2021

5th International Conference on Data Management, Analytics and Innovation

Virtual Conference

15 – 17 January 2021

REPORT

Report Prepared By
Dr. Neha Sharma
Steering Committee Chair | Technical Programme Chair, ICDMAI 2021
Founder Secretary, Society for Data Science

**5th International Conference on
Data Management, Analytics and Innovation**
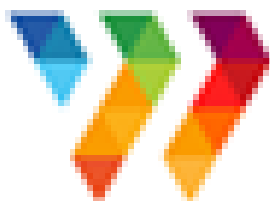
Virtual Conference | 15 – 17 January 2021

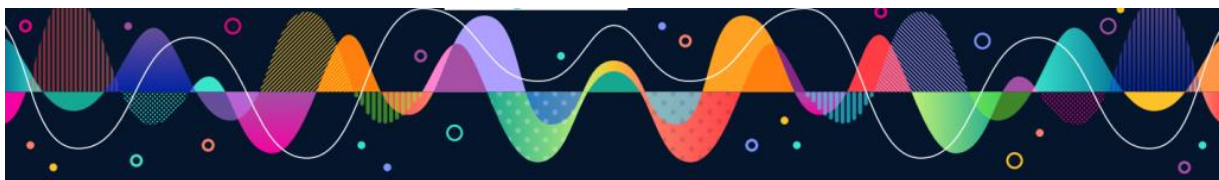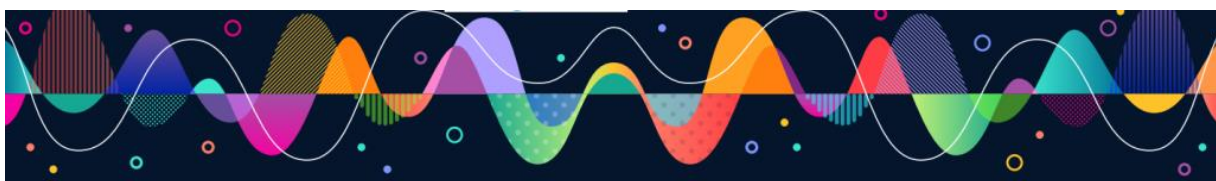*Technical Partner*

Publication Partner
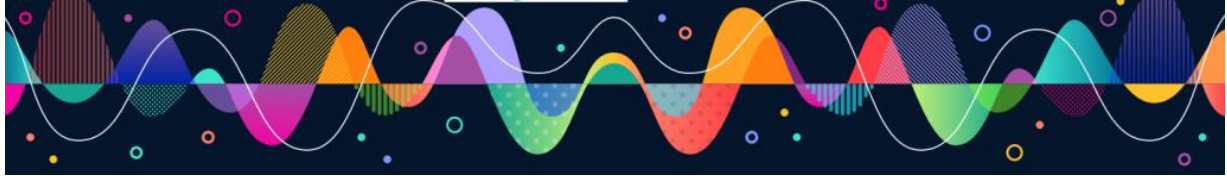

Knowledge Partners


Academic Partners

INDEX

ACKNOWLEDGEMENT

International Conference on Data Management, Analytics and Innovation (ICDMAI) is a signature conference of Society for Data Science (S4DS). This is the biggest data science conference in Southeast Asia, which were organized in the IT city of Pune, India; Kuala Lumpur, Malaysia; New Delhi, India in past years, but this year it was organized on the virtual platform due to pandemic. We are committed to create a forum which brings academicians, researchers, corporate experts and students on same page. Planning towards ICDMAI 2021 started around 14 months back and the entire core team ensured that we surpass our own bench mark.

This year is special as we have completed 5 years and it gives us immense satisfaction to put on record that we could successfully create a strong data science ecosystem in a short span of time. In these 5 years we could bring 50 doyens of data science as key note speakers and another set of 50 technical experts contributed towards workshops and tutorials. Besides we could engage around 200 experts as reviewers and session chairs. Till date we have received around 2093 papers from 42 countries, out of which 361 papers have been presented and published, which is just (17%) of submitted paper. Now, coming to the specifics of this year, we witnessed participants from 13 countries, 15 Industries, 121 International and Indian Universities. Total 63 papers were selected after rigorous review process for oral presentation and the Best Paper Awards were given for each Track.

We appreciate the bonhomie and support extended by IBM as a Technical Partner, Wizertech as Knowledge Partner, Springer as Publication Partner as well as IIT-Guwahati and NIT-Durgapur as Academic Partners. The conference of this magnitude was possible due to the consistent and concerted efforts of many good souls. We acknowledge the contribution of our advisory body members, technical programme committee, people from industry and academia, reviewers, session chairs, media, authors and enthusiastic volunteers, who have been instrumental in making this conference possible.

Dr. Neha Sharma
Steering Committee Chair, ICDMAI 2021
Technical Programme Chair, ICDMAI 2021
Founder Secretary, Society for Data Science
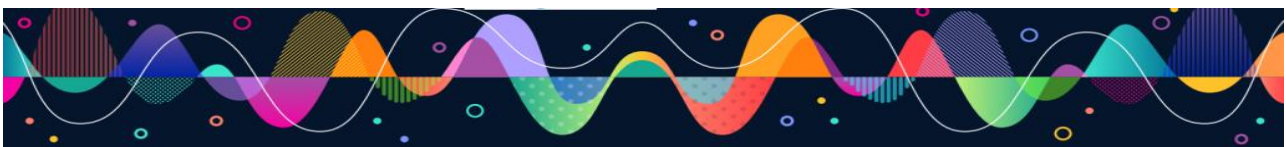
1. EVENT DETAILS

Event Type	:	Research Consortium
Description	:	International Conference
Event Name	:	5th International Conference on Data Management, Analytics and Innovation (ICDMAI 2021)
Venue	:	Virtual Conference
Date	:	15-17 January 2021

2. CONCEPTION OF THE PROGRAMME

We all are aware that the data is available in abundance, and they say it's a new fuel that threatens the old order and those old icons. It is fast replacing finance as the driver of business. However, a true wealth lies in innovations done using data. All the leading companies like apple, google, amazon, facebook, tesla, they all have research centers and research is going on in continuous basis. They have a reason to do so because this is an era of confluence of big data, connectivity and artificial intelligence. This has revolutionized the old industries and created an entirely new industry. Therefore, to prepare ourselves for this global competition, **Fifth International Conference on Data Management, Analytics and Innovation (ICDMAI 2021)** on **15-17 January 2021** was conceptualized. The conference aims to focus on Data Management, Analytics and Innovations associated with it, which we believe would play a pivotal role in making of new digital India, involving researchers from Industry and Academia. The conference would strive to give a thrust to research and make global impact using technology, as well as enable innovations to create positive impact on humanity and economy. Conference is designed to provide great opportunities to learn from and offer quality research work and innovations to academicians, scientists, research scholars, industry experts and students in the field of data management and analytics. This programme is to bring together researchers, engineers and practitioners interested on databases, big data, data mining, data management, data security and other aspects of information systems and technology involving advanced applications of data.

3. OBJECTIVES OF ICDMAI-2021

The three-day International Conference ICDMAI 2021 is designed to provide a common platform to the scientists, professors, research scholars, industry experts and students from all over the globe to share and disseminate knowledge on their original research. The conference would be a gathering of experts to "confer" about their own and each other's work, to hear experts illustrate on their work and to exchange their views on various topics relevant to the conference theme. The notable objectives of ICDMAI 2021:

1. To create an ecosystem of data science community by connecting to like-minded individuals and bringing them together for discussion.
2. To create a platform for the researchers and developers to collaborate and to identify avenues of funding for their project.
3. To organize a keynote sessions by expert from diverse verticals to set the central theme of conference.
4. To arrange pre-conference tutorial sessions and workshops, before the main conference, to set the right context.
5. To organize plenary talks to provide additional research highlights.
6. To arrange demonstrations and workshops on the innovative projects and products by experts from government sector and industry.

7. To provide the platform to present the research work in the form of oral/poster presentation in the field of Machine Learning, Big Data Management, Data Storage-Management-Innovation, Enabling Technologies and Data Science Techniques for handling Epidemic/Pandemic.
8. To arrange discussions on novel ideas and innovations to provide insight on various aspects of evolving technological advances for digitizing India.
9. To discuss the challenges in adopting the technologies, with a view to make recommendations concerning the problems under discussion.

The conference ensured the tangible takeaways for each participant of ICDMAI 2021.
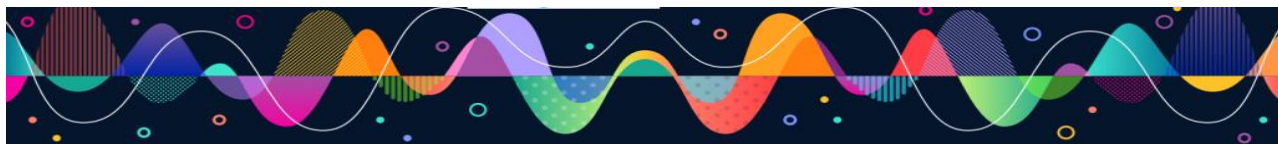
4. **CALL FOR PAPERS**

   Fifth International Conference on Data Management, Analytics and Innovation (ICDMAI – 2021) solicit papers in the areas of Computer Science, Information Technology, Computational Engineering, Electronics and Telecommunication, Electrical, Computer Application and all the relevant disciplines to a common forum. Original, unpublished research papers highlighting specific research domains from all viewpoints are invited from delegates all over the globe. It is planned to publish selected and presented papers in the proceedings with SPRINGER in their prestigious Lecture Notes on Data Engineering and Communications Technologies, **Springer**; which is indexed in Indexed by SCOPUS, INSPEC, EI Compendex. All books published in the series are submitted for consideration in Web of Science. Following are the topics of interest but not limited to:

   Track I: MACHINE LEARNING
   Algorithms and Models, Feature Engineering, Supervised Learning - Classification, Regression, Unsupervised Learning, Semi-supervised Learning, Association Rule Mining, Recommendation System

   Track II: AI & DEEP LEARNING
   Heuristic Search, nature inspired search, Fuzzy and Rough Set, Reinforcement Learning, ANN and Deep Neural Networks, RNN, CNN, RBM, Transformer, Auto Encoder, GAN, Transfer Learning, Application in Computer Vision, Natural Language Processing, Time Series Data, Other research Issues and Interdisciplinary applications in Science, Social Science and Humanities

   Track III: DATA STORAGE, MANAGEMENT AND INNOVATION
   Data Storage, Data warehouse and Data Lakes, Retrieval, Graph database, No SQL, Column based databases Other contemporary issues and Techniques

   Track IV: ENABLING TECHNOLOGIES
   Big Data, Cloud Computing, IoT, Robotics, Block Chain, Security and Privacy

Track V: DATA SCIENCE TECHNIQUES FOR HANDLING EPIDEMIC, PANDEMIC

Forecasting models for Tracking Number of affected, Image Processing Techniques for detection of disease, Applying Text Analysis to understand research articles to get a better understanding of the Research Literature, Drug Discovery and Genomic Sequencing, Assessing the business and Economic Impact of an Epidemic and Pandemic, Social Media Analytics to understand the Sentiments , Specific issues of Concern Building Conversation Agents to communicate genuine information

*(**Annexure A**-Conference Brochure)*

5. **CONFERENCE MANAGEMENT COMMITTEE**

    Conference Management Committee is the key for successful organization of any international conference and ICDMAI-2021 is not an exception to it. The primary role of the committee was to provide independent advice to enhance the quality of the conference regulatory decision-making and lend credibility to the review process. They also recommended/suggested changes and amendments towards the successful execution of the conference. ICDMAI-2021 was fortunate onboard some of the renowned personalities from corporate, academia and research field. The details are as follows:-

PATRON	GENERAL CHAIRS		STEERING COMMITTEE CHAIRS	
Amol Goje President, Society for Data Science	**Dr. P.K. Sinha** Vice Chancellor and Director, Dr S P Mukherjee International Institute of Information Technology, Raipur, Chhattisgarh	**Dr. Vincenzo Piuri** Professor, Università degli Studi di Milano, Italy	**Amlan Chakrabarti** Director and Professor, A.K.Choudhury School of Information Technology, University of Calcutta, India	**Neha Sharma** Founder Secretary, Society for Data Science

EXECUTIVE COMMITTEE OF S4DS

 Prof. Amol C. Goje is a President of Society of Data Science and has served as a Director, Vidya Pratishthan's Institute of Information Technology (VIIT), Baramati, Pune for last 19 Years. He has a total of over Twenty Five years of experience in the field of Information and Computer Technology (ICT). Dr. Amol's main area of interest is to work for underprivileged people in the rural part of India and his noteworthy innovation is Computer Mobile Van, which are economically sustainable to the rural schools and colleges. He has done lot of research work in Information Technology and its application for rural community. In appreciation to his exemplary work, Dr. Amol has received the Ashoka Fellow award in the year 2002. He is engaged as a Technical advisor on many government and non-government organizations. He was also a member of the Planning Commission, Government of India in Information Technology division. Dr. Goje has received the Marathwada Bhushan Award for spreading the IT education to the masses. He is the member of the Working group on Agricultural Extension Constituted by Planning Commission government of India. He is

key player in setting up the Community Training and Learning Centers (CTLC) in Maharashtra, to provide Computer Training to the women from the Self Help groups (SHG). Dr. Goje has received the Manthan (AIF) award successively for two years in Year 2005 and 2006. Governemt of Maharashtra "Maharashtra IT award (IT HRD) in 2008. He is also the President of Community Radio Association (CRA) of India. Recently he has been bestowed with the honor of 'Best Director' of Pune University -2016-17

