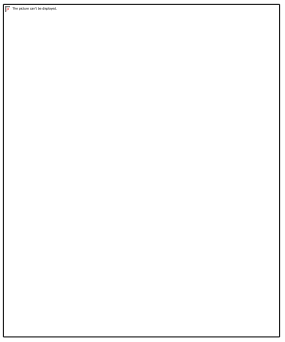
Curriculum Vitae

Career Objective: To leverage my expertise for pioneering research and innovation in addressing critical challenges in specific field.

1. **Full Name** Dr. Hirak Sarkar
2. **Date of Birth** 15th October 1993
3. **Gender** Male
4. **Address** 1689, Rajdanga Main Road,
   India, West Bengal, Kolkata - 700107
5. **Mobile No.** (+91) 82405-10582 / 96004-10582
6. **E-mail** dr.hiraksarkar@gmail.com
7. **Languages Known** English, Bengali, and Hindi



8. **Teaching Experience** 8+ years (see Section 22 for Details)
9. **Research Experience** 9+ years (Jan 2016 - Present)
10. **Industry Experience** 1+ years

Google Scholar Link

ResearchGate Link

ORC ID: 0000-0002-4444-2818

11. **Title of Ph.D. Thesis** Some Studies for The Early Detection of Solar Flares and Cyclonic Formation
12. **Title of M. Tech Thesis** Space Weather and its Effects on Communication Systems by Remote Sensing Through Space Probes and Satellites
13. **Subject of study/ Research Interests** Robotics and Automation, BCI Technology, Emerging Technologies Space Weather & Solar System, Magnetohydrodynamics**,** Embedded System, Signal System Sensing, IoT, Satellite Communication, Atmosphere, RF Propagation, Remote Sensing
14. **Area of specialization** Electronics, Communication Engineering, Mathematics, Mechatronics
15. **Computer Proficiency** MATLAB, PSPICE, C++, C, HTML, CSS, JavaScript, Fusion 360, Python Modules (TensorFlow, PyTorch, Scikit-learn, OpenCV), ROS, Arduino, AutoCAD, 3D-Printer, Scratch, PictoBlox, Raspberry Pi
16. **Academic Qualification**

○ **Ph.D.**	Techno India University, West Bengal, Awarded	2023
○ **Post-Graduation**	M. TECH in Electronics and communication Engineering, Techno India University, West Bengal, Grade (9.0/10),	2017
○ **Graduation**	B. TECH in Electronics and communication Engineering, Maulana Abul Kalam Azad University of Technology (Formerly known as W.B.U.T.),	2015
○ **Higher Secondary (Class 12)**	Pure Science (Physics, Chemistry, Mathematics, Biology), West Bengal Council of Higher Secondary Education (WBCHSE),	2011
○ **Secondary (Class 10)**	West Bengal Board of Secondary Education (WBBSE),	2009

17. Trainings / Projects Undertaken

Sl. No.	Name of Institute / Organization	Project Title	Duration
1.	Oriens Infotech	Microcontroller Based Embedded System Design	July-August 2014
2.	Kolkata Metro Railway	Communication Training	January 2014
3.	Bharat Sanchar Nigam Limited (BSNL)	Advanced Telecom with Specialization	June 2013
4.	ABB India Limited	T-314 Controller Software through VMware Workstation 17 Player	October 2025

