

# Curriculum Vitae

## Partha Pratim Ray

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*Google Scholar: <https://scholar.google.co.in/citations?user=ioplfaqAAAAJ&hl=en&oi=ao>*

## Academic Qualifications

**Master of Technology** in Electronics and Communication Engineering with specialization in Embedded Systems from *Maulana Abul Kalam Azad University of Technology (formerly known as West Bengal University of Technology)*, Kolkata, India in 2011 having 88.60 percent (DGPA 9.60/10).

GATE qualified in Computer Science (CS) in 2009 with 91.62 percentile.

**Bachelor of Technology** in Computer Science and Engineering from *Maulana Abul Kalam Azad University of Technology (formerly known as West Bengal University of Technology)*, Kolkata, India in 2008 having 74.09 percent (DGPA 8.15/10).

**Higher Secondary and Secondary Examination** from West Bengal Council of Higher Secondary Education and West Bengal Board of Secondary Education in 2004 and 2002 having 85.80 and 90.25 percent, respectively.

## Work Experience

### 11+ Years

July, 2012 – Present: **Assistant Professor**

**Dept. of Computer Applications, Sikkim University (A Central University)**  
Gangtok, Sikkim, India

January, 2012 – June, 2012: Assistant Professor

Surendra Institute of Engineering and Management  
Siliguri, West Bengal, India

## Research Interests

- Internet of Things
- Next Generation Computing

### Selected List of Publications

#### Journal

- (1) **Ray. P. P.**, Das. P. K., Majumder, P., “ChatGPT and Societal Dynamics: Navigating the Crossroads of AI and Human Interaction”, *AI & Society: Knowledge, Culture and Communication*, Springer, 2023 ISSN: 1435-5655 (**Scopus**). (Accepted)
- (2) **Ray. P. P.**, Majumder, P., “Impact of ChatGPT on Surgical Practice and Research: Embracing AI's Transformative Potential”, *Indian Journal of Surgery*, Springer, 2023 ISSN: 0973-9793 (**Science Citation Index**) (**IF: 0.609**). (Accepted)
- (3) **Ray. P. P.**, “Transforming Industrial Reliability: The Intersection of Failure Modes and Effects Analysis with Artificial Intelligence”, *Journal of Failure Analysis and Prevention*, Springer, 2023 ISSN: 1864-1245 (**Scopus**). (Accepted)
- (4) **Ray. P. P.**, “ChatGPT in Radiology: Transforming Patient Care with AI Chatbots”, *Journal of the American College of Radiology, American College of Cardiology - Elsevier*, 2023 ISSN: 1558-349X. (**Science Citation Index**) (**IF: 6.24**). (Accepted)
- (5) **Ray. P. P.**, “Leveraging Deep Learning and Language Models in Revolutionizing Water Resource Management, Research and Policy-Making: A Case for ChatGPT”, *ACS ET&Water*, American Chemical Society, 2023 ISSN: 2690-0637. (**Scopus**). (Accepted)
- (6) **Ray. P. P.**, Majumder. P., “ChatGPT's Potential to Transform Healthcare and Address Ethical Challenges in AI-driven Medicine”, *Journal of Clinical Neurology, Korean Neurological Association*, 2023 ISSN: 1738-6586. (**Science Citation Index**) (**IF: 3.701**). (Accepted)
- (7) **Ray. P. P.**, “AI in Sensor Research: A Reality Check and the Underestimated Potential of ChatGPT”, *ACS Sensors*, American Chemical Society, 2023 ISSN: 2379-3694. (**Science Citation Index**) (**IF: 9.618**). (Accepted)
- (8) **Ray. P. P.**, “Refining the Application of Artificial Intelligence in the Water Domain: Exploring the Potential of ChatGPT”, *Science of The Total Environment*, Elsevier, 2023 ISSN: 0048-9697. (**Science Citation Index**) (**IF: 10.754**). (Accepted)
- (9) **Ray. P. P.**, “A Sober Appraisal of AI Systems, Particularly ChatGPT, in the Facets of Emergency Medicine”, *Annals of Emergency Medicine*, Elsevier, 2023 ISSN: 1097-6760. (**Science Citation Index**) (**IF: 6.762**). (Accepted)
- (10) **Ray. P. P.**, “AI-Assisted Sustainable Farming: Harnessing the Power of ChatGPT in Modern Agricultural

Sciences and Technology”, ACS Agricultural Science & Technology, American Chemical Society, 2023 ISSN: 2692-1952. **(Scopus)**. (Accepted)

- (11) **Ray. P. P.**, Das, P., K., “Charting the Terrain of Artificial Intelligence: A Multidimensional Exploration of Ethics, Agency, and Future Directions”, Philosophy & Technology, Springer, 2023 ISSN: 2210-5441. **(Scopus)**. (Accepted)
- (12) **Ray. P. P.**, Majumder, P., “Assessing the Accuracy of Responses by the Language Model ChatGPT to Questions Regarding Bariatric Surgery: A Critical Appraisal”, Obesity Surgery, Springer, 2023 ISSN: 1708-0428. **(Science Citation Index) (IF: 3.836)**. (Accepted)
- (13) **Ray. P. P.**, Majumder, P., “The Double-Edged Sword of AI in Biomedical Engineering: ChatGPT's Controversial Impact on Research and Collaboration Paradigms”, Annals of Biomedical Engineering, Springer, 2023 ISSN: 1573-9686. **(Science Citation Index) (IF: 4.310)**.
- (14) **Ray. P. P.**, Majumder, P., “AI Tackles Pandemics: ChatGPT's Game-Changing Impact on Infectious Disease Control”, Annals of Biomedical Engineering, Springer, 2023 ISSN: 1573-9686. **(Science Citation Index) (IF: 4.310)**.
- (15) **Ray. P. P.**, Majumder, P., “Dr. ChatGPT in Cardiovascular Nursing: A Deeper Dive into Trustworthiness, Value, and Potential Risks”, The European Journal of Cardiovascular Nursing, Oxford Academic, 2023 ISSN: 1873-1953. **(Science Citation Index) (IF: 3.593)**. (Accepted)
- (16) **Ray. P. P.**, Majumder, P., “ChatGPT in Radiology: A Deeper Look into its Limitations and Potential Pathways for Improvement”, Canadian Association of Radiologists Journal, Sage, 2023 ISSN: 1488-2361. **(Science Citation Index) (IF: 4.186)**.
- (17) **Ray. P. P.**, Majumder, P., “Assessing ChatGPT's Potential: A Critical Analysis and Future Directions in Total Joint Arthroplasty”, The Journal of Arthroplasty, Elsevier, 2023 ISSN: 1532-8406. **(Science Citation Index) (IF: 4.435)**. (Accepted)
- (18) **Ray. P. P.**, “Web3: A Comprehensive Review on Background, Technologies, Applications, Zero-Trust Architectures, Challenges and Future Directions”, Internet of Things and Cyber-Physical Systems, Elsevier, 2023 ISSN: 2667-3452. **(Scopus)**
- (19) **Ray. P. P.**, “ChatGPT: A Comprehensive Review on Background, Applications, Key Challenges, Bias, Ethics, Limitations and Future Scope”, Internet of Things and Cyber-Physical Systems, Elsevier, 2023 ISSN: 2667-3452. **(Scopus)**
- (20) **Ray. P. P.**, Majumder, P., “A Review on Cancer Data Management Using Blockchain: Progress and Challenges”, Advances in Computers, Elsevier, 2023, ISSN: 0065-2458. **(Science Citation Index) (IF: 3.067)**.
- (21) **Ray. P. P.**, Skala, K., “Internet of Things Aware Secure Dew Computing Architecture for Distributed Hotspot Network: A Conceptual Study”, Applied Sciences, MDPI, (12), 2022, ISSN: 2076-3417. **(Science**