Prof Amlan Chakrabarti is presently a Full Professor and Director of the A.K.Choudhury School of Information Technology, University of Calcutta. He is an M.Tech. from University of Calcutta and did his Doctoral research at the Indian Statistical Institute, Kolkata. He was a Post-Doctoral fellow at the School of Engineering, Princeton University, USA during 2011-2012. He is the recipient of DST BOYSCAST fellowship award in the area of Engineering Science in 2011, Indian National Science Academy Visiting Scientist Fellowship in 2014, JSPS Invitation Research Award from Japan in 2016, Erasmus Mundus Leaders Award from European Union in 2017, Hamied Visiting Fellowship University of Cambridge in 2018 and Shiksha Ratna Award from Govt. of West Bengal, in 2018. He is the Team Leader of European Center for Research in Nuclear Science (CERN, Geneva) ALICE-India project for University of Calcutta and also a key member of the CBM-FAIR project at Darmstadt Germany. He is also the Principal Investigator of the Center of Excellence in Systems Biology and Biomedical Engineering, University of Calcutta funded by MHRD (TEQIP-II). He has published around 150 research papers in referred journals and conferences and has graduated 10 Ph.D. students till date. He has been involved in research projects funded by DRDO, DST, DAE, MietY, UGC, Ministry of Social Empowerment, TCS, Intel India and TEQIP.. He is a Sr. Member of IEEE and ACM, Secretary of IEEE CEDA India Chapter and Vice President Society for Data Science. His research interests are: Quantum Computing, VLSI design, Embedded System Design, Computer Vision and Analytics.

https://www.linkedin.com/in/prof-amlan-chakrabarti-7006323a

Neha Sharma is working with Tata Consultancy Services and is also a Founder Secretary of Society for Data Science. Prior to this she has worked as Director of premier Institute of Pune, that run post-graduation courses like MCA and MBA. She is an alumnus of a premier College of Engineering and Technology, Bhubaneshwar and completed her PhD from prestigious Indian Institute of Technology, Dhanbad. She is an ACM Distinguished Speaker, Senior IEEE member and Secretary of IEEE Pune Section. She is an astute academician and has organized several national and international conferences and published several research papers. Besides, she is the brain behind conceptualizing International Conference of Data Management, Analytics and Innovation (ICDMAI), which has become landmark conference in the field of data science. She is the recipient of "Best PhD Thesis Award" and "Best Paper Presenter at International Conference Award" at National Level. She is a well-known figure among the IT circle, and well sought over for her sound knowledge and professional skills. Neha Sharma has been instrumental in integrating teaching with the current needs of the Industry. and steering students towards their bright future. Not only loved by her students, who currently are employed in reputed firms; for her passion to mingle freely with every one, Neha Sharma enjoys

the support of her colleagues as well. Her area of interest includes Data Mining, Database Design, Analysis and Design, Artificial intelligence, Big data, Cloud Computing, Block Chain and Data Science.

linkedin.com/in/dr-neha-sharma-2127141b

https://speakers.acm.org/speakers/sharma_13085

Col Inderjit Singh Barara is a well-known personality in technical world especially in the world of Information System. An experienced Info Systems professional and a TEDx Speaker with experience of more than 27+ year across wide spectrum of areas spanning Info Security, Risk Management, Cyber Security , Cyber Forensics, Cyber Warfare, Expertise in SOC and CERT, Cloud Computing, Big Data , Internet of Things (IoT) including IoT Security, Blockchain, Machine Learning and Artificial Intelligence. He has consistently delivered mission-critical results and seamlessly managed diverse functions related to Project Management, Service Delivery and Key Account Management. He exhibits and models, influential leadership skills through efficient management of large and dispersed teams while promoting a cooperative working atmosphere. He delegates assignments according to skills and expects implementation of quality strategies. He demonstrates a strong work ethic and encourages teamwork, while clearly defining standards and expectations. He has a strong visioning and strategic thinking ability. He envisions opportunities and converts successfully into business through swift and analytical decision making. Keen eye for innovations in Technology. His Core Competencies are Creating business value supported by technology, Aligning IT with business, thought leadership, IT Transformation, turn around IT organization and improve effectiveness, Managing teams with focus on outcomes, Strategic Outsourcing and cost management, Business Process Improvement & Organizational Efficiency and Effectiveness, leading to applied cross-industry learning towards problem solving, thought leadership for E-Commerce start up. He was awarded Magnificent CIO Award in year 2016 and has been awarded Excellence Award - Cyber Security, Cyber Terrorism and Cyber Warfare for year 2019 by International Police Commission.

Saptarsi Goswami is currently working as an Assistant Professor – Computer Science, Bangabasi Morning College affiliated to University of Calcutta. He has completed his Ph.D in the area of feature selection in the year 2018 from University of Calcutta.   He has 16+ years of professional experience, out of which he has spent 10 + years in IT Services Industry in companies like Cognizant, PwC and Tata Infotech. He has briefly worked as a visiting scientist in Iwate Prefectural University, Japan. He has managed large data warehousing programs, as well as took active role in solutioning and designing. He has authored 50 + Journal, conference articles and book chapters. He is working as a meetup Ambassador of Open Data Science Conference (ODSC) for Kolkata Chapter. He conducts regular workshops and organizes meet-ups in the area of data science, machine learning and deep learning. He is working as a co-principal investigator in the domain of renewable energy in a funded project by United Sates Agency of International Development. He is a very active member of the data science community in Kolkata and regularly interacts with different organizations. He actively reviews articles in various journals and conferences.

https://www.linkedin.com/in/saptarsi-goswami-phd-93073661

Atul Bengeri is an industry veteran with over 22 years of experience, having worked in companies like Siemens, Intel & Dell has gained experience in various facets of IT / Digital transformation projects across various business verticals. He has worked on various IT and Digital Transformation projects on design, development and implementations. In his work as Regional Head - Strategic Projects and Smart Cities at Dell-EMC for over three years, he has been well acquainted with the technological and business acumen working on implementation of Smart City Command Centre solutions covering various aspects of Cloud, IoT, Big Data and SMAC. In his previous role at Intel, he worked in identifying technology entrepreneurs and startups that could partner and deliver path breaking solutions whilst being a member of the Ideas2Reality (I2R) program at Intel Technologies. Presently an Entrepreneur, working in the Education & Health data management domain; is the Director of a startup M/s AcumenToday Pvt., Ltd., based out of Pune. He is pursuing his Doctorate in Data Science using Big data and IoT platforms under the Computer Management faculty and has more than two decades of combined experience; Corporate and Academic. As an educator, he teaches several subjects in the Technical fields of Operating Systems, Database, Programming, Big Data, IoT, Data Science and Project Management at the PG level. Have taught specific subjects like Management Information Systems (MIS), Decision Support Systems (DSS), Executive Information Systems (EIS), Data Analytics, Consumer Behaviour, Organizational Behaviour, Marketing Strategy, Branding, AI, ML and programming subjects viz., C, C++, R Programming, Python and HDFS for the PG students. As part of the founding member of Society of Data Science (S4DS) https://s4ds.org/ has been in the forefront of proliferating and propagating the nuances of Data Science across academicians, corporate and student community across a few countries through various technical programs, sessions, seminars and conferences. Recently conducted the 5th International Conference on Data Management, Analytics and Innovation (ICDMAI 2021) https://www.icdmai.org/. In addition, he has conducted various Entrepreneurship Awareness and Development programs for budding entrepreneurs. He has also been a keynote speaker at various national and international conferences and seminars.

TECHNICAL PROGRAM CHAIRS

Neha Sharma
Founder Secretary,
Society for Data Science
Analytics & Insights,
Tata Consultancy
Services

Amlan Chakrabarti
Vice President, Society
for Data Science
Professor & Director,
A.K. Choudhury School
of Information
Technology, University
of Calcutta

Valentina Emilia Balas
Professor, Department
of Automatics and
Applied Software faculty
of Engineering,
University of Arad,
Romania

Alfred M. Bruckstein
Technion - Israel
Institute of
Technology, Faculty of
Computer Science,
Israel

ORGANIZING CHAIRS

Col. Inderjit Singh Barara
Technology Evangelist,
Solution Architect and a
Mentor

Saptarsi Goswami
Computer Science,
Bangabasi Morning
College University of
Calcutta. Kolkata

PUBLICITY CHAIRS

Himadri Nath Saha
Institute of Engineering &
Management, Kolkata

Jyoti Prakash Singh
National Institute of
Technology, Patna

INDUSTRY LIAISON CHAIRS

Biswadeep Chatterjee
Director,
Engineering at Intel India

Kaushik Dey
Head of AI/ML & Big
Data Practice, Ericsson

INTERNATIONAL LIASON CHAIRS

Juergen Seitz
Head of Business Information
Systems Department, Baden-
Wuerttemberg Cooperative
State University, Heidenheim,
Germany

Goutam Chakraborty
Department of Software
& Information Science
Iwate Prefectural
University, Iwate Ken,
Takizawa, Japan

TUTORIAL AND WORKSHOP CHAIRS

Basabi Chakraborty
Department of Software &
Information Science
Iwate Prefectural
University, Iwate Ken,
Takizawa, Japan 020-0193

Amit Kumar Das
Senior Research
Scientist, Data Science
Lab, AKCSIT, University
of Calcutta

Tandra Pal
Department of
Computer Science and
Engineering
NIT Durgapur

Saptarsi Goswami
Bangabasi Morning
College, University of
Calcutta

*(**Annexure B**-Conference Technical Programme Committee List)*

6. **CONFERENCE OPERATING MODEL - Preparation of the Event**

Every conference has its own model of operation in organizing the event. ICDMAI-2021 opted to serve as a vehicle for thought-leaders, academicians, researchers and industry personnel, to have a spirited debate and discussion on many advances and challenges in the field of Data Management, Analytics and Innovation and at the end propose creative solutions to combat the challenges in these areas. Keeping **QUALITY** as single point agenda, we started preparations for this mega event around 14 months back. However, when we started we had no idea about the forthcoming situation, and we had planned to host it at Science City, Kolkata. Various activities of the conference were identified and accordingly timeline was prepared. Also, various roles for the conference were finalized and the responsibilities were defined. General Chair, Technical Programme Chairs and other committee chairs / members were appointed.

This was a special year as ICDMAI reached its 5th edition; but it was also different because of the pandemic. Hence, we took a conscious decision to organize it on on-line platform. We realized that virtual world has become new normal now and has presented abundant opportunity to learn and grow together, which can be seamlessly aligned with the objectives of 'ICDMAI'. To keep the momentum, we at Society for Data Science organized many webinars, events, Faculty Development Programs throughout the year and with ICDMAI we tried to reach the peak. Academic and corporate leaders were approached to support the conference and Springer was approached to be the Publication Partner. Experts and researchers from academia and industry were approached to take up the responsibility to review the papers submitted to ICDMAI-2021. Altogether new tracks were decided after rigorous brainstorming sessions to cover all the aspects of Data Management, Analytics and Innovation and to encourage inter-disciplinary research. Besides, we introduced a track on "Data analysis techniques to handle pandemics" and a special session by NIT Durgapur on "Societal Application of Data Science". A Call for Paper was released with deadline for paper submission, notification and registration. In the 5th Edition of the conference, we tried to keep a perfect blend of participation from Industry and Academia.

The keynotes this time were planned to be more diverse and enriching, whereas workshops had altogether new format. Quite a few changes this time with two days of workshop instead of one, with more emphasis on Hands-on. A diligent effort was made to identify the Keynote Speakers and Resource Persons for Invited Talks, experts for Tutorials / Workshops, Chief Guests, Guest of Honor as well as other Guests. We also planned to provide Distinguished Fellow Award to Industry Experts and Academic Leaders.

An exclusive website (**http://www.icdmai.org**) of the conference was updated with the relevant information, keeping in view the need of communication with researchers, reviewers and guests. The website helped the prospective paper presenters and delegates in getting important details such as guidelines for papers submission, important dates with respects to submission of papers, venue of the conference, etc. We registered with conference management portal, **easychair** to provide a hassle free interface to authors for paper submission, smooth paper review and unbiased paper selection process. The conference was registered on various conference alert websites and simultaneous email blast was done to reach out to the research community and provide the wide publicity to the mega event.

Conference budget was prepared and sponsorship brochures were sent to prospective industries and academic institutions. Rigorous efforts were taken to outreach to educational institutions, corporates, government and industry for support and patronage. Application to seek permission from Ministry of External Affairs, Home Affairs and Nodal Ministry was submitted was submitted to Indian Government.

The beautifully crafted programme schedule of the conference promised it to be more than a just another "talk shop". Delegates and participants got many insights after listening to the variety of research works which are being carried out across the globe. The participants got an opportunity to listen to many eminent personalities of the world, in their keynote, plenary talks and panel discussion. Besides, the conference showcased workshops and tutorials by leaders from industry and academia. To add on, there was Best Paper Award in all the five tracks. Finally, a press release was given to brief the media and readers about the conference, countries participating, guests, speakers, and quality of paper submitted and other highlights of the conference.

7. DIGNITARIES AT ICDMAI 2021

Prof. Dr. Regiane Relva Romano has over 30 years of international experience working in technology and innovation. Special Adviser to the Ministry of Science, Technology and Innovation in Brazil. Worked as Head of Research and General Coordinator at Smart Campus FACENS, a prototype of a Smart City inside the College, that received the "Top Educacional/ABMES" and the "Innovation GS1" awards in 2016; "Smart City UK-London" in 2017; "Best IoT Implementation Europe IdTechEx"; "Top of Academy/RFIDBR/2018" and "InovaCidade" at Smart City Business America 2019. Also worked as CEO at VIP-SYSTEMS Informática. Writer. Professor at universities: FGV, FIA, ESALQ/USP, FDC, EINSTEIN and FACENS. International speaker. Consultant of innovation and technologies applied to businesses, IoT and Smart Cities. As a researcher in the business and emerging technologies, she has lectured in China, Dubai, Germany, Colombia, Poland, The Netherlands, Uruguay, Canada, Spain, Perú, Portugal, United States, and others. She developed the First Smart Store in Latin America, in 2011, and is widely recognized as an expert in topics related to Smart and Sustainable Cities, retail, RFID and technology. She earned a Ph.D. in a concentration in Information Technology Management, at FGV and a Master's degree in Informatics Management of Information Systems from PUC-CAMPINAS. She completed some studies in the improvement of international Retailing at the University of Ohio, in RFID at the University of Arkansas, in Business at Columbia University and in Smart Cities at Lleida University.