18. Projects Completed on Robotics & AI

Sl. No.	Project Name	Description	Key Components
1.	Obstacle Avoidance Robot	Robot navigates avoiding obstacles using sensors.	Ultrasonic sensor, Arduino, motor driver, wheels
2.	Light Following Robot	Robot follows light sources.	LDRs, Arduino, motor driver, wheels
3.	Line Following Robot	Robot tracks a line path.	IR sensors, Arduino, motor driver, wheels
4.	Autonomous Robotic Arm	Arm controlled for pick-and-place tasks.	Servo motors, Arduino, ESP32
5.	AI Chatbot	AI-powered conversational assistant.	Python, NLP libraries
6.	Digital Clock & Calculator	LED display controlled for numerical outputs.	Arduino, 7-segment display
7.	Temperature Display 16x2	Displays temperature readings on an LCD.	Temperature sensor, Arduino, LCD module
8.	Solar Powered Bot	Robot powered by solar energy.	Solar panel, motor driver, Arduino
9.	Mechatronics Robots (20)	A collection of 20 robots showcasing different mechanisms.	Motors, gears, Arduino, sensors
10.	Smart Dustbin	Automated lid opening using sensors.	Ultrasonic sensor, servo motor, Arduino
11.	Traffic Light	Simulates traffic light control.	LEDs, resistors, Arduino
12.	Smart Door Sensor with Buzzer	Alarm activated when a door opens.	Magnetic sensor, buzzer, Arduino
13.	Radar Using Servo	A radar system simulates scanning by rotating a sensor on a servo motor.	Ultrasonic sensor, servo motor, Arduino

14.	Raspberry Pi Projects	Innovative projects using Raspberry Pi as a controller.	Raspberry Pi, sensors, peripherals
15.	Auto Home Cleaner with Battery	A robotic vacuum cleaner for home.	Motors, battery, brushes, microcontroller
16.	Gear Bot (Car Mechanism, 1-2-N-R)	Robot mimicking a car's gear system.	Motors, gears, Arduino
17.	Bridge Construction and Momentum	Models demonstrating infrastructure and momentum.	Construction materials, load sensors
18.	3D Model using 3D Pen	Creating 3D physical models manually with a 3D pen.	3D pen, plastic filament
19.	3D Model using TinkerCAD	Designing 3D models virtually using TinkerCAD software.	Computer, TinkerCAD
20.	3D Model Print using 3D Printer	Creating and printing 3D objects using software and a 3D printer.	3D printer, PLA/ABS Filament
21.	Circuit on Greetings Card	Interactive greeting card with circuits.	Copper tape, LEDs, coin cell battery
22.	Scratch Programming	Programming basic animations, games, and tables in Scratch.	Scratch software, computer
23.	Machine Vision Projects	-	Webcam, Python Software
24.	Fire Monitoring System	UAV equipped with high resolution cameras and advanced image processing algorithms to detect smoke and fire features based on color segmentation, texture analysis, and pattern recognition.	Drone, Night-vision Camera, Python Software

19. Additional Qualification / Achievements / Certifications

- Completed Computer Hardware Certification, NIIT Kolkata. 2009
- Best Paper Award, International Conference on Computer, Electrical & Communication Engineering (ICCECE 2017), IEEE Xplore.
- University Fellowship, Techno India University, West Bengal, 2015-17.
- Ranked 3rd in M. Tech batch (2015–2017) and 2nd in the ECE Department.
- Reviewed research papers for IEEE Xplore and JSEHM journals.

- Editorial Assistant, JSEHM Journal (2018–2019).
- Established Two Robotics & AI Laboratories (₹6.36 lakh and ₹18 lakh budgets, 2024–2025).
- Faculty-in-Charge, Sensors & Signal Processing Laboratory and IQAC/5S/Exam Cell Assistance (KPRIET, 2025).
- Faculty-in-Charge, EV Laboratory, Centre of Excellence, worth 5.7 Crore (KPRIET, 2026).
- Attended Multiple Faculty Development Programmes (FDPs) on Emerging Technologies.
- Developed an Educational Website using HTML, CSS, JavaScript, Adobe XD, Photoshop.
- Designed and Implemented a Drone Prototype for an Inter-College Technical Competition.
- Organized and Participated in National & International Conferences, Hackathons, and Cultural Events.