**Citation Index) (IF: 2.838) (Accepted)**

- (22) **Ray. P. P.**, "A Review on TinyML: State-of-the-art and Prospects", Journal of King Saud University - Computer and Information Sciences, Elsevier, 34(4) April, pp. 1595-1623, 2022, ISSN: 1319-1578. **(Science Citation Index) (IF: 8.839)**
- (23) **Ray. P. P.**, "A Review on Tactile IoT: Architecture, Requirements, Prospects, and Future Directions", Transactions on Emerging Telecommunications Technologies, Wiley, 33(4), 2022, ISSN: 2161-3915. **(Science Citation Index) (IF: 3.310)**
- (24) **Ray. P. P.**, "IoT-Edge Analytics for BACON Assisted Multivariate Health Data Anomaly", Advances in Computers, Vol. 127, pp. 117-137, Elsevier, 2022, ISSN: 0065-2458. **(Science Citation Index) (IF: 3.067)**
- (25) **Ray. P. P.**, Dash, D., "IoT-Edge Anomaly Detection for Covariate Shifted and Point Time Series Health Data", Journal of King Saud University - Computer and Information Sciences, Elsevier, 34(10B), pp. 9608-9621, 2022, ISSN: 1319-1578. **(Science Citation Index) (IF: 8.839)**
- (26) Baidya. S., Potdar. V., **Ray. P. P.**, Mandi. C., "Reviewing the opportunities, challenges, and future directions for the digitalization of energy", Energy Research & Social Science, Elsevier, 81, 2021, ISSN: 2214-6296. **(Social Science Citation Index) (IF: 8.514)**
- (27) **Ray. P. P.**, "A Review on 6G for Space-air-ground Integrated Network: Key Enablers, Open Challenges, and Future Direction", Journal of King Saud University - Computer and Information Sciences, Elsevier, 34(9), pp. 6949-6976, 2022, ISSN: 1319-1578. **(Science Citation Index) (IF: 8.839)**
- (28) **Ray, P. P.**, "A Survey on Cognitive Packet Networks: Taxonomy, State-of-the-art, Recurrent Neural Networks, and QoS Metrics", Journal of King Saud University - Computer and Information Sciences, Elsevier, 34(8B), pp. 5663-5683, 2022, ISSN: 1319-1578. **(Science Citation Index) (IF: 8.839)**
- (29) **Ray, P. P.**, "A Perspective on 6G: Requirement, Technology, Enablers, Challenges and Future Road Map", Journal of Systems Architecture, Elsevier, Vol. 118, 2021, ISSN: 1383-7621. **(Science Citation Index) (IF: 5.836)**
- (30) Majumder, P, **Ray, P. P.**, "A Systematic Review and Meta-analysis on Correlation of Weather with COVID-19", Scientific Reports, Nature, 11, 2021, ISSN: 2045-2322. **(Science Citation Index) (IF: 4.996)**
- (31) **Ray, P. P.**, Kumar, N., Guizani, M., "A Vision on 6G-Enabled NIB: Requirements, Technologies, Deployments and Prospects", IEEE Wireless Communications, 28(4), pp. 120-127, 2021, ISSN: 1536-1284. **(Science Citation Index) (IF: 12.777)**
- (32) **Ray, P. P.**, Chowhan, B., Kumar, N., Almogren, A., "BioTHR: Electronic Health Record Servicing Scheme in IoT-Blockchain Ecosystem", IEEE IoT Journal, 8(13), pp. 10857 – 10872, 2021, ISSN: 2327-4662. **(Science Citation Index) (IF: 10.238)**
- (33) **Ray, P. P.**, Kumar, N., "SDN/NFV Architectures for Edge-Cloud IoT Environment: A Systematic

- Review", Computer Communications, vol. 169, pp. 129-153, 2021, ISSN: 0140-3664. **(Science Citation Index) (IF: 5.047)**
- (34) **Ray, P. P.**, Majumder, P., "Biofuel Powered Electronic Skin: Future of Healthcare", Current Science, vol. 119 (12), pp. 1882-1883, 2020, ISSN: 0011-3891. **(Science Citation Index) (IF: 1.169)**
- (35) **Ray, P. P.**, "Intelligent Ingestibles: Future of Internet of Body", IEEE Internet Computing, vol. 24 (5), pp. 19-27, 2020, ISSN: 1089-7801. **(Science Citation Index) (IF: 2.680)**
- (36) Dash, D., Kumar, N., **Ray, P. P.**, Kumar, N., "Reducing Data Gathering Delay for Energy Efficient Wireless Data Collection by Jointly Optimizing Path and Speed of Mobile Sink", IEEE Systems Journal, 15(3), pp. 3173 – 3184, 2020, ISSN: 1932-8184. **(Science Citation Index) (IF: 4.802)**
- (37) **Ray, P. P.**, Frincu, M., Wang, Y., Skala, K., "Special Issue Editorial: Internet of Things as a Key Enabler of Dew Computing", Internet of Things, Elsevier, 11, 2020, ISSN: 2542-6605. **(Science Citation Index) (IF: 5.711)**
- (38) **Ray, P. P.**, Dash, D., Mustafa, N., "Streaming Service Provisioning in IoT-based Healthcare: An Integrated Edge-Cloud Perspective", Transactions on Emerging Telecommunications Technologies, Wiley, vol. 31 (11), 2020, ISSN: 2161-3915. **(Science Citation Index) (IF: 3.310)**
- (39) **Ray, P. P.**, Majumder, P. "Coronavirus: A Novel Threat and ICT-based Mitigation", Current Science, vol. 118(8), pp. 1150-1151, 2020, ISSN: 0011-3891. **(Science Citation Index) (IF: 1.169)**
- (40) **Ray, P. P.**, Dash, D., De, D. "Intelligent Internet of Things Enabled Edge System for Smart Healthcare", National Academy Science Letters, Springer, 44, pp. 325-330, 2020, ISSN: 2250-1754. **(Science Citation Index) (IF: 0.649).**
- (41) **Ray, P. P.**, Dash, D., Kumar, N., "Sensors for internet of medical things: State-of-the-art, security and privacy issues, challenges and future directions", Computer Communications, vol. 160, pp. 111-131, 2020, ISSN: 0140-3664. **(Science Citation Index) (IF: 5.047)**
- (42) **Ray, P. P.**, Majumder, P., "Bacteria-on-a-Chip: Emergence of Digital Medicine", Current Science, vol. 118(4), pp. 513, 2020, ISSN: 0011-3891 **(Science Citation Index) (IF: 1.169).**
- (43) **Ray, P. P.**, Kumar, N., Dash, D., "BLWN: Blockchain-Based Lightweight Simplified Payment Verification in IoT-Assisted e-Healthcare", IEEE Systems Journal, vol. 15(1), 134-145, 2020, ISSN: 1932-8184. **(Science Citation Index) (IF: 4.802)**
- (44) **Ray, P. P.**, Dash, D., Salah, K., Kumar, N., "Blockchain for IoT-based Healthcare: Background, Consensus, Platforms, and Use Cases", IEEE Systems Journal, vol. 15(1), pp. 85-94, 2020, ISSN: 1932-8184. **(Science Citation Index) (IF: 4.802)**
- (45) **Ray, P. P.**, Majumder, P., "On Chaining the Epigenetic Blocks", Current Science, Indian Academy of Sciences vol. 117(10), pp. 1553, 2019, ISSN: 0011-3891. **(Science Citation Index) (IF: 1.169)**