Sushmita Mitra is an INAE Chair Professor and Fulbright-Nehru Senior Researcher, at the Machine Intelligence Unit (MIU), Indian Statistical Institute, Kolkata. From 1992 to 1994 she was in the RWTH, Aachen, Germany as a DAAD Fellow. She was a Visiting Professor in the Computer Science Departments of the University of Alberta, Edmonton, Canada in 2004, 2007; Meiji University, Japan in 1999, 2004, 2005, 2007; and Aalborg University Esbjerg, Denmark in 2002, 2003. Dr. Mitra received the National Talent Search Scholarship (1978-1983) from NCERT, India, the University Gold Medal in 1988, the IEEE TNN Outstanding Paper Award in 1994 for her pioneering work in neuro-fuzzy computing, and the CIMPA-INRIA-UNESCO Fellowship in 1996. She is the author of the books ``Neuro-Fuzzy Pattern Recognition: Methods in Soft Computing" and ``Data Mining: Multimedia, Soft Computing, and Bioinformatics" published by John Wiley, and ``Introduction to Machine

Learning and Bioinformatics", Chapman & Hall/CRC Press, beside a host of other edited books. Dr. Mitra has guest edited special issues of several journals, is an Associate Editor of ``IEEE/ACM Trans. on Computational Biology and Bioinformatics", ``Information Sciences", ``Neurocomputing", ``Fundamenta Informatica", and is a Founding Associate Editor of ``Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery (WIRE DMKD)". She has more than 150 research publications in referred international journals.According to the Science Citation Index (SCI), two of her papers have been ranked 3rd and 15th in the list of Top-cited papers in Engineering Science from India during 1992--2001. Dr. Mitra is a Fellow of the IEEE, Indian National Science Academy (INSA), International Association for Pattern Recognition (IAPR), and Fellow of the Indian National Academy of Engineering (INAE) and The National Academy of Sciences, India (NASI). She is an IEEE CIS Distinguished Lecturer and the current Chair Elect, IEEE Kolkata Section. She has visited more than 30 countries as a Plenary/Invited Speaker or an academic visitor. She served in the capacity of Program Chair, Tutorial Chair, and as member of programme committees of many international conferences. Her current research interests include data mining, pattern recognition, soft computing, medical image processing, and Bioinformatics.

Sandeep Shukla

Education: Ph.D., State University of New York at Albany, 1997

M.S., State University of New York at Albany, 1995

B.E., Jadavpur University, Calcutta, India, 1991

Teaching Interests: Formal methods, System level design for hardware, software, and embedded systems, Network application design, Formal verification, Stochastic methods in embedded systems design, Embedded software engineering, System synthesis.

Research Interests: Formal methods, System level design languages and frameworks, Component based and platform based design, System level power management, Formal verification and its use in system design, Concurrency analysis, Embedded systems design and co-design, Software engineering for embedded systems, Distributed object technology and its application in embedded systems design, Networked embedded systems, Self-stabilization and fault-tolerant distributed systems

Dr. Phillip G. Bradford is on the faculty at the University of Connecticut. He is the director of the computer science program at the University of Connecticut in Stamford. He is a computer scientist with extensive experience in academia and industry. Phil was a post-doctoral fellow at the Max-Planck-Institut für Informatik, he earned his PhD at Indiana University, an MS form the University of Kansas, and a BA from Rutgers University. He was on the faculty at Rutgers Business School and the University of Alabama's Engineering School. He worked for BlackRock, Reuters Analytics, founded a startup and worked with a number of early stage firms. He was a Principal Architect for General Electric. Phil has a deep belief in bringing real research to practice. This is the root of his entrepreneurial perspective. Phil has a handful of best-in-class results. His Erdős Number is 2. He has given over 70 talks in 9 countries and he is the author or co-author of over 65 articles.

Yogesh Kulkarni has over two decades of professional and research work in the field of Geometric Modeling. For past few years, working on various problems in the domain of Natural Language Processing using Machine/Deep Learning. Currently working as a Principal Architect (CTO Office) at Icertis-Pune and on sides, conducting meetups/workshops in topics related to Data Science.

Dr. Aloknath De is Corporate Vice President of Samsung Electronics, S.Korea and Chief Technology Officer of Samsung R&D Institute India, Bangalore. Dr. De has over thirty years of industrial and research experiences including BEL, Nortel (Montreal), Hughes and with ST-Ericsson where he was R&D Director and Country Manager. During 2005-11, he has served as Visiting/Adjunct Professorship with IIT-Roorkee and IIT-Delhi. He holds B.Tech. from IIT, Kharagpur; M.E. from IISc, Bangalore; and Ph.D. from McGill University, Montreal. He is a recipient of 'Alexander Graham Bell Prize' in Canada. He has received 'IETE Memorial Awards' for distinguished contributions in Electronics and Communications, IDC Insights Award for Innovation in Telecom, Zinnov 2016 'Intrapreneur of the Year' award. He is a Senior Member of IEEE and a Fellow of IE, IETE and Indian National Academy of Engg (INAE). He is considered as one of 'Most Influential CIO/CTOs of India' and is cited in Marquis' Who's Who in the World (2016). He promotes science and technology linkage through IP creation, startup collaboration and innovative solutions.

Sourabh Mukherjee has more than 24 years' experience in Information Technology. He presently works as a Vice President in the Data and Artificial Intelligence Group in Accenture. Prior to this, Sourabh was an Associate Partner with IBM leading IBM India's Analytics practice, and an Associate Director with Cognizant Technology Solutions. Sourabh has done his B.E. in Electronics and Telecommunications Engineering from Jadavpur University; Post Graduate Diploma in Management from School of Management Studies, New Delhi; Master-level certification in Data Architecture from Accenture-Massachusetts Institute of Technology collaboration; and Amazon Web Services Certified Cloud Practitioner certification. His paper on trends in Data Management was published in the prestigious Business Intelligence journal of The Datawarehousing Institute (TDWI), 2013. He has spoken in a number of national and international events like The MDM Institute Summit in London (2008, 2012), Informatica World in Las Vegas (2014), Business IT Conclave on the theme of Digital India, organized by Bengal Chamber of Commerce and Industry (2015) as well as in Industry events at Indian Institute of Foreign Trade (IIFT), Symbiosis, Kolkata University, Techno India, IISWBM and University of Engineering and Management (UEM). He has also co-authored a bestselling textbook Big Data Simplified, published by Pearson. As post-digital people, we don't just want more technology in the products and services we consume, but we want technology that is more human, collaborative, and developed and deployed in a way that reflects the enormous impact that technology has on our lives. The key to this innovation is to truly 'humanize' AI.

Professor Alfred Bruckstein , BSc, MSc in EE from the Technion IIT, Haifa, Israel, and PhD in EE, from Stanford University, Stanford, California, USA, is a Technion Ollendorff Professor of Science, in the Computer Science Department there, and is a Visiting Professor at NTU, Singapore, in the SPMS. He has done research on Neural Coding Processes, and Stochastic Point Processes, Estimation Theory, and Scattering Theory, Signal and Image Processing Topics, Computer Vision and Graphics, and Robotics. Over the years he held visiting positions at Bell Laboratories, Murray Hill, NJ, USA, (1987-2001) and TsingHua University, Beijing, China, (2002-223), and made short time visits to many universities and research centers worldwide. At the Technion, he was the Dean of the Graduate School, and is currently the Head of the Technion Excellence Program.

Pallab Dasgupta, Professor, Dept. of Computer Science and Engineering, IIT Kharagpur, is known for his work on AI and Formal Methods and their application on industrial verification problems. He has made fundamental contributions in temporal logic, model checking, and symbolic reasoning. He has applied his research on the verification of integrated circuits, embedded real-time control systems, and intelligent autonomous systems. He leads the research group on Formal Methods and Trusted AI at IIT Kharagpur and the Synopsys CAD Labs. His work has been published in more than 200 research papers, and brought into industrial practice by leading companies including Intel, Synopsys, Texas Instruments, General Motors, and SRC. He was conferred the IBM Faculty award and the Techno-Mentor award of the India Semiconductor Association. HAL has worked with him to formally prove the safety of India's first avionic RTOS. He delivered a tool to Indian Railways for checking the safety of signaling logic and interlocking systems. He has served as the Associate Dean and then Dean of Sponsored Research, IIT Kharagpur between 2013-2019. He is a Fellow of the Indian National Academy of Engineering and a Fellow of the Indian Academy of Sciences. He plays the classical instrument, sitar, and currently leads the Academy of Classical and Folk Arts at IIT Kharagpur.

Dipanjan (DJ) Sarkar is a Data Science Lead at Applied Materials, leading advanced analytics efforts around computer vision, natural language processing and deep learning. He is also a Google Developer Expert in Machine Learning. He has consulted and worked with several startups as well as Fortune 500 companies like Intel and Open Source organizations like Red Hat \ IBM. He primarily works on leveraging data science, machine learning and deep learning to build large- scale intelligent systems. He holds a master of technology degree with specializations in Data Science and Software Engineering. Dipanjan has been an analytics practitioner for several years now, specializing in machine learning, natural language processing, computer vision and deep learning. Having a passion for data science and education, he also acts as an AI Subject Matter Expert and Mentor at various organizations like Springboard, where he helps people build their skills on areas like Data Science and Machine Learning. Dipanjan is also a published author, having authored several books on R, Python, Machine Learning, Social Media Analytics, Natural Language Processing, and Deep Learning. In his spare time he loves reading, gaming, watching popular sitcoms and football and writing interesting articles on https://medium.com/@dipanzan.sarkar and https://www.linkedin.com/in/dipanzan. He is also a strong supporter of open-source and publishes his code and analyses from his books and articles on GitHub at https://github.com/dipanjanS.

Amol Dhondse is a Senior Technical Staff Member(STSM), Open Group Master Certified Architect & TOGAF Certified Senior IT Architect. He is an IBM Master Inventor and filed over 50 patents in areas such as Big Data, Cloud, AI and the Internet of Things (IoT). He has over 20 years of experience in the IT Industry and 11 years in the Architecture profession. Amol is active in multiple IBM technical communities as a technical evangelist and thought leader and is leading multiple initiatives within the IBM Academy of Technology & its affiliates. Amol has presented white papers in Regional Technical exchanges, external forums and has been invited in various universities to conduct workshops on Social, Mobile and Portal technologies. He has presented on "Cognitive Collaboration" in San Francisco, US as part of Connect 2017.

Kranti Athalye is a Sr. Manager with University Relations, IBM Research. She has 20+ years of industry experience after getting a Master's degree in Computer Science and Mathematics from the University of Illinois at Chicago. She has worked as a delivery manager in the IBM Cloud domain in India and in the Network Management domain when she worked in AT&T Bell Labs in the US. She delivers sessions on many leading edge technologies such as Artificial Intelligence, Cognitive Computing, Data Science, Blockchain and does Design Thinking workshops too. She has been an invited speaker at multiple national and international conferences.

Sonali Dey is working with IBM for the last 10 years. She started as a Java developer then moved over to Project Management and handled projects from multiple industries mainly from Telco (Bhart Airtel) and Distribution sector (Mckesson/Ecolab) to name a few. For the last few years she moved to Operations support and is managing the cost/recovery and financial prospects for IBM CoC industries. Her current job profile revolves around mdata handling and highlighting issues so as to catch and rectify them early. Apart from her regular job she has been working in developing Activity Kits for the IBM CSR team, currently working on Arduino Activity Kit. She is a mentor with the Niti Ayog - IBM partnership and had been designated to a private school in Delhi.

Vandana Verma Sehgal is a seasoned security professional with experience ranging from application security to infrastructure and now dealing with Product Security. She has been Keynote speaker / Speaker / Trainer at various public events ranging from Global OWASP AppSec events to BlackHat events to regional events like BSides events in India. She is part of the OWASP Global board of directors. She also works in various communities towards diversity initiatives InfosecGirls, WoSec and null. She has been recipient of multiple prestigious awards like Cyber Security Woman of the Year Award 2020 by Cyber Sec Awards, Global cybersecurity influencer among IFSEC Global's "Top Influencers inSecurity and Fire" Category for 2019, Cybersecurity Women of the year award by Women Cyberjutsu Society in the Category "Secure Coder". Finalist for Executives Women's Forum – Women of

Influence 2020 and Cyber Security Woman supporter of the year 2020. She has also been listed as one of the top women leaders in this field of technology and cybersecurity in India by Instasafe.

Usha is a polymath and India's first women Kaggle Grandmaster. She leads several communities like Women in Machine Learning and Data Science(WiMLDS – Bangalore and Mysore Chapter), TensorFlow User Group (TFUG Mysore) and Women in Data Science Ambassador(WiDS Mysore). She organized NeuroAI (www.neuroai.in) which is India's first-ever research symposium in the interface of Neuroscience and Data Science. She spoke at various conferences like ODSC, Pycon India, Indo Data Week, and GHCI. She specializes in Probabilistic Graphical Models, Machine Learning and Deep Learning. She has prepared curriculum for BITS Pilani's masters in Data Science program (consumed by 20,000+ students) and Upgrad's PGP program in DS(consumed by 10,000+ students)

Avni Gupta is passionate IT professional with over a decade in the industry with vast experience in building data driven applications, and presently working as Senior Data Analyst – IoT, Netradyne. She believes in sharing her knowledge and experiences to help inspire and grow the Data Science community. Avni holds an Engineering and MBA degree with a specialization in Data Science. She enjoys a mix of technical and leadership roles.

8. <u>VENUE OF ICDMAI 2021</u>

Due to pandemic, we decided to organize ICDMAI 2021 on a virtual platform – Zoom. Zoom helps businesses and organizations bring their teams together in a frictionless environment to get more done. Their easy, reliable cloud platform for video, voice, content sharing, and chat runs across mobile devices, desktops, telephones, and room systems. Zoom is publicly traded on Nasdaq (ZM) and headquartered in San Jose, California.

Figure 1. Magic Quadrant for Meeting Solutions

9. PARTNERS FOR ICDMAI 2021

IBM India Private Limited is the Indian subsidiary of IBM. It has facilities in Bengaluru, Ahmedabad, Delhi, Kolkata, Mumbai, Chennai, Pune, Gurgaon, Noida and Hyderabad. IBM is the multinational company with the largest number of employees in India.

Springer is a leading global scientific, technical and medical portfolio, providing researchers in academia, scientific institutions and corporate R&D departments with quality content through innovative information, products and services. Springer has one of the strongest STM and HSS eBook collections and archives, as well as a comprehensive range of hybrid and open access journals. The publication partner for the conference is their prestigious LNDECT Series.
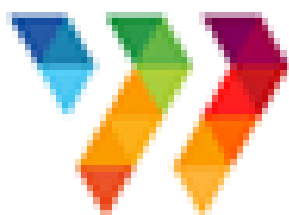
Wizertech Informatics Pvt Ltd is an ISO9001: 2008 certified IT Infrastructure Consultancy & System Integration company headquartered in Kolkata, India, with a strong presence in more than a dozen key cities of India. Since inception, a decade ago, we have diversified extensively to evolve into one of the largest System Integrators in Eastern India. Over the decade, we have augmented technical manpower, and gained experience in multiple domains. This coupled with an ever-increasing list of satisfied customers, has positioned us among the coveted names in the arena.

