: Technology Innovation Hub (TIH), IIT Guwahati**
Designation: Faculty Fellow (Assistant Professor on contract)
Period: From 02/12/2022 to date
Courses Teaching: Machine Learning, and Robot Vision & Sensing
- **Institute: NITS MIRZA, Mirza, Guwahati-781 125**
Designation: Assistant Professor (Teaching theory subjects and Lab duty)
Period: 01/03/2011 to 13/07/2012 and 01/08/2014 to 21/07/2015 (2 years 4 months)
Courses: Electronic Devices and Circuits, Network Theory, Digital Electronics, Microprocessors and Microcontrollers, Control System, Probability, Random Variables and Random Processes.

- **GATE Coaching:** Involved in GATE coaching teaching various subjects from Electronics in Institute of Science and Technology (IST), Gauhati University in 2014 and 2017.
- **Completed PhD** from the Dept. of EEE, IIT Guwahati.
PhD Topic: Hand Detection and Segmentation Schemes for Trajectory-guided Gesture Recognition (successfully defended Ph.D. Thesis on **21st October, 2022**)
Teaching Assistant (TA) experience during PhD in Signal Simulation Lab, Circuit Lab, and Basic Electronics course.
- Worked as a Liaison Officer in a **MeitY Sponsoed** project on **Deep Learning-based Machine Translation System** at Dept of Information Technology, Gauhati University for 6 months, May-Nov, 2022.

ME PROJECT:

- **Title of Project:** Study of Image Communication Schemes in Wireless Sensor Networks and Test-bed Development.
Organization: IEST, Shibpur
Duration: 1st June 2013-31st May 2014

B.TECH PROJECT:

- **Title of Project:** Household Appliances Control System using GSM mobile.
Organization: Tezpur University, Napaam, Tezpur
Duration: 1st September 2009-31st May 2010

SUMMER TRAINING AND OTHER PROJECTS:

- **Title of Project:** Queue Command Structure in Microcontroller using MODBUS Protocol
Organization: Variable Energy Cyclotron Centre (VECC), Kolkata
Duration: 8th June '09-24th July '09
- **Title of Project:** Working of Railnet and Exchange at NFR
Organization: Northeast Frontier Railway (HQ NFR), Maligaon, Guwahati
Duration: 11th August '09-31th August '09
- **Title of Project:** Working of OCB 283 Exchange
Organization: Bharat Sanchar Nigam Limited (BSNL), Guwahati
Duration: 15th June '08-15th July '08

ACHIEVEMENTS:

- **15th state position in H.S.L.C. examination** in the state of Assam, 2004.
- Qualified National Talent Search Exam (**NTSE**) at the state level, 2004.
- Recipient of SBI sponsored scholarship in Tezpur University, 2006.
- 4th position in B.Tech program, Electronics & Comm. Engg, Tezpur University, 2010.
- 1st position in M.E., Communication Engg & Signal Processing, Dept of ETC, IEST, Shibpur, 2014.

- 2nd position in Three Minute Thesis presentation in the Dept. of EEE, IIT Guwahati, 2017.
- Best poster presentation award in Research Conclave, 2018 organized at IIT Guwahati.
- 2012-2014 **TEQIP II Fellowship** (during M.Tech) - MHRD, Government of India
- 2015-2020 **Institute Fellowship** (during Ph.D.) - MHRD, Government of India.
- 4 times **GATE** qualified in **EC** paper (GATE 2011, 2012, 2013, 2014).
- **UGC NET** qualified in Electronics Paper (for Assistant Professor only) with 98.99 percentile in June, 2019.

ACTIVITIES AND HOBBIES:

- Event Manager of Research Scholar Forum (RSF), Dept. of EEE for the period of 2017-18.
- Student Member, Organizing Committee, “Algorithms and Architectures for High Efficiency Video Coding,” TEQIP Sponsored, IIT Guwahati, Sept. 05-09, 2016.
- Member of the organizing prize committee of the annual technical festival of Tezpur University “Techxetra” in the year 2008.
- Participated in technical festival of IIT Guwahati in robotics competition (manual robot) in the year of 2007.
- Also participated in National Social Service (NSS) scheme of Tezpur University.
- Actively participated in sports activities in school and university level and received many prizes.
- Hobbies include quizzing, cricket, badminton, table tennis.