- (46) **Ray, P. P.**, Thapa, N., Dash, D., "Implementation and Performance Analysis of Interoperable and Heterogeneous IoT-Edge Gateway for Pervasive Wellness Care", IEEE Transactions on Consumer Electronics, vol. 65(4), pp. 464-473, 2019, ISSN: 0098-3063. **(Science Citation Index) (IF: 4.414)**
- (47) **Ray, P. P.**, Dash, D., De, D., "Real-time event-driven sensor data analytics at the edge-Internet of Things for smart personal healthcare", Journal of Supercomputing, Springer, vol. 76, pp. 6648-6668, 2019, ISSN: 1573-0484. **(Science Citation Index) (IF: 2.557)**
- (48) **Ray, P. P.**, Thapa, N., Dash, D., De, D., "Novel Implementation of IoT based Non-Invasive Sensor System for Real-Time Monitoring of Intravenous Fluid Level for Assistive e-Healthcare", Circuit World, Emerald Publishing, vol. 45(3), pp. 109-123, 2019, ISSN: 0305-6120 **(Science Citation Index) (IF: 1.027)**.
- (49) **Ray, P. P.**, Dash, D., De, D., "Edge Computing for Internet of Things: A Survey, e-Healthcare Case Study and Future Direction", Journal of Network and Computer Applications, Elsevier, vol. 140, pp. 1-22, 2019, ISSN: 1084-8045 **(Science Citation Index) (IF: 7.574)**.
- (50) **Ray, P. P.**, Dash, D., De, D., "A Systematic Review and Implementation of IoT-based Sensor-Enabled Pervasive Tracking System for Dementia Patients", Journal of Medical Systems, Springer, vol. 43(9), 2019, ISSN: 1573-689X. **(Science Citation Index) (IF: 4.920)**
- (51) **Ray, P. P.**, "Energy Packet Networks: An Annotated Bibliography", SN Computer Science, Springer Nature, 2019, ISSN: 2661-8907. **(Scopus)**
- (52) **Ray, P. P.**, Dash, D., De, D., "Analysis and Monitoring of IoT Assisted Human Physiological Galvanic Skin Response Factor for Smart E-Healthcare", Sensor Review, Emerald Publishing, vol. 39(4), pp. 525-541, 2019, ISSN: 0260-2288. **(Science Citation Index) (IF: 1.544)**
- (53) Majumder, P., **Ray, P. P.**, Ghosh, S., Dey, S. K., "Potential Effect of Tobacco Consumption Through Smoking and Chewing Tobacco on IL1beta Protein Expression in Chronic Periodontitis Patients: In Silico Molecular Docking Study", IEEE/ACM Transactions on Computational Biology and Bioinformatics, vol. 17(4), pp. 1364-1371, 2019, ISSN: 1545-5963. **(Science Citation Index) (IF: 3.702)**
- (54) **Ray, P. P.**, "Minimizing Dependency On Internetwork: Is Dew Computing a Solution?", Transactions on Emerging Telecommunications Technologies, Wiley-Blackwell, Vol. 30(1), January 2019, ISSN: 2161-3915. **(Science Citation Index) (IF: 3.310)**
- (55) **Ray, P. P.**, Dash, D., De, D., "Internet of Things-based Real-Time Model Study on e-Healthcare: Device, Message Service and Dew Computing", Computer Networks, Elsevier, Vol. 149(11), pp. 226-239, February 2019, ISSN: 1872-7069. **(Science Citation Index) (IF: 5.493)**
- (56) **Ray, P. P.**, Dash, D., De, D., "Approximation of Fruit Ripening Quality Index for IoT based Assistive e-Healthcare", Microsystem Technologies, Springer, vol. 25, pp. 3027-3036, 2019, ISSN: 1432-1858. **(Science Citation Index) (IF: 2.012)**
- (57) **Ray, P. P.**, Thapa N., "A Systematic Review on Real-time Automated Measurement of IV Fluid Level: Status and Challenges", Measurement, Elsevier, Vol. 129, pp. 343-348, December 2018, ISSN: 1873-412X.

**(Science Citation Index) (IF: 5.131)**

- (58) **Ray, P. P.**, "Internet of Things based Approximation of Sun Radiative-Evapotranspiration (ET<sub>0</sub>) Models", *Journal of Agrometeorology*, Association of Agrometeorologists, Vol. 20(2), pp. 171-173, 2018, ISSN: 0972-1665. **(Scopus) (IF: 0.474)**
- (59) **Ray, P. P.**, "Continuous Glucose Monitoring: A Review of Sensor Systems and Prospects", *Sensor Review*, Vol. 38(4), pp.420-437, 2018, ISSN: 38(4), pp.420-437, 2018. **(Science Citation Index) (IF: 1.544)**
- (60) **Ray, P. P.**, "An Introduction to Dew Computing: Definition, Concept and Implications", *IEEE Access*, Vol. 6, pp. 723 -737, 2017, ISSN: 2169-3536. **(Science Citation Index) (IF: 3.476)**
- (61) **Ray, P. P.**, Dash D., De D., "A Systematic Review of Wearable Systems for Cancer Detection: Current State and Challenges", *Journal of Medical Systems*, Springer, 41:180, 2017, ISSN: 1573-689X. **(Science Citation Index) (IF: 4.920)**
- (62) **Ray, P. P.**, Mukherjee, M., Shu, L., "Internet of Things for Disaster Management: State-of-the-art, Challenges, and Future Road Map", *IEEE Access*, Vol. 5(1), pp. 18818-18835, 2017, ISSN: 2169-3536. **(Science Citation Index) (IF: 3.476)**
- (63) **Ray, P. P.**, "Internet of Things for Smart Agriculture: Technologies, Practices and Future Road Map", *Journal of Ambient Intelligence and Smart Environments*, IOS Press, Vol. 9, pp. 395–420, 2017, ISSN: 1876-1364. **(Science Citation Index) (IF: 4.920)**
- (64) **Ray, P. P.**, "An IR Sensor Based Smart System to Approximate Body Core Temperature", *Journal of Medical Systems*, Springer, 41:123, 2017, ISSN: 1573-689X. **(Science Citation Index) (IF: 4.920)**
- (65) **Ray, P. P.**, "A Survey on Visual Programming Languages in Internet of Things", *Scientific Programming*, Hindawi, Vol. 2017, Article ID 1231430, 2017, ISSN: 1058-9244. **(Scopus) (IF: 1.672)**
- (66) **Ray, P. P.**, "Data Analytics: India Needs Agency for Health Data", *Current Science*, Vol. 112(6), pp. 1082, 2017, ISSN: 0011-3891. **(Science Citation Index) (IF: 1.169)**
- (67) **Ray, P. P.**, "Obligations Behind Quantum Internet Dream", *Current Science*, Indian Academy of Science, Vol. 112(11), pp. 2175-2176, 2017, ISSN: 0011-3891. **(Science Citation Index) (IF: 1.169)**
- (68) **Ray, P. P.**, "Internet of Things Cloud Enabled MISSENARD Index Measurement for Indoor Occupants", *Measurement*, Elsevier, Vol. 92, pp. 157–165, 2016, ISSN: 1873-412X. **(Science Citation Index) (IF: 5.131)**
- (69) **Ray, P. P.**, "Communicating Through Visible Light: Internet of Things Perspective", *Current Science*, Indian Academy of Science, Vol. 111 (12), pp. 1903-1905, 2016, ISSN: 0011-3891. **(Science Citation Index) (IF: 1.169)**
- (70) **Ray, P. P.**, "Internet of Robotic Things: Concept, Technologies and Challenges", *IEEE Access*, Vol. 4, pp. 9489-9500, 2016, ISSN: 2169-3536. **(Science Citation Index) (IF: 3.476)**

- (71) **Ray, P. P.**, "Creating Values out of Internet of Things: An Industrial Perspective", *Journal of Computer Networks and Communications*, Hindawi, Volume 2016, Article ID 1579460, 2016, ISSN: 2090-7141. **(Emerging Sources Citation Index) (Scopus)**
- (72) **Ray, P. P.**, "A Survey on Internet of Things Architectures", *Journal of King Saud University - Computer and Information Sciences*, Elsevier, Vol. 30(3), pp. 291-319, July 2016, ISSN: 1319-1578. **(Science Citation Index Expanded) (IF: 8.839)**
- (73) **Ray, P. P.**, "A Survey of IoT Cloud Platforms", *Future Computing and Informatics Journal*, Elsevier, Volume 1, Issues 1-2, 2016, pp. 35-46.

#### **Peer-Reviewed International Conference Proceedings**

- (1) **Ray, P. P.**, "Parametric Analysis of Resource Constrained Devices for Internet of Things using FreeRTOS, 4<sup>th</sup> International Conference on Inventive Computation and Information Technologies (ICICIT - 2022), In *Evener Lecture Notes in Networks and Systems*, RVS Technical Campus, Coimbatore, August 25-26, 2022. **(Scopus)**
- (2) **Ray, P. P.**, "IoTGMRFM: Internet of Things-based Variable Wise Anomaly Detection", 4<sup>th</sup> International Conference on Data & Information Sciences (ICDIS-2022), In *Evener Lecture Notes in Networks and Systems*, Raja Balwant Singh Engineering Technical Campus, Bichpuri, Agra, Uttar Pradesh, June 3-4, 2022. **(Scopus)**
- (3) **Ray, P. P.**, Dash, D. "A Review on Internet of Wearable Things for Pervasive e-Healthcare: Energy Efficiency and Prospects", *International Conference on Cognitive & Intelligent Computing (ICCIC-2021)*, In *Evener Cognitive Science and Technology*, CMR College of Engineering & Technology, Hyderabad, December 11-12, 2021. **(Scopus)**
- (4) **Ray, P. P.**, "Non-Content Message Masking Model for Healthcare Data in Edge-IoT Ecosystem using Blockchain", *International Conference on Network Security & Blockchain Technology (ICNSBT-2021)*, In *Evener Lecture Notes in Networks and Systems*, Indian Statistical Institute Kolkata, Kolkata, December 2-4, 2021. **(Scopus)**
- (5) **Ray, P. P.**, Skala, K. "A Vision of Dew-IoT Ecosystem: Requirements, Architecture, and Challenges", *IEEE 45<sup>th</sup> Computer Society Computers, Software, and Applications Conference (COMPSAC-2021)*, Madrid, Spain, July 12-16, 2021, DOI:10.1109/COMPSAC51774.2021.00267.
- (6) **Ray, P. P.**, Nguyen, K. "A Review on Blockchain for Medical Delivery Drones in 5G-IoT Era: Progress and Challenges", *IEEE/CIC International Conference on Communications in China (ICCC-2020)*, Chongqing, China, August 9-11, 2020, DOI: 10.1109/ICCCWorkshops49972.2020.9209931.
- (7) Jain, R. K., Gupta, B., Ansari, M., **Ray, P. P.**, "IOT Enabled Smart Drip Irrigation System using Web/Android Applications", *11th IEEE International Conference on Computing Communication and Networking Technologies*, IIT Kharagpur, West Bengal, India Kharagpur, India, July 1-3, 2020, 2020, DOI: 10.1109/ICCCNT49239.2020.9225345.
- (8) Jain, R. K., Saikia, B. J., Rai, N. P., **Ray, P. P.**, "Development of Web-based Application for Mobile Robot