Indian Institute of Technology Guwahati (IIT Guwahati) is a public technical and research university established by the Government of India, located in Guwahati, in the state of Assam in India. It is the sixth Indian Institute of Technology established in India. IIT Guwahati is officially recognized as an Institute of National Importance by the government of India. IIT Guwahati has been ranked 7th both in Engineering and Overall category in NIRF India Rankings 2020, released on 11th June 2020.

National Institute of Technology Durgapur (also known as NIT Durgapur or NITDGP), formerly called as Regional Engineering College, Durgapur (also known as REC Durgapur or RECDGP), is a public technical and research university in the city of Durgapur in West Bengal, India. Founded in 1960, it is one of India's oldest, most selective, and most prestigious technical universities. It is located in a campus of 187 acres (0.75 km²). National Institutional Ranking Framework ranked the university 9th among the NITs, 47th for engineering, and 96th overall in India in 2020.

10. ITINERARY

ICDMAI 2021
5th INTERNATIONAL CONFERENCE ON DATA MANAGEMENT, ANALYTICS AND INNOVATION
(15-17 January 2021)
Venue: Virtual Platform

Date/Time	Min(s)	Pre Conference Workshop / Tutorial Day 1	Venue: Zoom Meeting Room
SATURDAY 19-December 2020 09:00 - 10:00	60	Registration and Networking
10:00 - 12:00	120	**Dipanjan Sarkar,** Data Science Lead at Applied Materials	Topic: *Attention and Transformer*
12:00 - 14:00	120	Break
14:00 - 16:00	120	**Avni Gupta,** Senior Data Analyst - IoT, Netradyne	Topic: *Building Trust with AI*

Date/Time	Min(s)	Pre Conference Workshop / Tutorial Day 2		Venue: Zoom Meeting Room
FRIDAY 15-January 2021 09:00 - 10:00	60	Registration and Networking
10:00–10:45 / 10:45-11:30 / 11:30-12:15 / 12:15-13:00	180	**Kranti Athalye,** Sr. Manager University Relations, IBM	Topic: *Data Scientists - Champions of the Future* **Sonali Dey,** Business Operations Manager, IBM	Topic: *Data Science Tools and Technologies* **Amol Dhondse,** Senior Technical Staff Member, IBM	Topic: *Open Source and Data Science* **Vandana Verma Sehgal,** Security Solutions Architect, IBM	Topic: *Spice of Data Analytics in Cyber Security*
13:00 - 14:00	60	Break
14:00 - 16:00	120	**Usha Rengaraju,** India's first women Kaggle Grandmaster	Topic: *[MASTERCLASS] Deep Dive in to Computer Vision using Tensorflow 2.0*
16:00 - 16:15	15	Session Snapshot

ICDMAI 2021 - Day 1 | Venue: Zoom Meeting Room

	09:00 - 09:45	45	Registration & Networking
	09:45 - 11:00	75	**INAUGURATION FUNCTION - Live Session**
	11:00 - 11:30	30	Keynote Address 1: **Regiane Relva Romano** - *Special Adviser to the Ministry of Science, Technology and Innovation in Brazil* Topic: **National Brazilian IoT**
	11:30 - 12:00	30	Keynote Address 2 : **Sushmita Mitra** - *Indian Statistical Institute, Kolkata* Topic: **Intelligent Analysis of Brain Images**
	12:00 - 12:15	15	Session Snapshot	Networking	Break	ICDMAI Exhibitions

		Venue	Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5
SATURDAY 16-January-2021	12:15 - 13:15 (60)	**Session 1**	**Track 1** MACHINE LEARNING	**Track 2** AI & DEEP LEARNING	**Track 3** DATA STORAGE, MANAGEMENT AND INNOVATION	**Track 4** ENABLING TECHNOLOGIES AND APPLICATIONS	**Track 5** DATA SCIENCE TECHNIQUES FOR HANDLING EPIDEMIC, PANDEMIC

	13:15 - 14:15	60	Session Snapshot	Networking	Break	ICDMAI Exhibitions
	14:15 - 14:45	30	Keynote Address 1: **Aloknath De,** *Corporate VP of Samsung Electronics, S.Korea and CTO of Samsung R&D Institute India, Bangalore* Topic: **How does Big Data bring Intelligence to Internet-of-Things?**
	14:45 - 15:15	30	Keynote Address 2: **Yogesh Kulkarni,** *Principal Architect (CTO Office), Icertis-Pune* Topic: **Introduction to Building Conversational Agents (chatbots)**
	15:15 - 16:00	45	Panel Discussion: **Data Science to Combat Pandemic - Global Scenario** Panelist: Regiane Relva Romano, Sushmita Mitra, Aloknath De, Yogesh Kulkarni	Moderator - Col Inderjeet

		Venue	Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5
	16:00 - 17:15 (75)	**Session 2**	**Track 1** MACHINE LEARNING	**Track 2** AI & DEEP LEARNING	**Track 3** DATA STORAGE, MANAGEMENT AND INNOVATION	**Track 4** ENABLING TECHNOLOGIES AND APPLICATIONS	**Track 5** DATA SCIENCE TECHNIQUES FOR HANDLING EPIDEMIC, PANDEMIC

17:15 - 17:30	15	Session Snapshot	Networking	Break	ICDMAI Exhibitions

ICDMAI 2021 - Day 2 | Venue: Zoom Meeting Room

	09:00 - 09:40	40	Registration & Networking
	09:40 - 10:00	20	Plenary Session by Publication Partner: **Aninda Bose** - *Senior Publishing Editor, Springer India Pvt. Ltd.*
	10:00 - 10.30	30	Keynote Address 1: **Phillip G. Bradford** - *Director, Computer Science Program, University of Connecticut, Stamford* Topic: **A Survey of Naming Authorities and their Applications in Data Science**
	10:30 - 11:00	30	Keynote Address 2: **Sourabh Mukherjee,** *Vice President, Data and Artificial Intelligence Group, Accenture* Topic: **Humans + AI**

		Venue	Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5
SUNDAY 17-January-2021	11:00 - 12:00 (60)	**Session 3**	**Track 1** MACHINE LEARNING	**Track 2** AI & DEEP LEARNING	**Track 3** DATA STORAGE, MANAGEMENT AND INNOVATION	**Track 4** ENABLING TECHNOLOGIES AND APPLICATIONS	**Track 5** DATA SCIENCE TECHNIQUES FOR HANDLING EPIDEMIC, PANDEMIC

	12:00 - 12:10	10	Session Snapshot	Networking	Break	ICDMAI Exhibitions
	12:10 -12:40	30	Keynote Address 1: **Pallab Dasgupta,** *Dept. of Computer Science and Engineering, IIT Kharagpur* Topic: **Building Verifiable Artifacts in Machine Learning**
	12:40 -13:10	30	Keynote Address 2: **Sandeep Shukla,** *Indian Institute of Technology, Kanpur* Topic: **Confluence of Cyber Security and Machine Learning**
	13:10-13:55	45	Panel Discussion: **Data Science to Boost Education Sector - NEP Perspective** Panelist: Phillip G. Bradford, Sourabh Mukherjee, Pallab Dasgupta, Sandeep Shukla, Alfred M. Bruckstein	Moderator - Prof. Amlan Chakrabarti
	13:55 - 14:30	35	Session Snapshot	Networking	Break	ICDMAI Exhibitions

		Venue	Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5
	14:30 - 15:30 (60)	**Session 4**	**Track 1** MACHINE LEARNING	**Track 2** AI & DEEP LEARNING	**Track 3** DATA STORAGE, MANAGEMENT AND INNOVATION	**Track 4** ENABLING TECHNOLOGIES AND APPLICATIONS	**Track 5** DATA SCIENCE TECHNIQUES FOR HANDLING EPIDEMIC, PANDEMIC

Valedictory Session | Venue: Zoom Meeting Room

15:30 - 16:00	30	Plenary Session by Technical Partner: **Umesh Mishra,** *VP Region Lead North, Wizertech*
16:00 - 16:30	30	Keynote: **Alfred M. Bruckstein,** Technion - Israel Institute of Technology, Faculty of Computer Science, Israel Topic: **Holographic Data Representations fot Progressive Retrieval**
16:30 - 17:00	30	Guest of Honor: **Rajendra Pratap Gupta** Chair- Dynamic Coalition on Internet & Jobs, IGF, United Nations, President, Disease Management Association of India
17:00 - 17:30	30	**Awards Distribution Ceremony**

11. EXECUTIVE SUMMARY

Pre-Conference Workshops / Tutorials

The ICDMAI 2021 was the first of the ICDMAI Series to have two days of pre-conference workshops based on requests. The first set of sessions was on December 19, 2020, and the second set was scheduled for January 15, 2021. The pre-conference activities are the prelude to the conference and to create the environment of engaging the participants with cutting-edge Data Science, Data Management and Analytics techniques.

Day 01: 19 December 2020

As a part of the first set of sessions, there were enlightening talks from two experts - Mr. Dipanjan Sarkar and Ms. Avni Gupta.

Workshop 1: Deep Transfer Learning for Natural Language Processing (19 December-2020, 10:00 – 12:00)
Mr. Sarkar is a Data Science Lead at Applied Materials, leading advanced analytics efforts around computer vision, natural language processing, and deep learning. He gave a very detailed session on NLP with a specific focus on Attention and Transformer. Handling challenging real-world problems in Natural Language Processing (NLP) include tackling class imbalance, problem complexity and the lack of availability of enough labeled data for training. Thanks to the recent advancements in deep transfer learning in NLP, we have been able to make rapid strides in not only tackling these problems but also leverage these models for diverse downstream NLP tasks. The session covered a journey through the recent advancements in deep transfer learning for NLP by taking a look at various state-of-the-art models and methodologies including:
•Pre-trained embeddings for Deep Learning Models (FastText with CNNs \ Bi-directional LSTMs + Attention)
•Universal Embeddings (Sentence Encoders, NNLMs)
•Transformers
We also looked at the power of some of these models, especially transformers, to solve diverse problems like summarization, entity recognition, question-answering, sentiment analysis, etc.
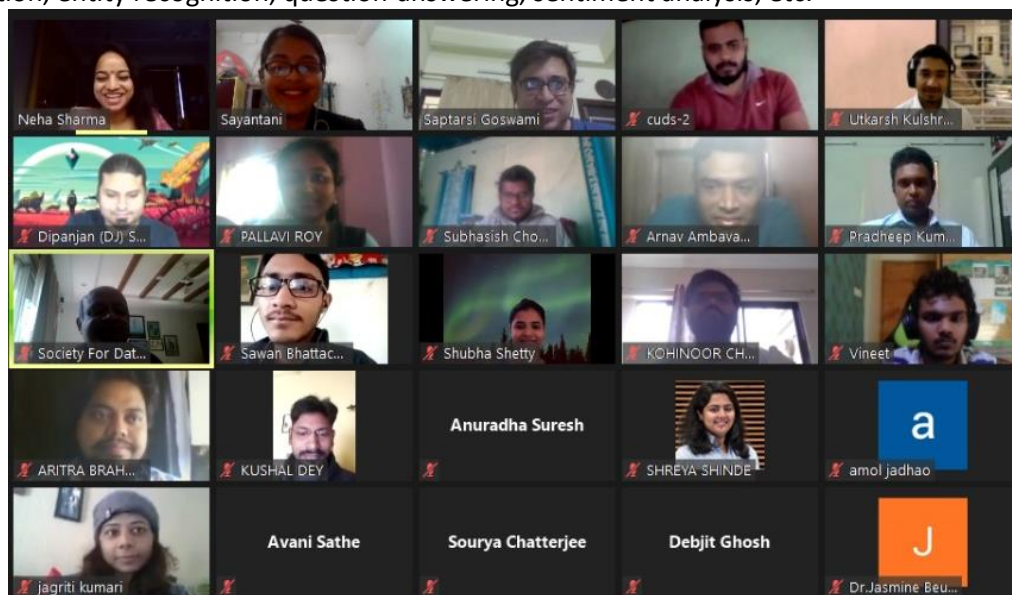
Mr. Dipanjan Sarkar, Lead at Applied Materials delivering the Tutorial Talk on 19 December 2020 at ICDMAI 2021

Workshop 2: Building Trust with AI (19 December-2020, 14:00 – 16:00)

Ms. Gupta is a passionate IT professional with over a decade in the industry having vast experience in building data-driven applications. Ms. Gupta captivated the participants with a very lucid but enriching hands-on session on Explainable AI. In this session Ms. Gupta presented an interesting topic, which is very relevant in the current scenario. Though we have been using AI systems for quite some time now, the basic trustworthiness of these systems have been under the scanner quite often in recent times. In this context, it is very important for the Data Science community to Build Trust with AI systems. The session helped us understand the concepts, methodologies, recent developments, tools and frameworks to make AI explainable, responsible and trustworthy of the outcomes it provides. The session had ample hands-on exercises that kept the participants engaged throughout.
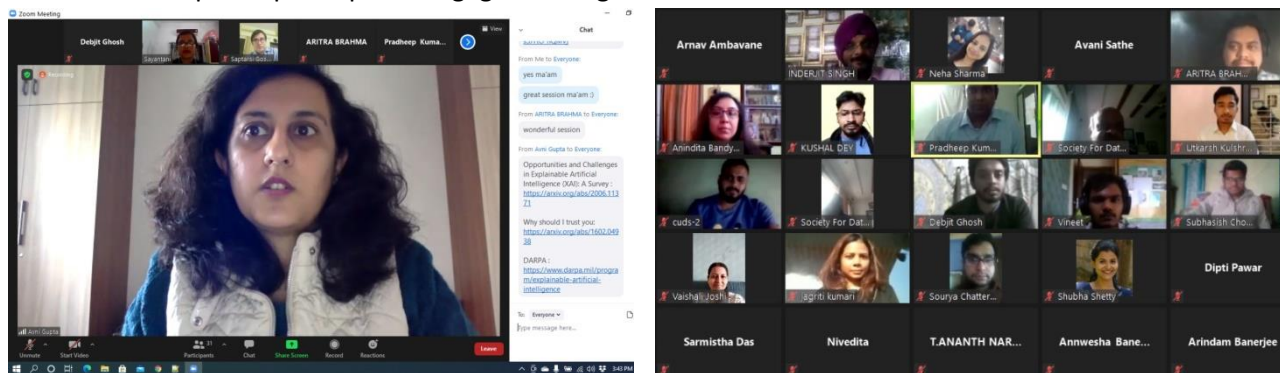
Anvi Gupta, Senior Data Analyst – IoT, Netradyne, delivering the Tutorial Talk on 19 December 2020 at ICDMAI 2021