20. Working Details

Sl. No.	Name of Institute / Organization	Designation / Department	Full Time / Part Time	From	To	Duration
1	Techno India University	Assistant Professor / ECE	Full Time	08 Jul 2017	27 Dec 2023	06 Years 05 Months 19 Days
2	Aces Infotech Private Limited	Sr. Faculty & Coordinator	Full Time	05 Jan 2024	03 May 2025	01 Year 03 Months 28 Days
3	BrightChamps	Robotics & AI-ML Trainer	Full Time	06 Jun 2025	08 Jul 2025	01 Month 02 Days
4	KPR Institute of Engineering and Technology	Assistant Professor III / Mechatronics Engineering	Full Time	12 Jul 2025	**Present**	-

21. Subjects Taught

A. Techno India University (Electronics and Communication Engineering Department)

1.	Advanced Digital Signal Processing	Theory & Lab	M. Tech I Year
2.	Satellite Communication	Theory & Lab	B. Tech IV Year
3.	Analog Communication	Theory & Lab	B. Tech III Year
4.	Circuit Theory	Theory & Lab	B. Tech II Year
5.	Basic Electronics	Theory & Lab	B. Tech I Year
6.	Instrumentation and Control	Theory & Lab	Diploma III Year

7.	Communication Engineering	Theory & Lab	Diploma III Year

B. Aces Infotech Pvt. Ltd.

Role	Key Responsibilities
Sr. Faculty	• Teaching courses on Introduction to Robotics and AI–ML, including theory and practical lab sessions. • Designing and delivering Industrial Training Programs on emerging technologies for university students and government/private professionals.
Coordinator	• Hiring, training, and evaluating subject teachers. • Developing, reviewing, and improving course curricula, academic systems, and procedures. • Planning, organizing, and delivering workshops, seminars, and academic/ technical events.

C. BrightChamps

1.	Robotics & AI	Theory & Hands-on Sessions	International Students (USA, UK)

D. KPR Institute of Engineering and Technology (Mechatronics Engineering Department)

1.	Machine Vision and Image Processing	Theory	B. E. IV Year
2.	Electric and Hybrid Vehicle	Theory & Lab	B. E. III Year
3.	Microcontroller and Embedded Systems	Theory & Lab	B. E. II Year
4.	Electronic Devices and Digital Circuits	Theory & Lab	B. E. II Year
5.	Sensors and Signal Processing	Theory & Lab	B. E. II Year
6.	Electrical and Electronics for Mechatronics	Theory & Project	B. E. I Year

22. Journal Reviewer (3)

- American Journal of Electrical and Computer Engineering. 2640-0502.
- Physica Scripta. 1402-4896. IF. 2.6
- International Journal of Innovative Research in Technology. 2349-6002. IF. 8.01

Publications

Patent (1)

1. Exoskeleton-Assisted Physical Therapy Suit, Design Number: 6487213 (Published, UK, 2025).
2. VR-ML Personalized Classroom Learning Desk, Application No 485146-001, (Filed, IP, 2025).

In Peer Reviewed Journals (13)

1. Banerjee, A., **Sarkar, H.**, Raha, B., Das, S., & Bhattacharya, A. B. (2016). Studies on some aspects of space weather and its effects on communication systems remote sensing through space probes and satellites. Journal of the Indian Society of Remote Sensing, 501-509. (IMPACT FACTOR: 2.2)