using IOT Platform”, *11th IEEE International Conference on Computing Communication and Networking Technologies*, IIT Kharagpur, West Bengal, India Kharagpur, India, July 1-3, 2020, 2020, DOI: 10.1109/ICCCNT49239.2020.9225467.

- (9) **Ray, P. P.**, Chowhan B., Sharma P. K., Lepcha, A. W., Sharma, K., Chattopadhyay, A., “Abstract: nCoV CBC: A Consortium Blockchain Architecture for EHR Transmission of Novel Coronavirus”, *Evenier 6th International Conference on Mathematics & Computing (ICMC 2020)*, Gangtok, India, 2020 (Earlier: 18-20 March, 2020, Revised 23-25 September, 2020).
- (10) Chaer, A., Salah, K., Lima, C., **Ray, P. P.**, Sheltami, T., “Blockchain for 5G: Opportunities and Challenges”, *IEEE Workshop on Telecommunications and Blockchain, IEEE GLOBECOM 2019*, Hawaii, United States, 9-13 Dec. 2019, DOI: 10.1109/GCWkshps45667.2019.9024627, 2019.
- (11) **Ray, P. P.**, L. Chettri, N. Thapa, “IoRCar: IoT Supported Autonomic Robotic Movement and Control”, *IEEE 7th International Conference on Computation of Power, Energy, Information and Communication, ICCPEIC-2018*, Melmaruvathur, India, 28-29 March 2018, DOI: 10.1109/ICCPEIC.2018.8525216, 2018.
- (12) **Ray, P. P.**, “Digital India: Perspective, Challenges, and Future Direction”, *IEEE 4th International Conference on Power Signals Control & Computation (EPSCICON)*, Thrissur, Kerala, India, 6-10 June, 2018, DOI: 10.1109/EPSCICON.2018.8379594, 2018.
- (13) **Ray, P. P.**, Pradhan, S., Sharma, R. K., Rasaily, A., Swaraj, A., Pradhan, A., “IoT Based Fruit Quality Measurement System”, *IEEE International Conference on Green Engineering and Technologies (IC-GET)*, Coimbatore, India, 19 November, 2016, DOI: 10.1109/GET.2016.7916620, 2016.
- (14) **Ray, P. P.**, “Towards Internet of Things based Society”, *IEEE International Conference on Signal Processing, Communication & Embedded Systems (SCOPEs)*, Paralakhemundi, Odisha, India, pp. 345-352, 3-5 October, 2016. DOI: 10.1109/SCOPEs.2016.7955849.
- (15) **Ray, P. P.**, “Internet of Things Cloud Based Smart Monitoring of Air Borne PM2.5 Density Level”, *IEEE International Conference on Signal Processing, Communication & Embedded Systems (SCOPEs)*, Paralakhemundi, Odisha, India, pp. 995 – 999, 3-5 October, 2016. DOI: 10.1109/SCOPEs.2016.7955590.
- (16) **Ray, P. P.**, Agarwal, S., “Bluetooth 5 and Internet of Things: Potential and Architecture”, *IEEE International Conference on Signal Processing, Communication & Embedded Systems (SCOPEs)*, Paralakhemundi, Odisha, India, pp. 1461-1465, 3-5 October, 2016. DOI: 10.1109/SCOPEs.2016.7955682.
- (17) **Ray, P. P.**, Rai, R., Chettri, L., Bishunkey, K., “B4Heal : Bio-Inspired Biopolymer based Biocompatible Biosensor for Smart Healthcare”, *1st International Conference on Nanocomputing & Nanobiotechnology (NanoBioCon)*, (Abstract), ISBN: 9789380813493, pp.74 , 2016.
- (18) **Ray, P. P.**, “An Internet of Things based Approach to Thermal Comfort Measurement and Monitoring”, *IEEE International Conference on Advances in Computing and Communications (ICACCS)*, pp. 1-7, 22-23 January, Coimbatore, India, 2016, DOI: 10.1109/ICACCS.2016.7586398, 2016.
- (19) **Ray, P. P.**, “Towards an Internet of Things based Architectural Framework for Defence”, *IEEE International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT)*, Kumaracoil, pp. 411-416, 18-19 December, 2015, DOI: 10.1109/ICCICCT.2015.7475314, 2015.

- (20) **Ray, P. P.**, "A Generic Internet of Things Architecture for Smart Sports", *IEEE International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT)*, Kumaracoil, pp. 405-410, 18-19 December, 2015 DOI: 10.1109/ICCICCT.2015.7475313, 2015.
- (21) **Ray, P. P.**, "Internet of Things based Smart Measurement and Monitoring of Wood Equilibrium Moisture Content", *IEEE International Conference on Smart Structures and Systems (ICSSS)*, 21-23 December, 2015, Bangalore, India, DOI: 10.1109/SMARTSENS.2015.7873612, 2015.
- (22) **Ray, P. P.**, Home Health Hub Internet of Things (H3IoT): An Architectural Framework for Monitoring Health of Elderly People", *IEEE International Conference on Science Engineering and Management Research (ICSEMR)*, Chennai, India, pp. 1-4, 27-29 November, 2014, DOI: 10.1109/ICSEMR.2014.7043542, 2014.
- (23) **Ray, P. P.**, "Internet of Things based Physical Activity Monitoring (PAMIoT): An Architectural Framework to Monitor Human Physical Activity", In Proceeding of *IEEE CALCON*, Kolkata, pp-32-34, 7-8 November, 2014.
- (24) **Ray, P. P.**, "Nano Computer Design Based on Intra Body Nanoscale Neuro-Spike Communication: a Nanonetwork Paradigm", ISBN 978-1-4673-4698-6. In proceeding of *IEEE International Conference on Communications, Devices and Intelligent Systems (CODIS)*, JU, Kolkata, pp. 314-317, 28-29 December, 2012, DOI: 10.1109/CODIS.2012.6422199, 2012.
- (25) **Ray, P. P.**, Banerjee, A., "Debugging Memory Issues in Embedded Linux: A Case Study", ISBN: 978-1-4244-8942-8. In proceeding of *IEEE Technological Symposium (TechSym)*, IIT Kharagpur, pp. 23-28, 14-16 January, 2011, DOI: 10.1109/TECHSYM.2011.5783857, 2011.

## National Conference

- (1) Sebastian S., **Ray, P. P.**, Development of IoT Invasive Architecture for Complying with Health of Home, In Proceeding of International Conference on Computing and Communication Systems (*I3CS*) 2015, Shillong, pp-79-83, 9-10 April, 2015.
- (2) Sebastian S., **Ray, P. P.**, When Soccer Gets Connected to Internet, In Proceeding of International Conference on Computing and Communication Systems (*I3CS*) 2015, Shillong, pp-84-88, 9-10 April, 2015.
- (3) **Ray, P. P.**, Sharma, A., Rai, R., "MDTRM: Abstraction to Model Driven Tree Reference Model of Internet of Things", In proceeding of *National Conference on Applied Electronics (NCAE)*, AIT Kolkata, pp-61-64, 25-26 October, 2013.
- (4) Rai, R., Lepcha, C., **Ray, P. P.**, Chettri, P., "GDMA: Generalized Domain Model Architecture of Internet of Things", In proceeding of *National Conference on Applied Electronics (NCAE)*, AIT Kolkata, pp. 65-68, 25-26 October, 2013.