SYMPOSIUM/WORKSHOPS ORGANIZED:

- **Coordinator** of a **10 Day Summer School** on Machine Learning (ML) and Deep Learning (DL) Techniques with Applications
Place & Date: IIT Guwahati, 26th June-7th July, 2023
- **Coordinator** of a **5 Day Online Workshop** on Machine Learning (ML) and Deep Learning (DL) Techniques with Applications
Place & Date: IIT Guwahati, 9th Jan 2023
- **Resource Person** in “DSP Day” on the application of “Real Time Communication Signal Processing on TMS320C6713 Board”.
Place & Date: Gauhati University, Guwahati on 23rd Nov, 2011.
- **Resource Person** in summer training titled “VLSI and Embedded System” for Globsyn Skills Summer School, Kolkata.
Place & Duration: Kolkata, Globsyn Centre, May 10-30, 2013.
- **Resource Person** in “Deep Learning and Machine Learning Workshop” in Gauhati University.
Place & Date: E&ICT Academy IIT Guwahati and Kovid Academy, March 19-24, 2018.

SYMPOSIUM/WORKSHOPS ATTENDED:

- Attended workshop on ‘Artificial Intelligence and Machine Learning,’ organized by Gauhati University and ASTU, Guwahati, 27-28 Sept. 2019.
- Attended workshop on ‘Matlab Workshop,’ EEE Dept, IIT Guwahati, 9-10 March 2019.

- Attended workshop on ‘Tutorial Series on Deep Learning using Tensorflow (TSDLT),’ organized by IEEE Branch, IIT Guwahati, Oct. 2018.
- Attended workshop on ‘Latex Tutorial,’ by IIT Guwahati, 25-26 Aug. 2018.
- Attended workshop on ‘Algorithm and Architecture for High Efficiency Video Coding,’ sponsored by MHRD, IIT Guwahati, 5-9 Sept. 2016.
- Attended summer school on ‘Deep Learning for Computer Vision,’ organized by IIIT Hyderabad, 11-16 July, 2016.
- Attended workshop on ‘Advance Matlab Applications (ADMAT 2015),’ organized by IIT Guwahati, 11-12 April, 2015.
- Attended workshop on ‘ARM Embedded Systems,’ organized by IEEE Branch, IIT Guwahati, 19-20 March, 2015.
- Attended symposium on ‘High Performance Computing,’ organized by AEC, 2012.
- Also attended many more online and offline workshops.

PUBLICATIONS:

➤ **JOURNALS:**

1. **Sarma, D.,** Dutta, H P. J., Yadav, K. S., Bhuyan, M.K. and Laskar, R.: ‘Attention-based Hand Semantic Segmentation and Gesture Recognition using Deep Networks,’ **Evolving Systems, Springer**, pp. 1-17, 2023.
2. **Sarma, D.,** Kavyasree, V and Bhuyan, M.K.: ‘Two-Stream Fusion Model using 3D-CNN and 2D-CNN via Video-Frames and Optical Flow Motion Templates for Hand Gesture Recognition,’ **Innovations in Systems and Software Engineering, Springer**, pp. 1-14, 2022.
3. **Sarma, D.** and Bhuyan, M.K.: ‘Hand Detection by Two-Level Segmentation with Double-Tracking and Gesture Recognition using Deep-Features,’ **Sensing and Imaging, Springer** vol. 23, No. 1, pp. 1-29, 2022.
4. Chakraborty, B.K., **Sarma, D.,** Bhuyan, M.K., MacDorman, K.F.: ‘Review of constraints on vision-based gesture recognition for human-computer interaction,’ **IET Computer Vision** vol. 12, No. 1, pp. 3-15, 2017.
5. **Sarma, D.** and Bhuyan, M.K.: ‘Methods, Databases and Recent Advancement of Vision-based Hand Gesture Recognition for HCI Systems: A Review,’ **SN Computer Science, Springer Journal**, vol. 2, No. 6, pp. 1-40, 2021.