2. Chakraborty, M., Banerjee, A., **Sarkar, H.**, & Bhattacharya, A. B. (2017). Characteristic of integrated field intensity of atmospherics during monsoon of West Bengal. TIU Transactions on Intelligent Computing, 1, 17-26.
3. **Sarkar, H**., Banerjee, A., Das, S., & Bhattacharya, A. B. (2018). Design of a coupled log periodic dipole array for receiving radio signal from distant sun. Journal of Science, Engineering, Health and Management, 1, 7-15.
4. Chowdhury, G. R., Bhattacharya, A. B., Lichtman, J. M., & **Sarkar, H.** (2018). Reaching another world with a solar system having liquid water and probable life. Journal of Science, Engineering, Health and Management, 2, 2-7.
5. Banerjee, A., **Sarkar, H.**, Bhattacharya, A. B., & Das, G. K. (2018). Solar modulation of the terrestrial atmosphere and the associated climatic changes. Journal of Science, Engineering, Health and Management, 2, 43-50.
6. **Sarkar, H.**, Sen, P., & Bhattacharya, A. B. (2018). Emerging techniques and instruments for brain-computer interfacing. Journal of the Institute of Electronics and Telecommunication Engineers (JIETE).
7. **Sarkar, H.**, Sen, P., & Bhattacharya, A. B. (2018). Technologies for Mind Machine Interface. Journal of Science, Engineering, Health and Management. 2 (3). 84-94.
8. **Sarkar, H.**, Banerjee, A., Mitra, S. P., Bhattacharya, A., & Sen, P. (2019). A comparative study of ELF and VLF noise characteristics of nor'wester at a low latitude tropical station. SN Applied Sciences, 1, 154. Springer. https://doi.org/10.1007/s42452-018-0028-4 (IMPACT FACTOR: 2.88)
9. Mitra, S. P., **Sarkar, H.**, Sen, P., & Bhattacharya, A. B. (2019). Implementation of system II transit point data for investigating the reduction of the rotational speed of the planet Jupiter. SN Applied Sciences, 1, 115. Springer. https://doi.org/10.1007/s42452-018-0017-7 (IMPACT FACTOR: 2.88)
10. Mandal, P., **Sarkar, H.**, & Chowdhury, S. K. (2024). Designing an IoT platform using wireless sensor network. International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), 4(1), 13-18. (IMPACT FACTOR: 7.53)
11. Chowdhury, S. K., & **Sarkar, H.** (2025). Neuroimaging and analyzing brain matrices. Journal of Sustainable Development Innovations, ASPUR Publishing. DOI:10.61552/JSI.2025.01.001
12. **Sarkar, H.**, Thamilselvi, R., Hemasri P., Harinipriya S., Saha, A. (2025). Spatiotemporal Analysis of Severe Hailstorms Over Kolkata and Surrounding Regions for Last 24years Using IMD Radar Data and Machine Learning Approaches, International Journal of Research and Analytical Reviews, 12 (3). 596-606. (IMPACT FACTOR: 7.17)
13. **Sarkar, H.**, Karmakar, S., Saha, A., Chowdhury, K. S., Nyamusoro, T. (2025) Big Data–Driven Smart Climate Change Prediction Using a Machine Learning Framework. International Journal

of Innovative Research in Technology (IJIRT). 12 (6).

14. Karmakar, S., **Sarkar, H.**, & Chowdhury, S. K. (2025). Predictive Modelling and Big Data Analysis for Optimizing Android App Development. Elsevier. (Communicated)
15. **Sarkar, H.**, Karmakar, S., Saha, A. (2025). Predicting Climate Change Simulation with Big Data and Machine Learning Approach. Climate Change, Springer. (Communicated)
16. **Sarkar, H.**, Priyadharshini, M. (2025). A Comparative Analysis of Real-Time Algorithmic Performance Optimization in Systems. Journal of Propulsion Technology. (Communicated)
17. Dutta A., Chowdhury K. S., Shadangi R. A., Saha A., **Sarkar H.** (2025). Quantum Computing Framework Optimization Challenges. Discrete Optimization. (communicated)
18. Karmakar, S., **Sarkar, H.**, & Chowdhury, S. K. (2025). Investigating correlation dynamics and predictive modeling for airline passenger referral using XGBoost and perception features. (communicated)

In Seminar/Symposium/Conferences (18)