## Book Chapter

- (1) Majumder. P, **Ray. P. P.**, “Estimation of Basic Reproduction Number and Herd Immunity for COVID-19 in India”, Artificial Intelligence for Information Management: A Healthcare Perspective, Evener, pp. 265-282, Eds(Srinivasa K.G., G. M. S., Sekhar S.R.M), ISBN: 978-981-16-0415-7, 2021.
- (2) **Ray. P. P.**, Dash, D. “Blockchain for IoT-based Medical Delivery Drones: State-of-the-art, Issues, and Future Prospects”, Blockchain Technology for Emerging Applications, Elsevier, Eds(SKH Islam, AK Pal, D Samanta, S Bhattacharyya), ISBN: 9780323901932, 2021. (In Press)

## Books

- (1) **Ray. P. P.**, Ray, A., “Metaverse Unbound : Exploring Infinite Possibilities in the Digital Frontier”, Notion Press, ISBN: 979-8890265005, 2023.
- (2) **Ray. P. P.**, Ray, A., “A Handbook on Community Based Participatory Research”, New Delhi Publishers, ISBN: 978-93-93878-30-4, 2022.
- (3) **Ray. P. P.**, “Getting Started with PHPoC for Internet of Things”, Ane Books Pvt. Ltd., ISBN: 9390658608, October 2021.
- (4) **Ray. P. P.**, “A Guide to Research and Publication Ethics”, New Delhi Publishers, ISBN: 9789391012212, November 2021.
- (5) **Ray. P. P.**, “Open Source Hardware: An Introductory Approach”, Lap Lambert Publishing, ISBN: 9783659465918, 2013.
- (6) **Ray. P. P.**, “Automated Bug Localization in Embedded Softwares”, Lap Lambert Publishing, ISBN: 9783848444397, March, 2012.

## Full List of Patents

### National Patents Filled

- (P1) Novel Development of Decentralized Light-Weight SPV Client for Trustless Blockchain-IoT Assisted e-Healthcare in Resource-Constrained Environment. (Application Number: **201931008732**), Inventor: **Ray. P. P.**, Dash Dinesh, De Debashis, 2019. **(Under Examination)**
- (P2) Real-Time Monitoring of Non-Invasive Intravenous Fluid Level for Pervasive and Assistive E-Healthcare using IoT. (Application Number: **201831049716**), Inventor: **Ray. P. P.**, Thapa Nishant, 2019. **(Under Examination)**
- (P3) A System for Writing and Reading of Human Understood Study Materials. (Application Number: **1083/KOL/2015**), Inventor: **Ray. P. P.**, Kumar Shailendra, 2015. **(Under Examination)**

- (P4) IoT Physical Activity Monitoring. (Application Number: **599/KOL/2015**), Inventor: **Ray. P. P.**, Chettri. L., Rai. R., Bishunkey. K, 2015.
- (P5) An Automated Missenard Index Measurement System. (Application Number: **566/KOL/2015**), Inventor: **Ray. P. P.** , 2015. (**Under Examination**)
- (P6) Internet of Things based Environment Heat Index Measurement. (Application Number: **549/KOL/2015**), Inventor: **Ray. P. P.**, 2015. (**Under Examination**)
- (P7) API-CRIEM : An API based Cloud Platform Supported Real Time Smart Device for Indoor Environment Monitoring with Triggering Mechanism. (Application Number: **531/KOL/2015**) Inventors: **Ray. P. P.**, Bishunkey. K., Rai. R., Chettri, L., Khawas, C, 2015.

### **Awards and Fellowships/Achievements**

- 2021 Recognized as the one of the **World's Top 2%** Scientists by the Stanford University, 2021. Stanford University, USA in both career and yearly database.
- 2020 Recognized as the one of the **World's Top 2%** Scientists by the Stanford University, 2020. Stanford University, USA in both career and yearly database.
- 2020 Felicitated with the "Top Downloaded Paper 2018-2019" as one of the most read in the "Transactions on Emerging Telecommunications Technologies" by Wiley, 2020.
- 2020 Felicitated with the "IEI Young Engineers Award 2019-20" in the "Computer Engineering Division" for outstanding achievement in research by The Institution of Engineers (India), on Jaipur 15-16<sup>th</sup> February, 2020.
- 2019 Winner of the Emerald Literati Awards 2019 as Highly Commended for "Continuous glucose monitoring: A systematic review of sensor systems and prospects" published in Sensor Review.
- 2019 Elevated to Senior Member IEEE, February 16, 2019.
- 2015 Received Intel Galileo kits from Intel® India to set up Intel IoT Center.
- 2014 Selected as Member of IEEE CSI Chapter Council Executive Body.
- 2013 Science Academies' Summer Research Fellowship Programme (SRFP) **selected** by Indian Academy of Sciences, Bangalore (IAS), Indian National Science Academy, New Delhi (INSA), and The National Academy of Sciences, Allahabad (NAS).
- 2009-11 Post Graduate Scholarship by All India Council for Technical Education (AICTE).

### **Talks/Invited Lectures/Training/Hands-On Delivered**

- Delivered talk on “*An Introspection to Internet of Things*” at ECE Department, SR University, Warangal on 24 April, 2021.
- Delivered talk and hands-on on “*Internet of Things using Raspberry Pi*” on occasion of Winter Training course at NIELIT, Gangtok in during 30 December 2019 to 3 January, 2020.
- Delivered talk on “*Blockchain Storm: An IoT based Cumulative Perspective*” at Department of Computer Applications, Sikkim University with EICT Academy, IIT Guwahati on 29th March, 2019.
- Delivered talk and hands-on “*Latex*” on the occasion of 2 days Hands-on Workshop using LaTeX (TeX-2014) on 15<sup>th</sup>-16<sup>th</sup> November, 2014 at Department of Computer Applications, Sikkim University.

### **Masters Project/Thesis Guidance**

- Integration of Sensor based Circuit for Monitoring Leaf Temperature by Pinju Priyam Gogoi, Ridhiman Bora, Rizuwana Sultana Hussai (MCA), 2022 Odd.
- Web Based Information System for Medicinal and Aromatic Plants of Sikkim by Adarsh Sharma, Neeraj Anand, Nirmal Gupta (MCA), 2021 Even.
- A Study of Time Series Database for IoT-Based Applications by Manita Rai, Yojana Thapa (MCA), 2021 Odd.
- Development of Web-based Application for Pipeline Inspection Robot using IoT Platform by Bhaskar Jyoti Saikia, Nitant Pilmo Rai (MCA), 2020 Even with co-supervisor Dr. Ravi Kant Jain, CSIR-CMERI, India.
- Smart Drip Irrigation System using IOT Platform by Bikash Gupta, MD Mustaq Ansari (MCA), 2020 Even with co-supervisor Dr. Ravi Kant Jain, CSIR-CMERI, India.
- Development of Web-Based Application for Graphical Data Visualization by Bikash Gupta, Nitant Pilmo Rai (MCA), 2020 Odd.
- Boilerplate as a Service for IoT Edge Based e-Healthcare Service by Bhumika Sharma and Sunita Pradhan (MCA), 2019 Even.
- Implementation of Dual layer Private Blockchain for Secure HER Transmission by Biky Chowhan, Keshang Sherpa, and Abhishek Mukhia (MCA), 2019 Even.
- Implementation of Decentralized Autonomous Network using Blockchain by Biky Chowhan and Keshang Sherpa (MCA), 2018 Odd.
- A study on Rating Algorithms by Robin Gurung and Ashish Pradhan (MCA), 2018 Odd.
- Development of Edgenet enabled Edge Computing System for IoT based Scenario by Arun Subba (MCA), 2018 Even.
- Design and development of IoT based Interoperable gateway by Nishant Thapa (MCA), 2018 Even.
- Design and Development of Wearable Galvanic Skin Response Systems by Shubham Pradhan, R. K. Sharma, Animesh Chettri (BCA-MCA Integrated), 2018 Odd.
- Intravenous Bag Fluid Measurement System by Nishant Thapa (MCA), 2018 Odd.
- Design and Development of Cloud Enabled Internet of Robotic Things (IoR) by Nishant Thapa, (BCA-MCA Integrated), 2016, Even.
- Prep Your Self Quiz: An Android Based Applications, Ashish Sharma & Kiran Regmi (BCA-MCA Integrated), 2015 Even.