Day 02: 15 January 2021

Second day of Pre-Conference workshops of ICDMAI 2021 commenced on 15th January 2021 with a warm welcome to the experts, delegates and participants from all across the globe, on a virtual platform. The core team did all the technical checks and the programme started at 10:00 a.m. as per the schedule. The event started with a short introductory networking session for the attendees.
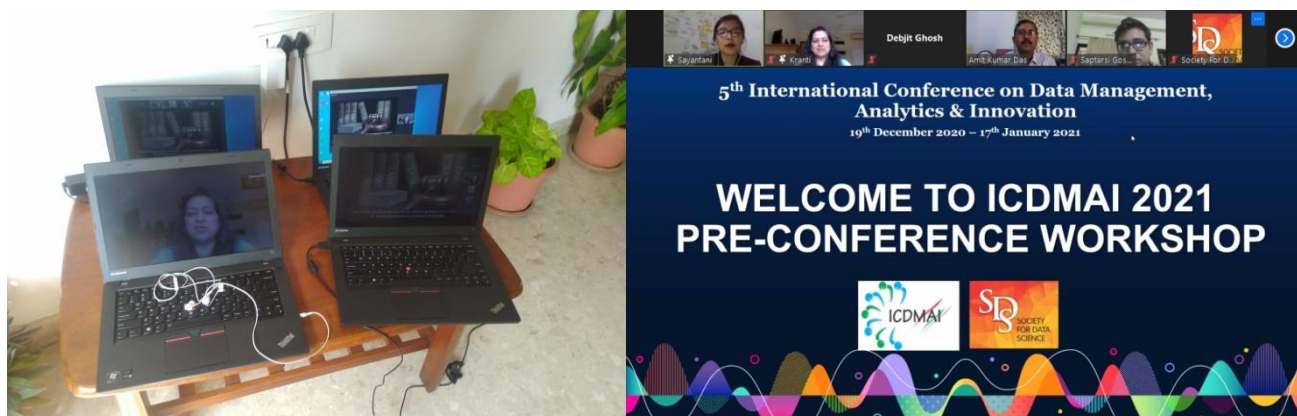
Pre-Conference-Day 2, 15 January 2021 at ICDMAI 2021

Tutorial Talk: Team IBM (15-January-2021, 10:00 – 12:00)

The set of tutorial sessions started with mind-sharing talks by 4 technical experts from IBM. These talks gave a good industry perspective of Data Science. The sessions were started by Ms. Kranti Athalye, Sr. Manager University Relations, IBM talking about "Data Scientists – Champions of the future" and followed up by her

able colleagues Ms. Sonali Dey, Mr. Amol Dhondse, and Ms. Vandana Verma Sehgal. Ms. Dey covered some interesting details about Data Science Tools and Technologies, while Mr. Dhondse presented a great anecdote on Open source platforms in the Data Science space. Ms. Sehgal touched upon a very critical aspect - the application of Data Analytics in Cyber Security.

Tutorial 1: Kranti Athalye, Sr. Manager University Relations, IBM,
Delivering the Tutorial Talk on "Data Scientists – Champions of the future" on 15 January 2021 at ICDMAI 2021

Tutorial 2: Sonali Dey, Business Operations Manager, IBM,
Delivering the Tutorial Talk on "Data Science Tools and Technologies" on 15 January 2021 at ICDMAI 2021

Tutorial 3: Amol Dhondse, Senior Technical Staff Member, IBM,
Delivering the Tutorial Talk on "Open source and Data Science" on 15 January 2021 at ICDMAI 2021

Tutorial 4: Vandana Verma Sehgal, Security Solutions Architect, IBM
Delivering the Tutorial Talk on "Spice of Data Analytics in Cyber Security" on 15 January 2021 at ICDMAI 2021
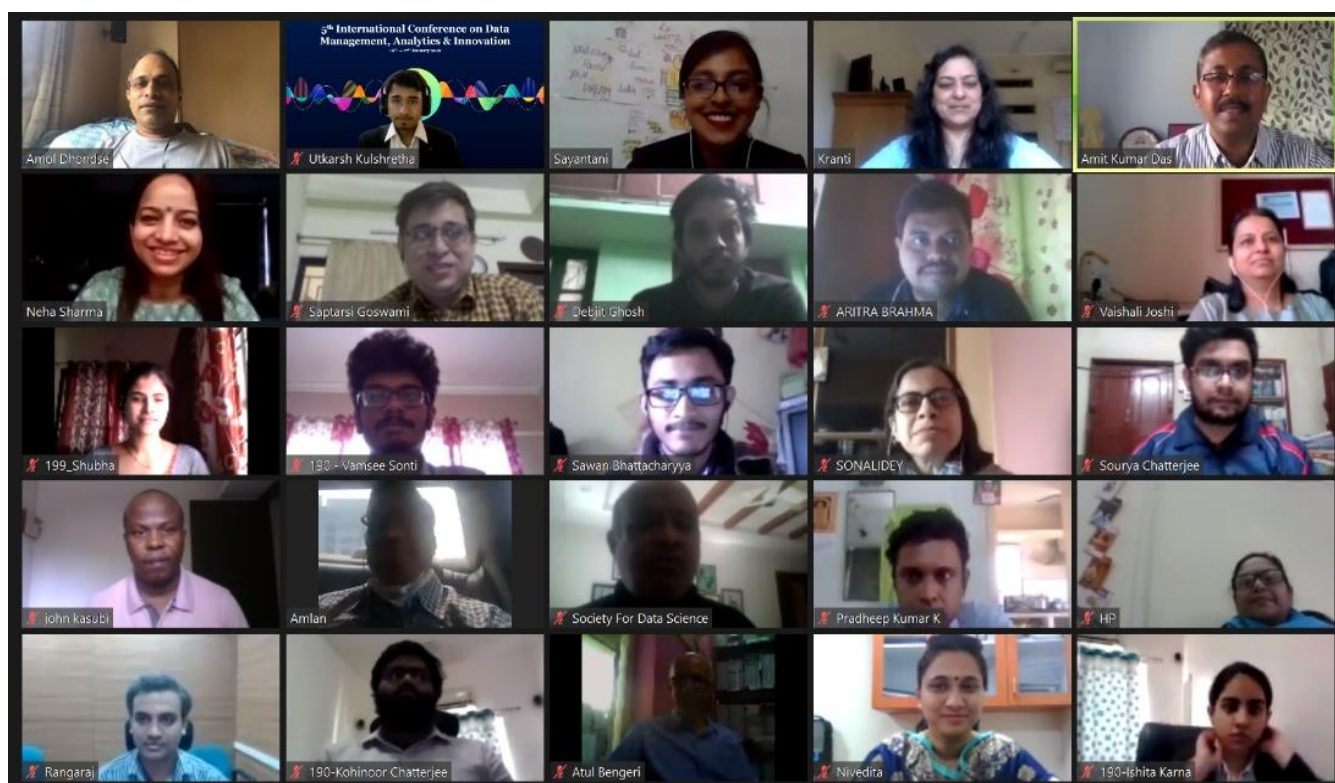
Participants of Morning Tutorial Session on 15 January 2021 at ICDMAI 2021

Workshop 3: "[MASTERCLASS] Deep Dive into Computer Vision using Tensorflow 2.0 (15 January 2021, 14:00 – 16:00)
In the second half, there was another deeply enriching session by Ms. Usha Rengaraju titled "[MASTERCLASS] Deep Dive into Computer Vision using Tensorflow 2.0". Ms. Rengaraju is a polymath and India's first woman Kaggle Grandmaster. She walked through the real-world challenges in computer vision solved using Deep Learning in TensorFlow 2.0.

**Usha Rengaraju, Polymath and India's first women Kaggle Grandmaster,
delivering the Tutorial Talk on 15 January 2021 at ICDMAI 2021**

Overall, all the sessions were extremely enlightening and captivated the participants completely.
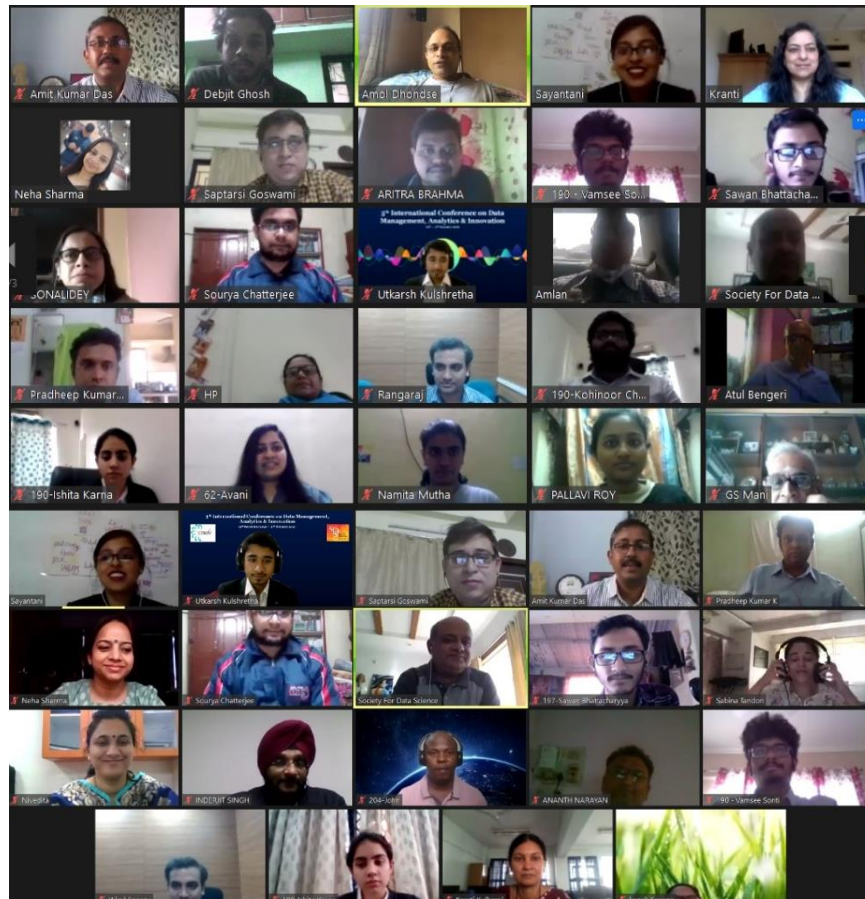
Random Clicks of Experts, Speakers, Participants, Volunteers and Executive Members of S4DS on 15 January at ICDMAI 2021

Day 03: 16 January 2021

(Keynote Address / Plenary Talk / Panel Discussion / Paper Presentations)

In this new normal, the preparation for the conference is all about the technical setup. The virtual meeting platform – Zoom was configured properly, couple of breakout rooms were created for delegates with similar interest to interact. Other preparations like presentations and backdrops were diligently completed for the Inauguration ceremony.
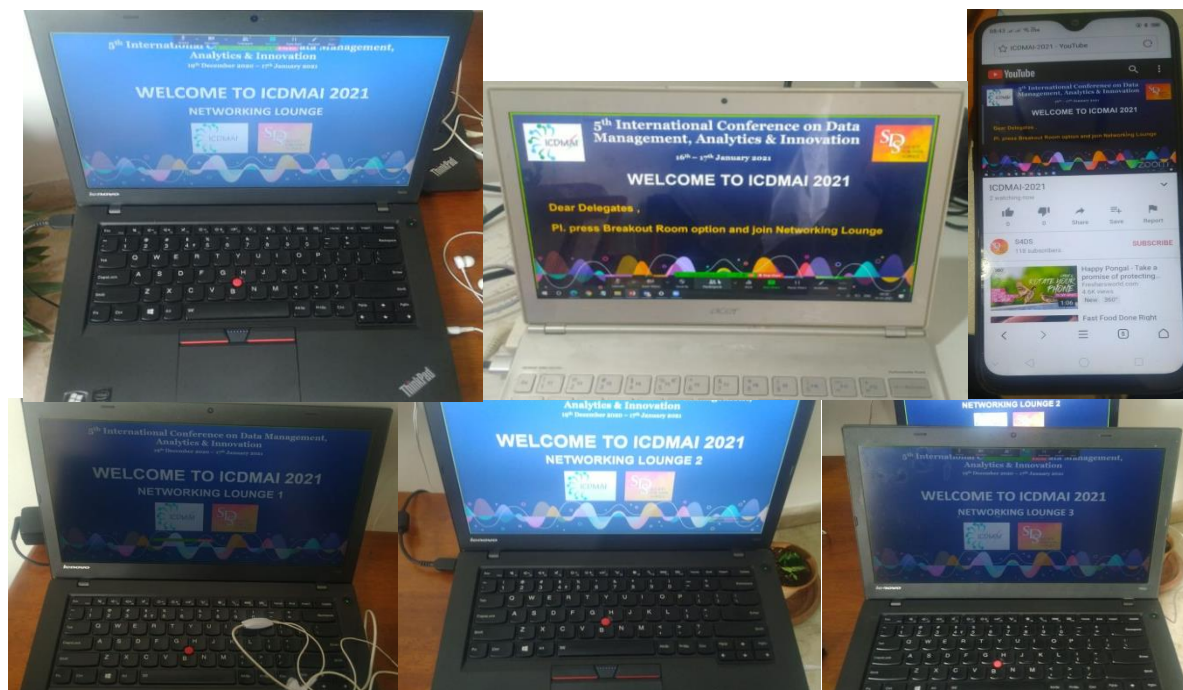
Completely Decked up Virtual Venue for the Inauguration Ceremony on 16th January 2021 at ICDMAI 2021
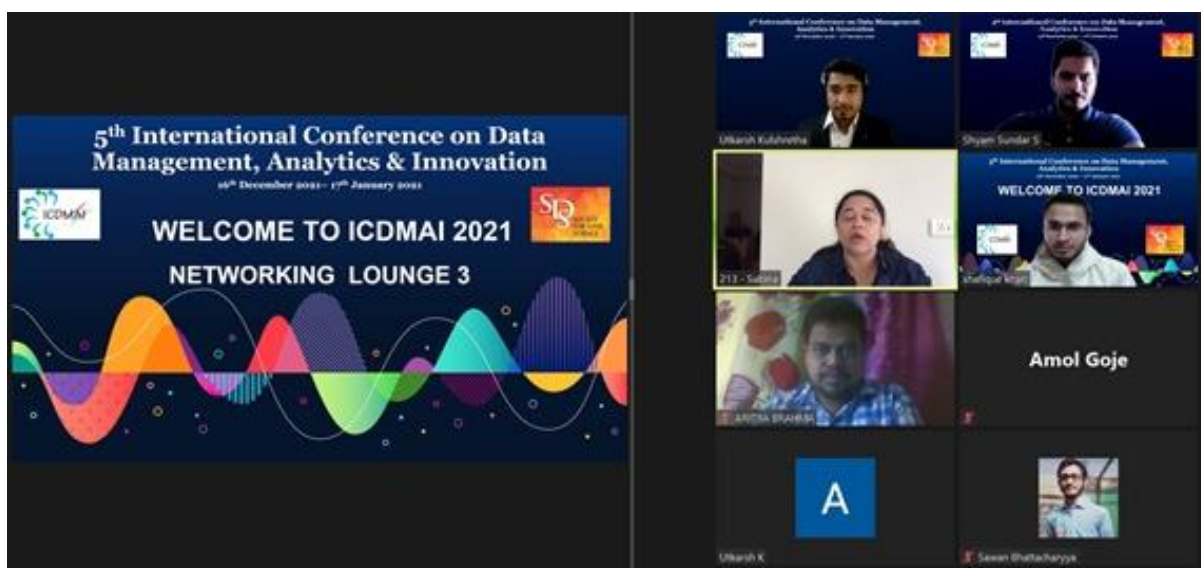
Delegates interacting with each other in the networking launge on 16ᵗʰ January 2021 at ICDMAI 2021