1. Banerjee, A., **Sarkar, H.**, & Bhattacharya, A. B. (2017). Studies on solar radio signal variations at frequencies in the VLF and VHF bands. IEEE Xplore Digital Library, 38, 1-6.
2. **Sarkar, H.**, Banerjee, A., Biswas, S., & Bhattacharya, A. B. (2018, April 21-22). Emission of beam of electromagnetic radiation from pulsating star. Paper presented at the National Conference on Progress in Bioengineering and Environmental Management.
3. **Sarkar, H.**, & Chakraborty, S. (2022). Investigations on characteristic features of cyclonic storm 'MORA 2017' through radio signal, satellite, and radar over the Bay of Bengal. In Proceedings of the International Conference on Industrial Instrumentation and Control (Vol. 815, pp. 31-40). Springer.
4. Das, S., **Sarkar, H.**, & Chowdhury, S. K. (2024, April 11-12). Live pulsation gadget using Arduino. Paper presented at the 14th Inter-University Engineering, Science & Technology Academic Meet.
5. Karmakar, S., **Sarkar, H.**, & Chowdhury, S. K. (2024, October 24-25). Predicting bike sharing demand: Analyzing weather, time, and seasonal influences. Accepted and Presented at the International Conference on Advanced Innovations in Engineering, Science and Technology.
6. **Sarkar, H.**, Priyadharshini, R. (2025, September 27-28) A Comparative Analysis of Real-Time Algorithmic Performance Optimization in Intelligent systems. Accepted and Presented at the International Conference on Advances in Mathematics, Engineering & Technology.
7. Sikidar, A., Thakur, B., Vidyasagar, K. E. Ch., Panwar, A. A., **Sarkar, H.**, Pal, D., Joel, E., & Kumar, M. (2025, November 19-21). Comparative Analysis of Adolescent Idiopathic Scoliosis (AIS) and Healthy Subjects Using Electromyography (EMG) and Ground Reaction Forces (GRF). Accepted and Presented in International Conference on Interdisciplinary Research in

Technology & Management. IIT Gandhinagar Campus.

8. Shadangi, A. R., **Sarkar, H.**, Das, S. S., & Chakrabarti, I. (2025, December 29-30). Analyzing the BER of OTFS Compared to OFDM in a Multipath Fading Channel. Accepted and Presented in Engineering Advances 2025: Second International Conference.
9. **Sarkar, H.**, & Saha, A. (2026, January 30-31). An analysis of solar modulation of cosmic rays and their significance on Earth's climate. Second International Conference on Advances in Energy and Environmental Engineering.
10. Sidoine B. N. C., Shadangi R. A., **Sarkar H.** (2026, January 30-31). AI Based IoT-Enabled Infrared Flame Detection and Infrasound-Based Fire Suppression System. International Conference on Robotics, Automation & Mechanical Engineering (ICRAME 2026). Lucknow.
11. Kumar, N. J., Subhhashree, T., Anandhi, S., Saha, A., & **Sarkar, H.** (2026, January 30-31). Structural analysis and Manufacturing optimization of spring mattress systems through computational and AI Approaches. International Conference on Robotics, Automation & Mechanical Engineering (ICRAME 2026). Lucknow.
12. **Sarkar, H.**, Priyadharshini, R. (2026, February 10-12) Optimization Techniques for Real-Time Intelligent Systems through Machine Learning Techniques. International Conference on Advanced Scientific Computing & Machine Learning. Bits Pilani, Goa. (Accepted and presented)
13. **Sarkar, H.**, Saha, A., Harini Priya, S., Hema Sri, P., Thamilselvi, R., & Niranjan, J. (2026, February 10-12). Technological challenges and future analysis of sustainable electric mobility systems using deep learning algorithms. International Conference on Advanced Scientific Computing & Machine Learning, BITS Pilani, Goa.
14. Nyanzvi, T., Saha, A., Niranjan, J., Subhhashree, T., Harinipriya, S., Hemasri, P., Thamilselvi, R., & **Sarkar H.** (2026, February 17-20). Real-time Forest fire monitoring with UAV and image processing techniques, International Workshop and Conference on Robotics, Automation, and Manufacturing (RAM'26), Thailand
15. Navasakthi, S., Sangavi, K., Kanimozhi, R., Roshini, J., Saha, A., & **Sarkar, H.** (2026, February 20-22). Machine-learning-driven soil moisture monitoring for precision agriculture applications. International Conference on Mathematical Sciences and Computational Intelligence (ICMSCI-2026).
16. Mitra, V. L., Nilanthini, B., Kirubhavathi, V., Janani, S., Thanika Sree, S., & **Sarkar, H.** (2026, February 20-22). An adaptive fuzzy-logic-based multi-sensor decision system using Arduino for low-cost fire and gas detection. International Conference on Mathematical Sciences and Computational Intelligence (ICMSCI-2026).
17. Harinipriya, S., Hemasri, P., Thamilselvi, R., Saha, A., & **Sarkar, H.** (2026, February 20-22). Advances and challenges in BCI-controlled wearable exosuits for paralysis rehabilitation.