### Conference Technical Committee Member

- Technical Program Committee Member in *22nd IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology* from 26-29 October, 2023, Venice, Italy.
- Technical Program Committee Member in *2023 IEEE CTSoc Gaming, Entertainment and Media (GEM) 2023* from 19-22 November, 2023, Barbados.
- Technical Program Committee Member in *2023 IEEE 13TH International Conference on Consumer Technology (ICCE) 2023* from 2-5 September, 2023, City Cube, MEsse Barlin (IFA).
- Technical Program Committee Member in *2021 ICNBST 2021* from 2-4 December, 2021, Kolkata, India.
- Technical Program Committee Member in *2021 45<sup>th</sup> IEEE COMPSAC-2021* from 12-16 July, 2021, USA.
- Technical Program Committee Member in *2021 10<sup>th</sup> International Conference on Communication Systems and Network Technologies (CSNT-2021)* from 24-25 April, 2021, Bhopal, India.
- Technical Program Committee Member in *2020 1<sup>st</sup> International Conference on Artificial Intelligence & Modern Assistive Technology (ICAIMAT' 2020)* from 24-26 September, 2020, Riyadh, Saudi Arabia.
- Technical Program Committee Member in *2020 12<sup>th</sup> International Conference on Computational Intelligence and Communication Networks (CICN' 2020)* from 25-26 September, 2020, Nainital, India.
- International Program Committee Member in *2020 2<sup>nd</sup> IFSA Frequency & Time Conference (IFTC' 2020)* from 23-25 September, 2020, Porto, Portugal.
- Technical Program Committee Member in *2020 7<sup>th</sup> International Conference on Electrical Engineering, Computer Science and Informatics (EECSI)*, from 23-25 September, 2020, Royal Ambarrukmo, Yogyakarta, Indonesia.
- Technical Program Committee Member in *2020 Ahmad Dahlan International Conference Series on Engineering and Science (ADICS-ESIT 2020)*, from 26-27 August, 2020, Yogyakarta, Indonesia.
- Technical Program Committee Member in *2019 2nd International Conference of Computer Science and Information Technology (ICoSNIKOM)*, from 28-29 November, 2019, Medan, Indonesia.
- Technical Program Committee Member in *2020 3rd IEEE International Conference on Computer Applications & Information Security (ICCAIS' 2020)*, from 19-21 March, 2020, Holiday Inn Izdehar area, Riyadh, Saudi Arabia.
- Technical Program Committee Member in *2019 IEEE Middle East & North Africa COMMunications Conference (MENACOMM 2019)*, from 19-21 November, 2019, Kingdom of Bahrain.
- Technical Program Committee Member in *2019 IEEE International Symposium on Innovation and Entrepreneurship (TEMS-ISIE)*, from 24-26 October, 2019, Hangzhou, China.
- Technical Program Committee Member in *IEEE/WIC/ACM International Conference on Web Intelligence (WI'19)*, Demo Track, from 14-17 October, 2019, Thessaloniki, Greece.
- Technical Program Committee Member in *5<sup>th</sup> International Conference on Computer Science, Information Technology (CSITEC 2019)*, from 24-25 August, 2019, Vienna, Austria.
- Technical Program Committee Member in *2nd IEEE Middle East and North Africa COMMunications Conference (MENACOMM)*, from 19-21 November, Kingdom of Bahrain, 2019.

- Technical Program Committee Member in *AnSWer19: 3rd International Workshop on the Applications of Knowledge Representation and Semantic Technologies in Robotics (AnSWer19)*, Co-located with IROS 2019 (IEEE/RSJ International Conference on Intelligent Robots and Systems), from 4-8 November, Macau, China, 2019.
- Technical Program Committee Member in *Fifth International Conference on Image Information Processing (ICIIP -2019)*, from 15-17 November, Wagnaghat, India, 2019.
- Technical Program Committee Member in *First IFSA Frequency & Time Conference (IFTC' 2019)*, from 23-25 October, Barcelona, Spain, 2019.
- Technical Program Committee Member in *International Conference on Computer Science, Information Technology, and Electrical Engineering (ICOMITEE 2019)*, from 16-17 October, Jember, Indonesia, 2019.
- Technical Program Committee Member in *2nd International Conference on Computer Applications & Information Security (ICCAIS)*, from 19-21 March, Saudi Computer Society, Riyadh, Saudi Arabia, 2019.
- Technical Program Committee Member in *International Conference on Data and Smart Systems Engineering (DSSE 2018)*, from 09-12 July, American University of Beirut (AUB), Beirut, Lebanon, 2018.
- Technical Program Committee Member in *International Conference on Information Society and Smart Cities (ISC 2018)*, from 06-07 June, Oxford city, United Kingdom, 2018.
- International Advisory Committee Member *International Conference on Chip, Circuitry, Current, Coding, Combustion and Composites (I7C-17)*, from 16 – 17 November, Anekal, Bengaluru, 2017.
- Technical Program Committee Member in *International Conference on Education and Social Development (ESD-17)*, from 20-22 October, Xiamen, China, 2017.
- Technical Program Committee Member in *International Conference on Information Society and Smart Cities (ISC 2018)*, from 06-07 June, Oxford city, United Kingdom, 2018.
- Technical Program Committee Member in *International Conference on Education and Social Development (ESD-17)*, from 20-22 October, Xiamen, China, 2017.
- International Advisory Committee Member in *International Conference on Ubiquitous Computing (ICUC-17)*, from 19-20 June, Sinhgad College of Engineering, Pune, India, 2017.
- Technical Program Committee Member in *Second International Conference on Advanced Wireless Information and Communication Technologies (AWICT'2018)*, from 13-14 November, Université De Paris-Saclay, Paris, France, 2017.
- Technical Program Committee Member in *World Symposium on Computer Applications & Research (WSCAR'2017)*, from 02-04 April, Istanbul, Turkey, 2017.
- Technical Program Committee Member in *International Conference on Internet of Things and Machine Learning (IML 2017)* in Liverpool John Moores University, Liverpool city, United Kingdom during October, 2017.
- Technical Program Committee Member in *10<sup>th</sup> International Conference on Theory and Practice of Electronic Governance (ICEGOV)*, New Delhi, during 7-9 March, 2017.
- Technical Program Committee Member in *2<sup>nd</sup> International Conference on Modelling, Simulation and Applied Mathematics 2017 (MSAM 2017)*, in Bangkok, during 26-27 March, 2017.

- International Conference on Informatics, Robotics, Network, Control and Systems (IRONCONS) 2016, Bandung, Indonesia, 23-25 November, 2016.
- Technical Program Committee Member in *International Conference on Geoinformatics 2016 (ICGWC 2016)*, in Suzhou, China, during 15 -16 October, 2016.
- Technical Program Committee Member in *International Conference on Internet of Things and Applications (IOTA' 2016) organized by Maharashtra Institute of Technology*, in Pune, India during 22 - 24 January 2016.
- Technical Program Committee Member in *7<sup>th</sup> International Conference on Computational Intelligence and Communication Networks (CICN) organized by MIR Labs, Gwalior, and GGITS in Jabalpur, India* during 12<sup>th</sup>-14<sup>th</sup> December, 2015.
- Technical Program Committee Member in *1<sup>st</sup> International Conference on Computing and Communication Systems (I3CS) organized by NEHU, Shillong, India* during 9<sup>th</sup>-10<sup>th</sup> April, 2015.

#### **Editor**

- Editor in the journal of ICT Express, Elsevier, Impact Factor: 4.317, Indexed in Science Citation Index Expanded, Scopus, Emerging Sources Citation Index, ISSN: 2405-9595.