➤ **JOURNALS ACCEPTED/UNDER REVIEW/COMMUNICATED:**

1. Atif, N., Mazhar, S., **Sarma, D.,** Bhuyan, M. K., & Ahamed, S. R.: ‘Efficient Context Integration through Factorized Pyramidal Learning for Ultra-Lightweight Semantic Segmentation,’ (**Under Review in Machine Learning, Springer**).

➤ **BOOK CHAPTERS:**

1. Vishwakarma, A., Bhuyan, M.K., **Sarma, D.** and Bora, K.: ‘Multi-Focus Image Fusion using Sparse Representation and Modified Difference,’ **Pattern Recognition and Machine Intelligence (PReMI), LNCS, Springer-Verleg**, pp. 482-489, 2019.

2. Purwar, P., Bhuyan, M.K., Bora, K. and **Sarma, D.**: ‘Modified Parallel Tracking and Mapping for Augmented Reality as an alcohol deterrent,’ **Pattern Recognition and Machine Intelligence (PREMI)**, LNCS, Springer-Verleg, pp. 587-595, 2019.
3. Devi, Trishna and **Sarma, D.**: ‘Covid-19 and Its Impact on Society,’ **Impact of COVID-19 on Economy, Business, Education and Social Life**, Kripa Dhrishti Publications, Pune, India (ISBN: 978-81-948755-9-8), 2021.

➤ **INTERNATIONAL/ NATIONAL CONFERENCES:**

1. **Sarma, D.**, Tarafder, M.K., Choudhury, T. and Sarma, K. K.: ‘An energy efficient image communication framework for bandlimited wireless sensor networks,’ *Proc. in International Conference on Accessibility to Digital World (ICADW)*, pp. 197-201, 2016.
2. **Sarma, D.** and Bhuyan, M.K.: ‘Hand gesture recognition using deep network through trajectory-to-contour-based images,’ *Proc. in IEEE India Council International Conference (INDICON)*, pp. 1-6, 2018.
3. Dutta, H P. J., **Sarma, D.**, Bhuyan, M.K. and Laskar, R.: ‘Semantic Segmentation based Hand Gesture Recognition using Deep Neural Networks,’ *Proc. in National Conference on Communications (NCC)*, pp. 1-6, 2020.
4. Kavyasree, V., **Sarma, D.** and Bhuyan, M.K.: ‘Deep Network-based Hand Gesture Recognition using Optical Flow guided Trajectory Images,’ *Proc. in IEEE Applied Signal Processing Conference (ASPCON)*, pp. 252-256, 2020.
5. **Sarma, D.** and Bhuyan, M.K.: ‘Optical Flow guided Motion Template for Hand Gesture Recognition,’ *Proc. in IEEE Applied Signal Processing Conference (ASPCON)*, pp. 262-266, 2020.
6. **Sarma, D.** and Bhuyan, M.K.: ‘A Comparison of Deep Network with SVM Classifier for Static Hand Gesture Recognition,’ *Proc. in International Conference on Advances in Communication Technology, Computing and Engineering (ICTACTCE)*, 2021.
7. **Sarma, D.**, Barman, T., Bhuyan, M.K. and Iwahari, Y.: ‘Motion-based Representations for Trajectory-based Hand Gestures: A Brief Overview,’ *Proc. In International Conference on Data, Electronics and Computing (ICDEC)*, 2022.
8. Kangkana Bora, M.K Bhuyan, Yuji Iwahori, Genevieve Chyrmang and **Sarma, D.**: ‘ML based PCB Classification with Gabor and Statistical Features,’ *Proc. in International Conference on Data, Electronics and Computing (ICDEC)*, 2022.
9. **Sarma, D.**, Bora A. and Bhagat A.: ‘Automatic License Plate Detection and Recognition System for Security Purposes,’ *Proc. in International Conference on IEEE Guwahati Subsection (GCON)*, 2023.

➤ **PATENT:**

1. **Title: A Single Point Wearable Device For Isolation Of The Patients Having Infectious Diseases Including COVID-19**
Date of Filing: 16/08/2021, Date of Publication: 10/11/2021
Name of Patent Office: Australian Government Patent
Patent Number: 2021105614