The inauguration programme of 5th ICDMAI was anchored by Ms. Anindita Banerjee, Data Scientist at KPMG, India. She briefed the delegates about the event and expressed her deep gratitude to the galaxy of professionals and experts for their gracious virtual presence from all across the globe.

The inauguration ceremony begun at 09:45 AM as per the schedule and the agenda for the programme was as given below:

TIME	Min(s)	DETAILS
09:00 am – 09:45 am	45	Registration and Networking
09:45 am – 09:50 am	05	Felicitation of Guests on the Dias- Col. Inderjit Barara and Dr. Saptarsi Goswami, Organising Chairs, ICDMAI 2021
09:50 am – 09:55 am	05	Welcome Address by Dr. Amol Goje, President, Society for Data Science
09:55 am – 10:00 am		Introduction of ICDMAI 2021 by Prof. Amlan Chakrabarti and Dr. Neha Sharma, Program
10:00 am – 10:05 am	05	Release of Abstract Book
10:05 am –10:10 am	05	Address by General Chair, Dr. P.K. Sinha
10:10 am – 10:15 am	05	Prof. Anupam Basu, Director, NIT, Durgapur
10:15 am –10:35 am	20	Ravinder Pal Singh, CEO of Merkadoraah and GoKadda
10:35 am –10:55 am	20	Dr. Ashutosh Sharma, Secretary at Department of Science and Technology, Government of
10:55 am – 11:00am	05	Vote of Thanks by Atul Bengiri, Executive Body Member, Society for Data Science

At the outset, Organizing Chairs of ICDMAI – Col Inderjit Berara and Dr Saptarsi Goswami presented their opening remarks and virtually felicitating the Chief Guest and the Guest of Honors. They emphasized that there is a dire need of academia, research community, corporate and professional society's like ours to come together and create a sustainable ecosystem that deals with current and futuristic need of the societal problem.

Opening Remarks by the Organizing Chairs -Col. Inderjit Barara and Dr. Saptarsi Goswami at ICDMAI 2021

Prof Amol Goje, President of Society for Data Science delivered the Presidential Welcome Address. Prof. Goje welcomed all the participants and conveyed his heartfelt thanks to Technical Partner IBM, Knowledge Partner Wizer, Academic partners IIT Guwahati & NIT Durgapur and Publication Partner Springer, for their rock solid support.

Then, the Programme Chairs, Prof Amlan Chakrabarti and Dr Neha Sharma introduced the Society for Data Science and shared the statistics of 5th ICDMAI with the guests, speakers and delegates. Prof. Amlan briefed the audience about formation, philosophy and activities of Society for Data Science. Dr. Neha shared that in last 5 years, ICDMAI could host 50 doyens of data science as key note speakers and another set of 50 technical experts contributed towards workshops and tutorials. Besides we could engage around 200 experts as reviewers and session chairs. Till date we have received around 2093 papers from 42 countries, out of which 361 papers have been presented and published, which is just (17%) of submitted paper. Now, Coming to the specifics of this year, we shall witness participants from 13 countries, 15 Industries, 121 International and Indian Universities. Total 63 papers are selected after rigorous review process for oral presentation. She promised to present the bouquet of interesting events like workshops, tutorials, keynote sessions, plenary talks, panel discussion and paper presentations by the experts, in this ICDMAI 2021.
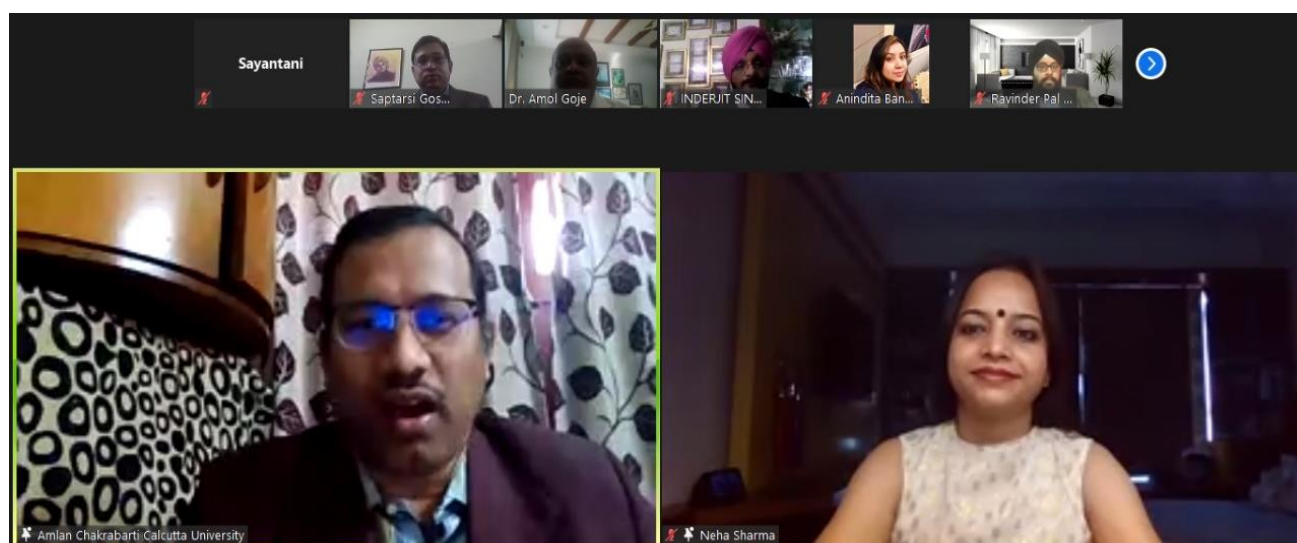
Programme Chairs, Prof Amlan Chakrabarti and Dr Neha Sharma introducing S4DS and ICDMAI on 16 January 2021 at ICDMAI 2021

Moving ahead, Ms. Anindita invited all the dignitaries on call for virtual release the abstract book for ICDMAI 2021.

Going forward, **Dr. P. K. Sinha**, Vice Chancellor & Director of International Institute of Information Technology (IIIT), Naya Raipur and General Chair - ICDMAI 2021, welcomed all the guests and delegates. Sir shared that ICDMAI made a humble beginning in 2016 in India has become truly international in just few years. The past versions of this conference saw eminent scientists, engineers and academicians delivering keynote speeches and invited talks, thus providing enriching experience for the participants. He said that he is sure that this year's version is going to be much more interesting. Further, sir said that with increasing use of data analysis for decision making in all spheres of our modern society, today Data Science has become main stream in all domains, be it science, engineering, finance, marketing or any other area. Most of today's business and research decisions as well as disruptive innovations are data-driven. In next few decades, several disruptive technologies based on data-driven innovations are going to impact our social ecosystem. Hence, the conference is very topical.

Dr. P.K. Sinha, General Chair, ICDMAI 2021 - Welcoming the Delegates and Explaining the Relevance of the Conference on 16th January 2021 at ICDMAI 2021

Proceeding further, Prof Amol Goje introduced the Guest of Honours **Prof Anupam Basu**, Director-NIT, Durgapur and **Mr Ravinder Pal Singh**, CEO of Merkadoraah and GoKadda. Prof. Basu spoke about data democratization and its impact on the human kind, as well as highlighted the importance of data security aspects to build trust. The emphasis on gaining knowledge across various domains is what the take away from his address was. On the other side, Mr. Singh, who is a stalwart from the industry, shared his experience on the technology advancements and various different applicable solutions across myriad of opportunities that the world throws at us. He walked us through the digital journey of the past and showed us the vision of the future on data monetization through 8C's of Data Cycle that provided an in-depth insight on data and digital disruption from the industry perspective and bridging the gap – Digitally! Listening to him is always a pleasure.

Guest of Honours - Prof Anupam Basu, Director-NIT, Durgapur and Mr Ravinder Pal Singh, CEO of Merkadoraah and GoKadda addressing the delegates on 16th January 2021 at ICDMAI 2021

Finally, it was the time to listen to the chief guest, **Prof Ashutosh Sharma**, Honorable Secretary of Department of Science & Technology, Govt. of India. Prof. Sharma's yeomen service to the nation and to the community of the science and technology fraternity is beyond praise. His directions in the application of Data Science in Research & Development, academia and industry have paved the way for our conference. Prof Sharma shared some of the recent developments across various industry, domains and departments that have been driven through his department. His initiatives and personal involvement in driving the scientific responsibility has shown us the path to success. Besides, the emphasis on Cyber-Physical era and the thrust from his side on proliferating the impact across all walks of life through data driven interventions is highly motivating. The talk was very informative and well appreciated by the participants.

Chief Guest - Prof Ashutosh Sharma, Honorable Secretary of Department of Science & Technology, Govt. of India addressing the delegates on 16th January 2021 at ICDMAI 2021

At the end, Mr. Atul Bengiri, Executive Committee Member, S4DS proposed the vote of thanks and thanked everybody who supported us to organize a conference of this magnitude. Atul appealed to all the guests, partners and delegates for their continued support in future to help us create a data science ecosystem.
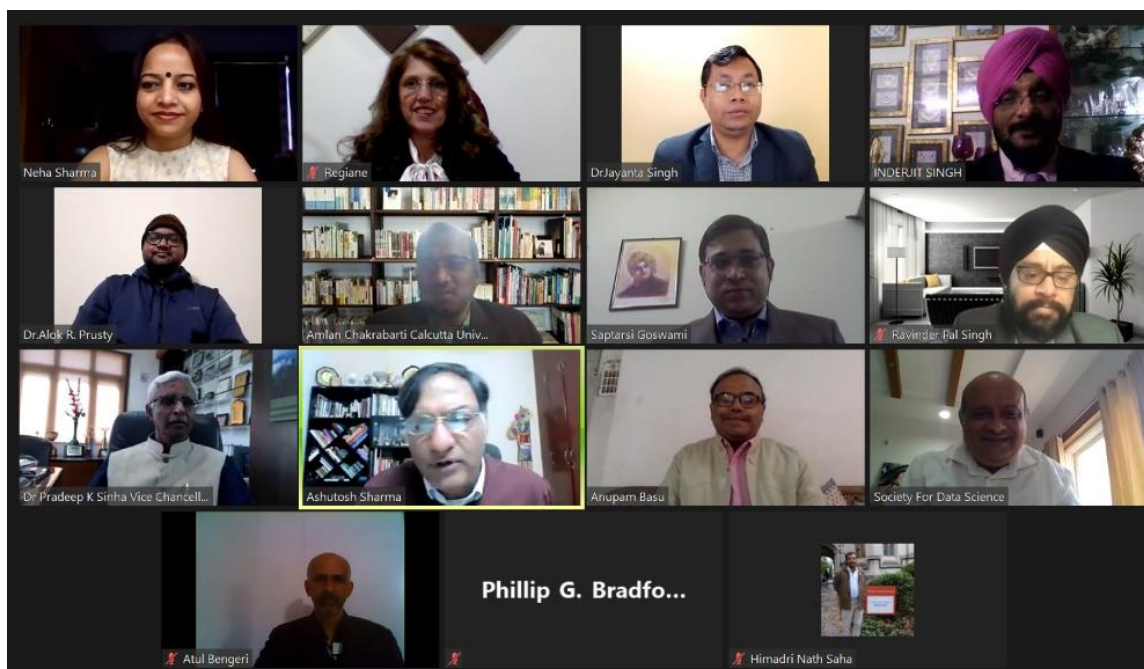

Vote of Thanks by Atul Bengiri, Executive Committee Member, S4DS on 16 January 2021, ICDMAI 2021

Inauguration ceremony was followed by the **First Session**, which had 02 Keynote Talks and 16 Paper Presentations. This session was chaired by **Dr. Neha Sharma**, Secretary, S4DS, who introduced both the Keynote Speakers - **Prof. Dr. Regiane Relva Romano**, Special Adviser to the Ministry of Science, Technology and Innovation, Brazil and **Prof. Sushmita Mitra**, Indian Statistical Institute, Kolkata

Keynote Address by Prof. Dr. Regiane Relva Romano, Special Adviser to the Ministry of Science, Technology and Innovation, Brazil on 16 January 2021, ICDMAI 2021