#### **Guest Editor/Workshop Chair/Reviewer /Advisory**

- Workshop Chair on "Designing Metaverse using Next Generation Internet of Things" in The 2nd International Conference on Computing, Communication, Perception and Quantum Technology (CCPQT 2023), August 4-7, 2023, Xiamen, China.
- Lead Guest Editor in Special issue on "Security and Computing on IoT", *Computers, Materials & Continua*, Science Citation Index Expanded, Impact Factor 3.024, along with Dr. Nour Moustafa, The University of New South Wales, Australia and Kien Nguyen, Chiba University, Japan, 2020-2021.
- Guest Editor in Special issue on "Blockchain and IoT Enabled Sensing for Smart City", *MDPI Journal: Sensors*, Science Citation Index Expanded, Impact Factor 3.031, along with Vidyasagar Potdar, Curtin University, Australia 2018-2019.
- Advisory Board Member of the European Union project *DewSys: Dew-Oriented Platform for Cyber-Physical Systems of Systems*, 2019.
- Lead Guest Editor in Special issue on "Dew Computing: A Key Enabler of Future Internet of Things", Elsevier Journal: *Internet of Things Engineering: Cyber Physical Human Systems*, along with Marc Frincu, West University of Timisoara, Romania, Yingwei Wang, University of Prince, Edward Island Canada, SC. Karolj Skala, Ruđer Bošković Institute, Zagreb, Croatia in 2018-2019.
- Reviewer of 9th International Conference on Electronics, Communications and Networks (Oct. 18-21, Kitakyushu City, Japan, 2019).
- Editorial Advisory Board Member of the Edited Volume on the Cryptographic Security Solutions for the Internet of Things, IGI Global, 2018.
- 3rd International Conference on Computing Methodologies and Communication (ICCMC 2019)
- 27th Irish Signals and Systems Conference 2016
- 1st Annual International Conference of the IEEE Technology and Engineering Management Society 2017 (IEEE TEMSCON), Silicon Valley (Santa Clara), California USA



- International Conference on Informatics, Robotics, Network, Control and Systems (IRONCONS) 2016, Bandung, Indonesia, 2016
- 10<sup>th</sup> International Conference on Theory and Practice of Electronic Governance (ICEGOV), New Delhi, India, 2017.
- Evener International Conference on Computational Intelligence & Data Engineering (ICCIDE), Mylavaram, Krishna District, Andhra Pradesh, India, 2017.
- Reviewer of IEEE Transaction on Industrial Informatics, IEEE Transaction on Instrumentation and Measurement, IEEE Systems Journal, IEEE Access, IEEE IoT Journal, Measurement, Journal of Medical Systems, etc.

### **Training Programs, Workshops, Conferences Organized**

- Organizing Chair *6th International Conference on Mathematica and Computing (ICMC 2020)* held on 18-20th March, 2020 at Sikkim University.
- Organized *Three-day Workshop on Block Chain Technology (BCT-2019)* with EICT Academy, IIT Guwahati held on 28-30th March, 2019 at Sikkim University.
- Organized *Innovation and Entrepreneurship Awareness Workshop and Contest-2018* held on 6th March at Sikkim University.
- Organized *1day Seminar on Green Computing* on 28<sup>th</sup> August, 2015 at Sikkim University.
- Coordinated *2 days Hands-on Workshop using LaTeX (TeX-2014)* on 15<sup>th</sup>-16<sup>th</sup> November, 2014 at Sikkim University.
- Organized 5 days workshop on *ISI-SU Autumn School on Machine Intelligence and Applications (ASMIA)* jointly with Indian Statistical Institute (ISI), Kolkata on 22<sup>th</sup>-26<sup>th</sup> September, 2014 at Sikkim University.
- Organized 5 days workshop on *Theory and Tools for Language and Document Analysis and Research (TTL DAR)* jointly with Indian Statistical Institute (ISI), Kolkata on 24<sup>th</sup>-28<sup>th</sup> March, 2014 at Sikkim University.

### **Training Programs and Workshops Attended**

- Attended 7-day Cloud Computing Course, by Turnip Innovations Private Limited, from 4 May – 10 May, 2023.
- Attended Joint Online One Week Certificate Program Social Robotics & AI, by PDPM IITDM, Jabalpur, MNIT Jaipur, NIT Patna, from 28 June – 4 July, 2021.
- Attended *Faculty Induction Programme (FIP) 4 Weeks Orientation Programme* by Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT), Teaching Learning Centre, Ramanujan College, University of Delhi from 10 November – 9 December, 2020.
- Attended *Faculty Development Programme Research Methodology* by Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT), Teaching Learning Centre, Ramanujan College, University of Delhi from 1-15th October, 2020.
- Attended *One Week Faculty Development Programme on "Introduction to Machine Learning in Research (Concepts and Practical)"* by Pandit Madan Mohan Malaviya National Mission on Teachers and

Teaching (PMMMNMST), Teaching Learning Centre, Ramanujan College, University of Delhi and Department of Computer Science, Ram Lal Anand College, University of Delhi from 10-18th October, 2020.

- Attended *One Week International Webinar on Industry4.0: Artificial Intelligence and Related Technology* by Integral University, India from 6-10th July, 2020.
- Attended online Faculty Development Program (FDP) on *Quantum Computing* organized by AICTE Training and Learning (ATAL) Academy, NITTTR Chandigarh, India from 15-19th June, 2020.
- Attended One Week Online National Workshop on *E – Learning Resources – Best Practices In E Learning In The Modern Era and Future* organized by St. Joseph's College, Darjeeling, India from 22-27th June, 2020.
- Attended online Faculty Development Program (FDP) on *Artificial Intelligence & Machine Learning and Its Application* organized by E & ICT Academy, NIT Patna from 18-24th May, 2020.
- Attended online Faculty Development Program (FDP) on *Blockchain and its Application* organized by E & ICT Academy, NIT Patna from 4-10th May, 2020.
- Attended workshop on *Xilinx FPGA Architecture and Design flow* organized by Indian Institute of Technology-Guwahati, Guwahati on 22<sup>nd</sup> – 23<sup>rd</sup> November, 2013.
- Attended workshop on *Advances in Document Analysis and Retrieval* jointly organized by Indian Statistical Institute, Kolkata at Gauhati University, Gauhati on 7<sup>th</sup> - 11<sup>th</sup> March, 2013.
- Attended workshop on *i-Robotics* at Haldia Institute of Technology, Haldia, on 15<sup>th</sup> - 16<sup>th</sup> February, 2011.
- Attended workshop on *Hawk-Board* at Indian Institute of Technology Kharagpur, Kharagpur on 16<sup>th</sup> January, 2011.
- Attended short term course on *Advance DSP design techniques* at Indian Institute of Technology Kharagpur, Kharagpur on 28<sup>th</sup> Jun - 2<sup>nd</sup> July, 2010.
- Attended training programming on *Infosys campus connect* jointly organized by Infosys Inc. at B. P. Poddar Institute of Management and Technology in the year 2008-2009.
- Attended industrial training programming on *Switching, GSM mobile and OFC* at BSNL, Cooch Behar on 2<sup>nd</sup> - 24<sup>th</sup> July, 2007.

### **Courses/Certifications Completed**

- Completed *Mastering Digital Twins*, accredited by Coursera June, 2019.
- Completed Annual Refresher Programme in Teaching (ARPIT) by UGC SWAYAM course on *"Fundamentals of Outcome-based Curriculum in Engineering Education"* on 28<sup>nd</sup> January– 23<sup>rd</sup> February, 2019.
- Certified *Blockchain Expert-V2*, accredited by the Blockchain Council, during October, 2018.
- Completed *Blockchain and Bitcoin Fundamentals*, accredited by Udemy during October, 2018.
- Completed *Blockchain Advanced Level: Uses Beyond Bitcoin 2018*, accredited by Udemy during October, 2018.

## Professional Activities

### Administration

- **Judge of Debate Competition of SUSA:** Judge of debate competition on “This House Rejects Artificial Intelligence Generated Art” organized by SUSA< Sikkim University, April 13, 2013.
- **Member of IEEE Technical Committee:** Member of IEEE IEEE CTSoc Internet of Things (IoT) Technical Committee (TC) IEEE CTSoc, 2023 -.
- **Member of Working Committee:** Nominated by the Vice Chancellor of Sikkim University as the Admission Working Committee member to see in admission process at Sikkim University, 2023.
- **Member of Technical Committee:** Nominated by the Vice Chancellor of Sikkim University as the SWAYAM member to review MOOC courses in department of Computer Applications at Sikkim University, 2022-.
- **Member of Technical Committee:** Nominated by the Vice Chancellor of Sikkim University as the member of technical committee to review all lab equipment in all departments at Sikkim University, 2022-.
- **Member of procurement of professional audio-video online meeting software Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to buy online AV software for online meet at Sikkim University, 2022-.
- **Member of College Inspection Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to assess college for affiliation extension/revision at Sikkim University, 2021-.
- **Member of ICT Policy Committee:** Nominated by the HoD, Department of Computer Applications for acting as coordinator “Compulsory Audit Paper on National Services (NSS)” Sikkim University, 2021-.
- **Member of ICT Policy Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to prepare ICT policy at Sikkim University, 2021-.
- **Member of Board of Studies Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform regular works of BOS of Dept. of Computer Applications at Sikkim University, 2019-.
- **Member of School Board Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform regular works of School Board of School of physical Sciences at Sikkim University, 2019-.
- **Member of Project Purchase Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform regular works of project purchase committee of NETRA lab of Dept. of Computer Applications at Sikkim University, 2019-.
- **Member of Project Appointment Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform regular works of project appoint committee of NETRA lab of Dept. of Computer Applications at Sikkim University, 2019-.
- **Micro-Observer of Lok Sabha Poll:** Nominated by the Vice Chancellor of Sikkim University as the member to perform regular works of micro-observer of Lok Sabha Poll in 2019-.
- **Member of B.Voc Syllabus Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform regular works of drafting B.Voc syllabus committee at Sikkim University,

2019-.