International Conference on Mathematical Sciences and Computational Intelligence (ICMSCI-2026).

18. Jagadeesh N, **Sarkar H.**, Design of a Touchless Hand-Gesture Controlled Augmented Reality System Using Computer Vision. International Conference on Smart Mobility for Sustainable Future"-ICSMSF2026.
19. Hema Sri P, Harini Priya S, Saha A., Shadangi R. A., Sarkar, H, (2026, May 15-17) Advances in Nanobiotechnology: From Nanoparticle Engineering to Biomedical Applications. 2nd International Conference on Advances in Sustainable Research for Energy and Environmental Management (ASREEM 2.0). (Accepted for Presentation).
20. Jagadeesh Kumar, N., Subhhashree, T., Consty Sidoine, B. N., Devipriya, M., Saha, A., Shadangi, A. R., & **Sarkar, H.** (2026, April 27-29). Design and implementation of a low-power edge-based offline speech command system for smart appliance control. International Conference on Electrical and Electronics Engineering (Submitted)

Monograph (1)

Bhattacharya, A., Banerjee, A., & **Sarkar, H.** (2018). Today's biggest cosmic mysteries. LAP Lambert Academic Publishing. Germany. **ISBN 9786202058834**

Books (2)

1. **Sarkar, H.** (2024). Beginner's guide to electronics and robotics. LAP Lambert Academic Publishing. Germany. **ISBN 9786207808847**
2. **Sarkar, H.**, Chowdhury, S. K., & Karmakar, S. (2024). NeuroLink: Brain-computer interaction. LAP Lambert Academic Publishing. Germany. **ISBN 9786208170363**

Book Chapters (2)

1. Karmakar, S., **Sarkar, H.**, & Chowdhury, S. K. (2025). Predicting bike sharing demand: analyzing weather, time, and seasonal influences. Recent Trends in Engineering, Science and Technology. Taylor and Francis. CRC Press. USA. **ISBN 9781041121633**.
2. Karmakar, S., **Sarkar, H.**, Chowdhury, S. K., Vij, R., (2026). Innovative approaches to cloud-based standardization and advanced techniques for next-gen online evaluation. Transforming Education with Singularity Technologies. Lifelong Learning from Childhood to Adulthood. Taylor and Francis. CRC Press. USA. **ISBN 9781032953250**.
3. **Sarkar, H.**, & Chowdhury, S. K. (2025). Future-driven material handling systems: LLMs and BCIs for optimized operational intelligence and adaptive control. In IEEE (Abstract Accepted, Chapter Submitted).
4. **Sarkar, H.**, Shadangi, A. R., Pal, D., Sikidar, A., Panwar, A. A., & Karmakar, S. (2025).

EcoSenseAI: Real-Time Pollution Data Visualization through AI and Big Data Intelligence. Wiley Publication. UK. (Abstract Accepted, Chapter Submitted).

Hirak Sarkar