Regiane's keynote talk was on the topic "**National Brazilian IoT Plan and its Impact on Business**". She emphasized on the fact that innovation is the only way to excel in the business and IoT provides ample opportunity to innovate. She shared that after performing demand analysis, three key opportunities for developing IoT in Brazil has been identified- 1) Add the value to the export product and reduce "Brazil Cost" by adopting IoT solution, 2) Adopt IoT solutions to improve public services in health, security, mobility and natural resource management, 3) Create an IoT Development Strategy that addresses the challenges of changing labor relationship and professional profiles. She said that the pilot project will target few prioritized area like cities, health, rural, industry and integrate the intelligence across. She gave ample examples of possible solutions.
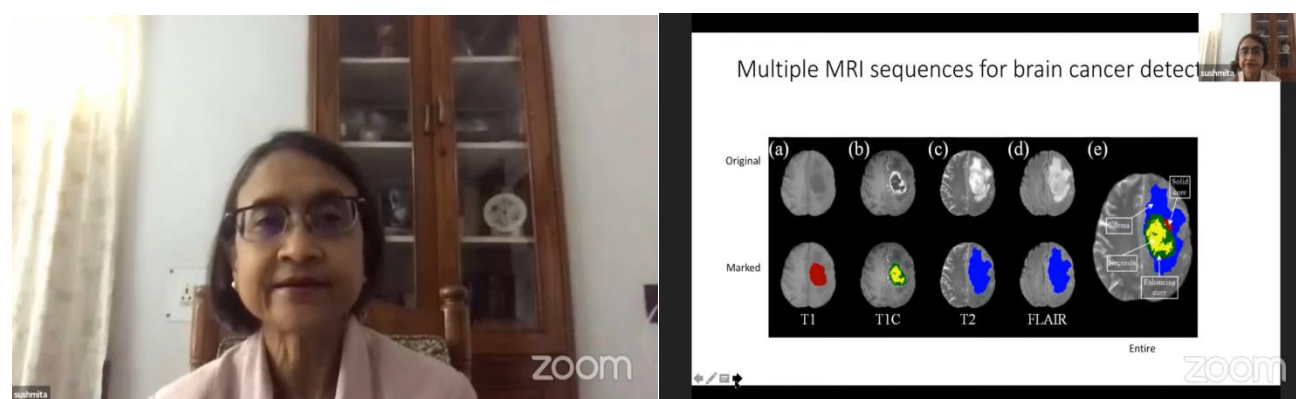
Keynote Address by Prof. Sushmita Mitra, Indian Statistical Institute, Kolkata on 16 January 2021, ICDMAI 2021

Sushmita Mitra's keynote talk was on the topic "**Intelligent analysis of brain images**". She explained about automated detection and segmentation of brain tumor from MRI. She talked about saliency for fast localization and detection of tumor and discussed GBM Saliency model they build. Prof. Mitra also talked

about single seed delineation of brain tumor using discrete curve evolution. Further, she touched upon various applications of deep learning for detection, classification, segmentation and survival prediction.

After keynote address, the delegates dispersed for the paper presentation in four different tracks of 60 mins each. Total 16 papers were presented in session 01.
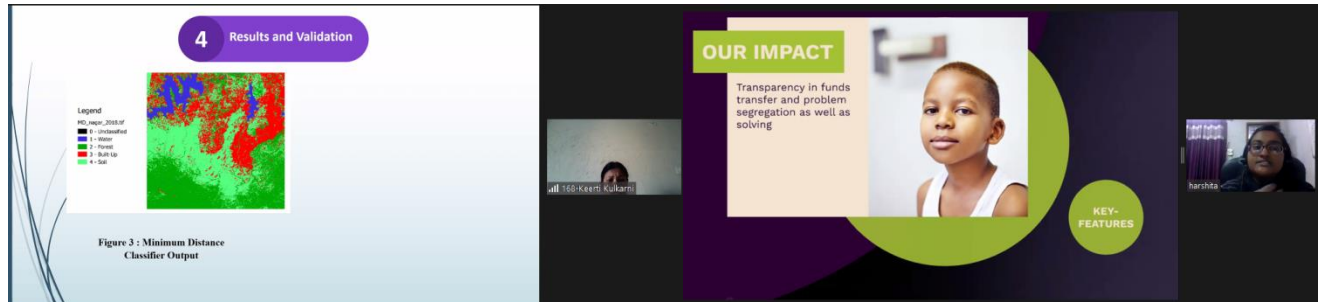
Glimpse of Paper Presentation by the delegates during Session 1 on 16 January 2021, ICDMAI 2021

Post lunch, we started the **Second Session**, which had 02 Keynote talks, 01 Panel Discussion and 13 Paper Presentations. This session was chaired by **Prof. Amlan Chakrabarti**, Vice President, S4DS, who introduced the Keynote Speakers - **Dr. Aloknath De**, Corporate Vice President of Samsung Electronics, S.Korea and Chief Technology Officer of Samsung R&D Institute India, Bangalore and **Yogesh Kulkarni**, Principal Architect (CTO Office), Icertis-Pune.
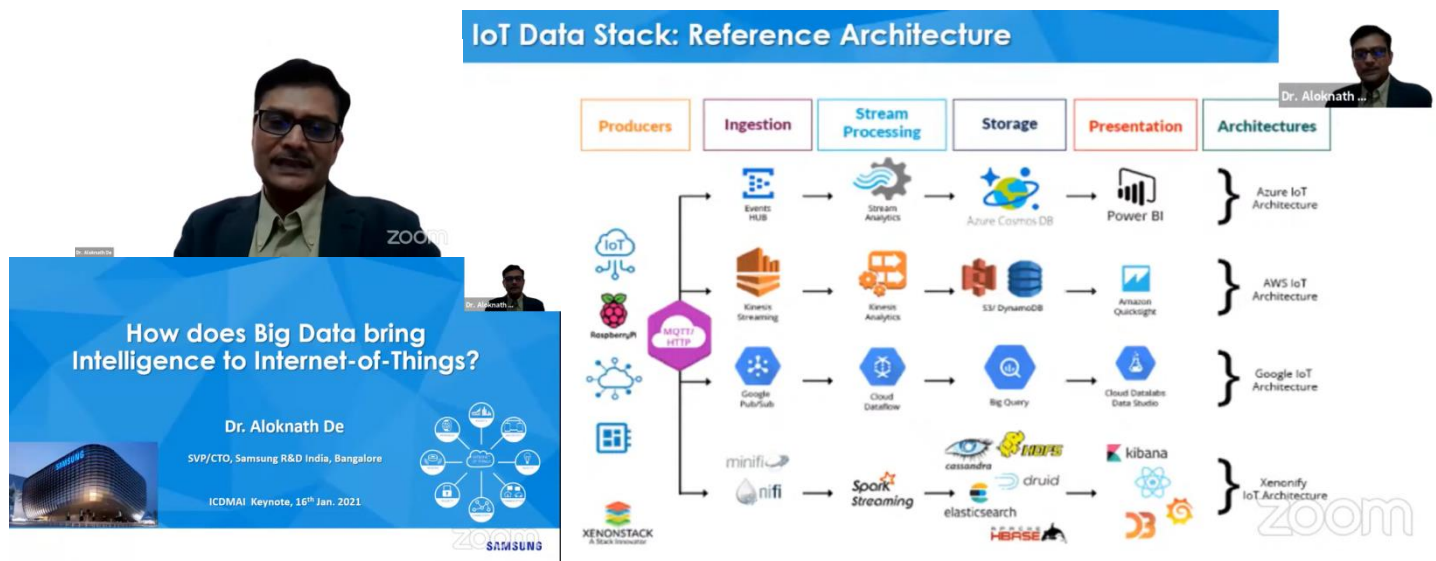
Keynote Address by Dr. Aloknath De, Corporate Vice President of Samsung Electronics, S.Korea and Chief Technology Officer of Samsung R&D Institute India, Bangalore on 16 January 2021, ICDMAI 2021

The keynote talk by Dr. Aloknath was on very interesting and relevant topic "**How does Big Data bring Intelligence to Internet-of-Things?** He enlightened the audience by providing a brief introduction into the vast world of Internet of Things and how the network of interconnected systems helps us in our day- to- day activities. Dr. De spoke about the importance of Smart things engagement to connect and share information. He also helped the audience refine their knowledge in the field of Cognitive IoT and the importance of

cognitive IoT in providing suggestions to the users for routine tasks. Dr Alok concluded his keynote address by explaining the interconnection between IoT devices and Big data as well as highlighted how the combined usage of these technologies can pave the way for meaningful analysis.
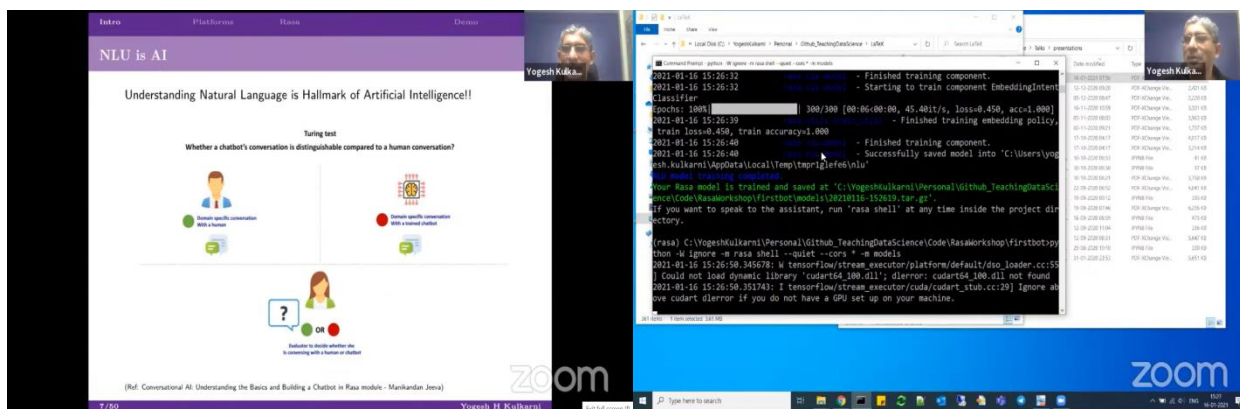
Keynote Address by Yogesh Kulkarni, Principal Architect (CTO Office), ICERTIS-Pune on 16 January 2021, ICDMAI 2021

Yogesh's topic for the keynote talk was "**Introduction to building conversational agents (chatbots)**". He spoke about the complexities involving building the basic anatomy of conversational agents or chatbots. Yogesh briefed about the foundational blocks of AI and the importance of Natural Language Understanding (NLU) in the task of building an efficient conversational agent. Apart from diving into the difficulty of creating such systems, he also gave an introduction to the types of conversational agents that include – text based and speech based conversational agents. Dr Yogesh concluded his enlightening address by explaining the skillset required by a developer and the steps to be followed in order to build an efficient chatbot.

After 02 power packed keynote talks, there was a Panel Discussion on "**Data Science to Combat Pandemic - Global Scenario**", moderated by Col Inderjit Barara, Executive Member, Society for Data Science and the panelist were Regiane Relva Romano, Sushmita Mitra, Aloknath De, Yogesh Kulkarni.


Glimpse of Panel Discussion on "Data Science to Combat Pandemic - Global Scenario" on 16 January 2021, ICDMAI 2021

This inquisitive and intellectual panel discussion moderated by Col Barara comprised of some of the great minds in the field of data science and analytics. The discussion provided a global perspective on how data science and analytics can be used as an effective tool to combat the ongoing COVID-19 pandemic. The discussion provided multi-faceted views regarding the use of different technologies in obtaining meaningful data in this time of uncertainty. The highlight of the discussion was the fact that the audience was provided perspectives from different fields including healthcare, NLP, AI and ML which helped refine their knowledge in fighting the pandemic, keeping in mind the global scenario.

After panel discussion, the delegates dispersed for the paper presentation in four different tracks of 60 mins each. Total 13 papers were presented in session 02.

Dr. Saptarsi and Dr. Neha guiding delegates to join appropriate tracks during Session 2 on 16 January 2021, ICDMAI 2021
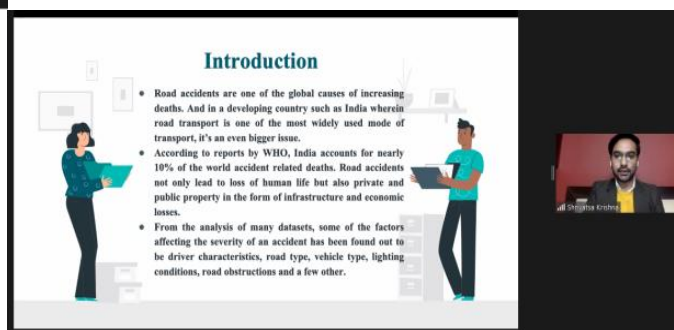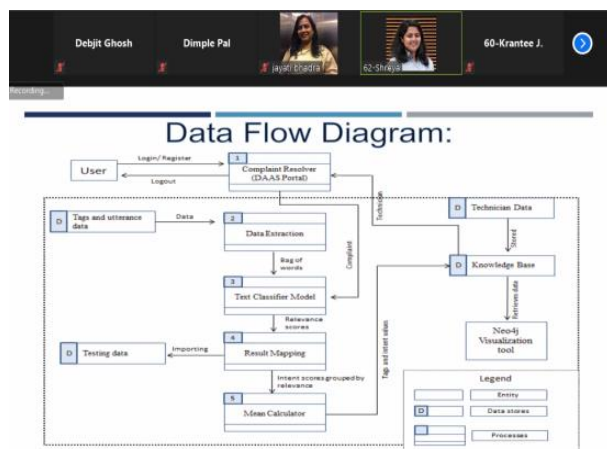
Glimpse of Paper Presentation by the delegates during Session 2 on 16 January 2021, ICDMAI 2021

Day 04: 17 January 2021
(Keynote Address / Plenary Talk / Panel Discussion / Paper Presentations / Award Function)

Day 04 began with the arrival of the guests, delegates and participants at the virtual venue since morning to attend the final day of the conference. The day started with a Plenary Session on very important topic for every researcher. The anchor, Anindita introduced Mr. Aninda Bose, Senior Editor – Hard Sciences, Springer India Pvt. Ltd, and invited him for his talk on "**How to Write and Publish a Book".**

Plenary Talk by Mr. Aninda Bose, Senior Editor – Hard Sciences, Springer India Pvt. Ltd on 17 January 2021, ICDMAI 2021

Mr Aninda Bose, was kind enough to give a brief introduction to aspiring publishers about how to write and publish a book. He spoke about the important dos and don'ts that a person should take into account while publishing. His session threw light on different aspects of writing including sources, methods, steps and the different approaches in successfully publishing a book. Mr Bose also spoke a bit about Springer and how it assists publishers with the help of cutting-edge technologies. The session certainly helped the authors and participants gain a keen insight into publishing, thereby assisting them to write and publish their research papers in the near future.