- **Member of Oracle Software Scrutiny Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform scrutiny of Oracle software procurement at Sikkim University, 2017-.
- **Member of Review Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform review of Dept. of Computer Applications activities at Sikkim University, 2017-.
- **Member of IT Skill Course Chief Coordinator:** Nominated by the Vice Chancellor of Sikkim University as the Chief Coordinator of IT Skill Courses at Sikkim University, 2016-.
- **Member of Language Laboratory Setup Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform review of language laboratory setup procedure at Sikkim University, 2016-.
- **Member of IED Cell Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform regular activities of Innovation and Entrepreneurship Development cell at Sikkim University, 2016-.
- **Member of Purchase Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform review of purchase activities at Sikkim University, 2016-.
- **Member of Innovator's Club:** Nominated by the Vice Chancellor of Sikkim University as the member of innovator's club to establish incubator cell at Sikkim University, 2015-.
- **Member of B.Sc. Computer Science Syllabus Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to draft syllabus of B.Sc. Computer Science at Sikkim University, 2015-.
- **Member of MCA Entrance Exam Committee:** Nominated by the Vice Chancellor of Sikkim University as the member to perform MCA entrance exam conduct at Sikkim University, 2015-.
- **Member of Meeting with General Managers of Industries:** Nominated by the Vice Chancellor of Sikkim University as the member to meet and discuss about the job prospects in Sikkim industries at Sikkim University, 2015-.
- **Member of Technical Sub-Committee for Center of Endangered Languages (CEL) Committee:** Nominated by the Vice Chancellor of Sikkim University as the member of Technical Sub-Committee for Center of Endangered Languages (CEL) Committee to seek for infrastructure needed for smooth running of the center in Sikkim University, 2014-.
- **Member of Training and Placement Committee:** Nominated by the Vice Chancellor of Sikkim University as the member of Training and Placement Committee to provide job and training opportunities of students in Sikkim University, 2014-.
- **Member of NAAC Criterion Search Committee:** Nominated by the Vice Chancellor of Sikkim University as the member of NAAC Criteria Search Committee to search the Infrastructure and Learning Resources in Sikkim University, 2014-.
- **Member of IEEE CSI (Chapter Council) Executive Body:** Selected as member for executive body of the IEEE CSI as the member 2014-.
- **Member of Board of Studies (BOS):** Nominated by the Vice Chancellor of Sikkim University as the member of BOS of the Department of Computer Sciences and Applications, Sikkim University, 2013-.
- **Member of Convocation Committee:** Nominated by the Vice Chancellor of Sikkim University as the

ember to perform volunteer activities in the convocation at Sikkim University, 2013-.

- **Member of Admission Committee:** Served admission committee for the Integrated BCA-MCA 5 years course admission for the year 2013-.
- **Syllabus Drafting Committee:** Served as syllabus drafting committee member for BCA-MCA 2013-.
- **Department Library Committee:** Served as library committee member for BCA-MCA 2013-.
- **Question Moderation Committee:** Served as library committee member for BCA-MCA 2013-.
- **Departmental Purchase Committee:** Serves as purchase committee member for BCA-MCA 2013-15.

#### **Academic**

- **Adjunct Faculty:** Served as Adjunct Faculty at Various Departments (Chinese, Hindi, Music, Psychology), Sikkim University during March-August 2023, taught Introduction to Cyber Security as per UG-NEP 2020 mandatory course.
- **Adjunct Faculty:** Served as Adjunct Faculty at the Department of Horticulture, Sikkim University during February-July 2018, taught Statistics and Computer Applications.
- **Adjunct Faculty:** Served as Adjunct Faculty at the Department of Management, Sikkim University during August-December 2013, taught Computer Applications in Management.
- **Adjunct Faculty:** Served as Adjunct Faculty at the Department of Management, Sikkim University during February-June 2014, taught Operation Research.

#### **Teaching Activities**

##### **Full Semester Courses taught at the Sikkim University from July, 2012 onwards**

- Introduction to Cyber Security (2022-23 Even semester)
- Object Oriented Programming in C++ and Java (2022-23 Even semester)
- Introduction to Computer Systems (2022-23 Odd semester)
- Discrete Mathematics (2022-23 Odd semester)
- Data Structure and Algorithm (2021-22 Even semester)
- Formal language and Automata Theory (2021-22 Even semester)
- Discrete Mathematics (2021-22 Odd semester)
- Introduction to Computer Systems (2021-22 Odd semester)
- Mathematics – II (Discrete Mathematics) (2020-21 Even semester)
- Computer Organization and Architecture (2020-21 Even semester)
- Mathematics – I (Numerical Methods) (2020-21 Odd semester)
- Digital Logic (2020-21 Odd semester)
- Mathematics – II (Discrete Mathematics) (2019-20 Even semester)
- Computer Organization and Architecture (2019-20 Even semester)
- Internet of Things (Elective Paper) (2019-20 Odd semester)

- Digital Logic (2019-20 Odd semester)
- Mathematics-III (Discrete Mathematics) (2018-19 Even semester)
- Computer Organization and Architecture (2018-19 Even semester)
- Formal Language and Automata Theory (2018-19 Odd semester)
- Compiler Design (2018-19 Odd semester)
- Computer Organization and Architecture (2017-18 Even semester)
- VLSI Design (2017-18 Even semester)
- Microprocessors and Microcontrollers (2017-18 Odd semester)
- Digital Logic (2017-18 Odd semester)
- Java (2016-17 Even semester)
- CMOS VLSI Design (2016-17 Even semester)
- Computer Organization and Architecture (2016-17 Odd semester)
- Microprocessors (2016-17 Odd semester)
- Artificial Intelligence (Fuzzy Set) (2016-17 Odd semester)
- Formal Language and Automata Theory (2015-16 Even semester)
- Microprocessors (2015-16 Even semester)
- Computer Organization and Architecture (2015-16 Odd semester)
- Microprocessors (2014-15 Even semester)
- PhD Research Methodology (Statistics) (2014-15 Odd semester)
- Basic Electronics (2014-15 Odd semester)
- Computer Organization and Architecture (2013-14 Even semester)
- Mathematical Foundation-I (Discrete Structure) (2013-14 Odd semester)
- Computer Application in Management (2013-14 Odd semester)
- Computer System Architecture (2013-14 Odd semester)
- Data Structure (2013-14 Odd semester)
- Basic Electronics (2013-14 Odd semester)
- Computer Organization (2012-13 Odd semester)
- Basic Electronics (2012-13 Odd semester)

**Full Semester Courses taught at Surendra Institute of Engineering and Management, Siliguri from January, 2012 to June, 2012**

- C Programming and Laboratory (at B. Tech. level)

**Professional Memberships**

2019 Senior Member, Institute of Electrical and Electronics Engineers (IEEE) (91152489)

- 2019 Member, The Institution of Engineering and Technology (IET) (MIET 1100765728)
- 2019 Member, The Institution of Electronics & Telecommunication Engineers (MIETE) (M 501509)
- 2019 Associate Member, The Institution of Engineers of India (MIE) (M-1645315)
- 2018 Member, Computer Society of India (2010000360).
- 2015 AM, The Indian Science Congress Association (ISCA) (A2691).
- 2015 Universal Association of Computer and Electronics Engineers (UACEE) (AM1010002745).
- 2015 Member, Association of Agrometeorologists (AAM) (AM-2017-202).
- 2014 Member, Association for Computing Machinery (ACM) (5140889).
- 2013 Member, Global ICT Standardisation Forum for India (GISFI).
- 2013 Member, International Association of Computer Science and Information Technology (IACSIT) (80346421).
- 2012 Member, Institute for Computer Sciences, Social Informatics and Telecommunications Engineering (ICST).
- 2010 Member, International Association of Engineers (IAE) (110263).