Post plenary talk, we started the **Third Session**, which had 02 Keynote talks, and 16 Paper Presentations. This session was chaired by **Col. Inderjit Barara**, Executive Committee Member, S4DS, who introduced both the Keynote Speakers - **Phillip G. Bradford** - Director, Computer Science Program, University of Connecticut, Stamford and **Sourabh Mukherjee,** Vice President, Data and Artificial Intelligence Group, Accenture.

Keynote by Phillip G. Bradford - Director, Computer Science Program, University of Connecticut, Stamford on 17 January 2021, ICDMAI 2021

Dr Phillip made his presence felt by delivering a meritorious keynote address on "**A Survey of Naming Authorities and their Applications in Data Science**". He spoke about identity management and the different economic driven authorities including UPSC, ISBN, ULAN, ISNI, and VIAF. He also gave a brief description about the role of descriptive statistics in Relational Databases. Dr. Bradford made sure that he left no stone unturned as he also touched upon various other topics including the role of graph databases in Data Science. He also threw light on graph embedding, binary trees, knowledge graph embedding and dimensional reduction. Dr Phil was also kind enough to answer a few questions posted by the participants on the major role played by graph databases in the context of Data Science in contrast with RDBMS and he also illustrated more about DAG (Directed Acyclic Graphs).

Keynote by Sourabh Mukherjee, Vice President, Data and Artificial Intelligence Group, Accenture on 17 January 2021, ICDMAI 2021

Sourabh Mukherjee was scheduled to give the second keynote address of the day, and did so in style by presenting a topic that he mentions as "close to his heart". Mr. Sourabh spoke briefly about the iconic duo of the near future "**Humans and AI**". The virtual audience was in for a treat as Mr. Mukherjee, with his eye-catching slides spoke about the recent "takelash" (Backlash against technology) and the dilemma of post digital generation. He also explained the need for adopting AI and training the workforce to be able to handle the incorporated and relatively newer AI technologies. Mr. Sourabh also explained the vital differences between Extended Reality (XR), Augmented Reality (AR) and Virtual Reality (VR) apart from giving a keen insight into explainable AI and its applications. The session turned more interactive and insightful when the participants posed their questions to Mr. Mukherjee who answered every question with the same enthusiasm and passion.
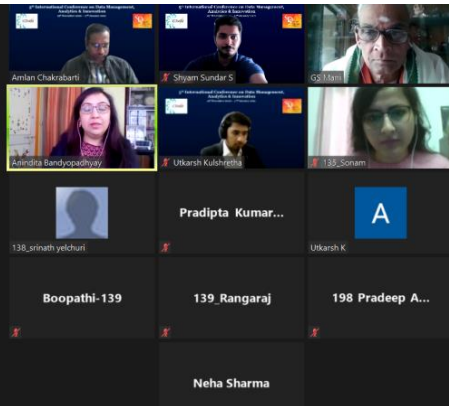
Followed by two diverse keynote talks, the delegates dispersed for the paper presentation in five different tracks of 60 mins each. Total 20 papers were presented in session 03.


Glimpse of Paper Presentation by the delegates during Session 3 on 17 January 2021, ICDMAI 2021

Moving forward, we started the **Fourth Session**, which had 02 Keynote talks, 01 Panel Discussion and 14 Paper Presentations. This session was chaired by **Atul Bengiri**, Executive Committee Member, S4DS, who introduced both the Keynote Speakers - **Pallab Dasgupta**, Dept. of Computer Science and Engineering, IIT Kharagpur and **Sandeep Shukla**, Indian Institute of Technology, Kanpur.
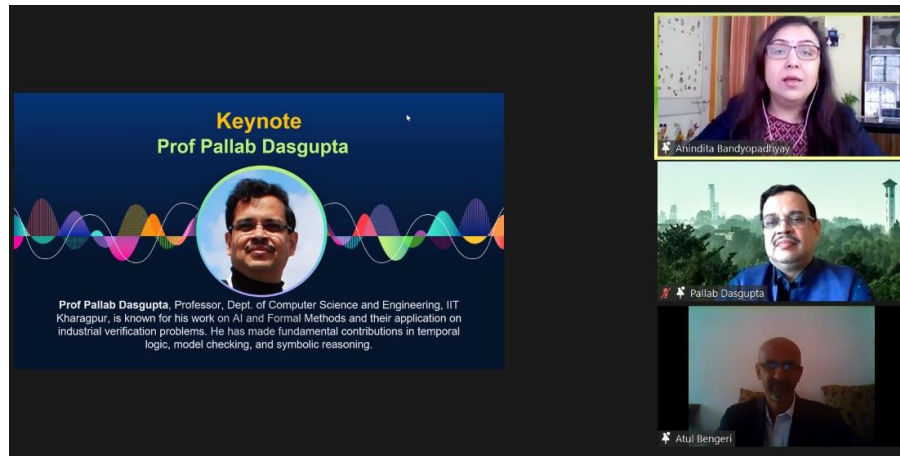
Keynote by Pallab Dasgupta, Dept. of Computer Science and Engineering, IIT Kharagpur on 17 January 2021, ICDMAI 2021

Prof Pallabh Dasgupta gave the third keynote address on "**Building verifiable artifacts in Machine Learning**" and explained the diverse applications of Artificial Intelligence and Machine Learning focusing mainly on autonomous driving cars. He explained the major challenges in terms of safety and security of such models in autonomous driving. The virtual audience was also given a technical explanation on the basics of Machine Learning models after which they were given an elaborate explanation on the solutions to increase safety and security mechanisms in AI and ML that included learning interpretable models (decision trees and assertions), verifying black box models (Adversarial testing and formal verification), Safety Constrained learning etc. Finally, Prof Dasgupta gave a brief about how formal methods are relevant for reinforcement learning. The takeaway from the keynote was the fact that Prof Pallabh gave a sneak peek into the future with his in-depth explanations of the characteristics of accuracy and safety of prediction.
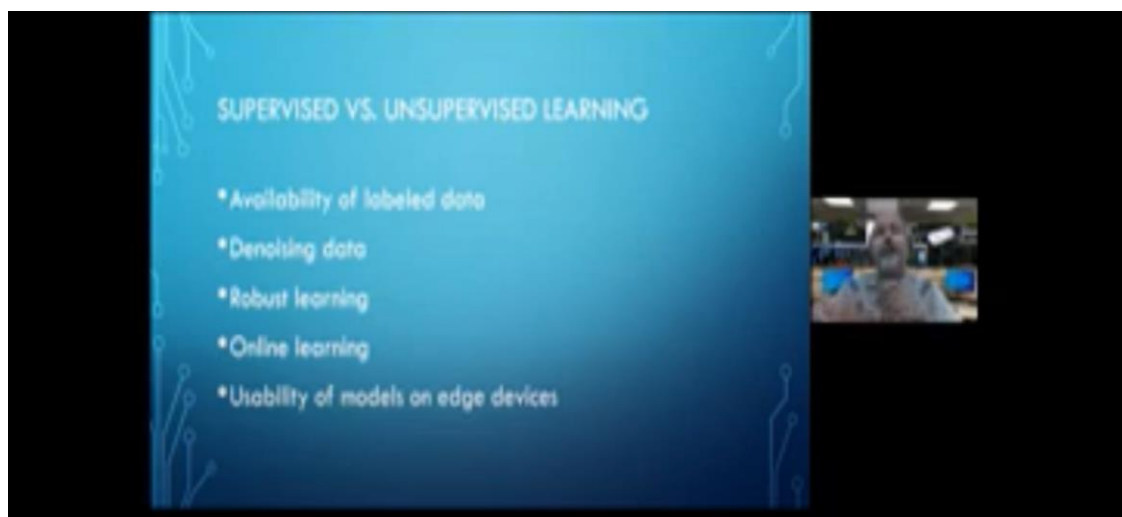
Keynote by Sandeep Shukla, Indian Institute of Technology, Kanpur on 17 January 2021, ICDMAI 2021

Prof Sandep Shukla was scheduled to give the 4th keynote address of the day on the diverse topic of "**Confluence of Cyber Security and Machine Learning**". Prof. Shukla started by addressing the two distinct issues that include Machine Learning for Cyber Security and Cyber Security for Machine Learning. In the former, he spoke about malware analysis, intrusion detection, digital forensics, fraud detection etc. However, in the latter Prof. Sandeep explained about how Machine Learning is itself under attack. Prof Shukla also made it a point to brief the virtual audience with the major differences between supervised and unsupervised Machine learning models. In conclusion, he stressed on the need for robust Machine Learning Models in the context of Cyber security.

After the keynote talks, there was a **Panel Discussion** on "**Data Science to Boost Education Sector - NEP Perspective**", moderated by Prof. Amlan Chakrabarti, Vice President, Society for Data Science and the panelist Phillip G. Bradford, Sourabh Mukherjee, Pallab Dasgupta, Sandeep Shukla, Alfred M. Bruckstein.


Glimpse of Panel Discussion on "Data Science to boost education sector – NEP Perspective" on 17 January 2021, ICDMAI 2021

The panel discussion on "**Data Science to boost education sector – NEP Perspective**" was one of the top highlights of the conference considering the nature of the topic and its relevance in today's world. The panel was chaired by Dr Amlan Chakrabarti and consisted of experienced and distinguished panel members in Mr Pallab Dasgupta, Dr Phillip Bradford, Mr. Juergen Seitz and Mr. Sourabh Mukherjee. Each of the panel members gave a unique view point with respect to the role of Artificial Intelligence, Machine Learning and Natural Language Processing particularly in digital evaluation in the education sector. They also touched upon the role of delivery of education with digitalization and the difference in perspectives of the universities and people. Last but not the least there was also a discussion about data storage and the importance of the security mechanisms in data storage.

Followed by two diverse keynote talks, the delegates dispersed for the paper presentation in five different tracks of 60 mins each. Total 14 papers were presented in session 04.
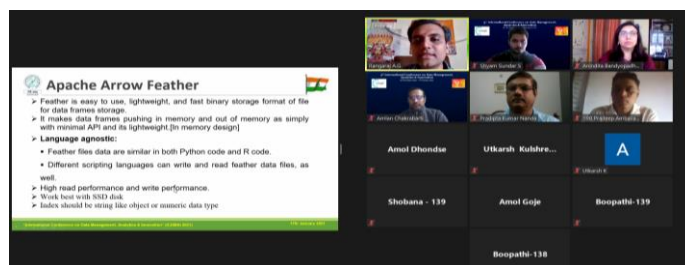
Finally, it was a time for Valedictory Session which was chaired by Dr. Saptarsi Goswami. This final session had one plenary session, one valedictory keynote and award announcement. Dr. Goswami introduced both the eminent speakers - **Umesh Mishra**, VP Region Lead North, Wizertech and **Alfred M. Bruckstein**, Technion - Israel Institute of Technology, Faculty of Computer Science, Israel.
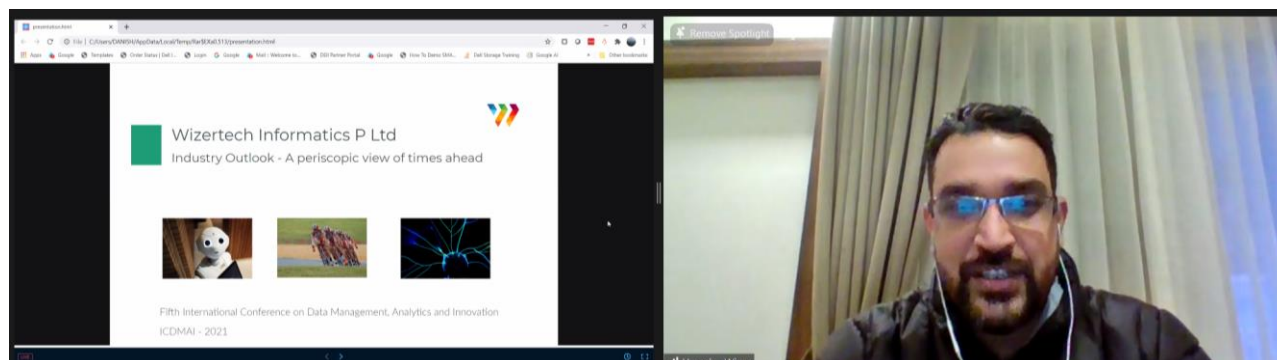
Plenary Talk Umesh Mishra, VP Region Lead North, Wizertech on 17 January 2021, ICDMAI 2021

The plenary session post lunch was scheduled to be given by our technical partner WizerTech which is an end to end IT & ITES services and solution provider with 20+ years of enriching experience across spectrum. The session was taken by Mr. Umesh Mishra and he gave a brief about Wizertech's services for businesses in the context of business intelligence and analytics. He also gave an industry outlook as to how Wizertech Informatics helps a company to plan for the future.

Keynote by Alfred M. Bruckstein, Technion - Israel Institute of Technology, Faculty of Computer Science on 17 January 2021, ICDMAI 2021

Prof Alfred M Bruckstein gave the final keynote address of the conference with extraordinary enthusiasm and passion for the subject. Alfred made sure that he showed the virtual audience a hologram before explaining in detail about "**Holographic Data Representation for Progressive Retrieval**". He spoke about how a hologram can be viewed and how it provides full reconstructions of the entire scene, however blurred. He also focused on how images, videos and graphics can be encoded into holographic bit streams

with its existing properties. Alfred also briefed about optical holography and its applications in art, microscopy, sensors, security and data storage. Finally, he also gave a brief insight into the differences between holographic and hierarchical data representations. The experience and passion portrayed by Prof Alfred inspired the audience to dwell deep into this topic.

To mark 5th year of ICDMAI, the executive committee decided to felicitate the champion of Data Science field with the award of **S4DS FELLOW**. The details are as follows:

| AWARD	NAME
Academic S4DS Fellow Award (International)	Prof. Alfred M Bruckstein, Technion - Israel Institute of Technology, Israel
Academic S4DS Fellow Award (India)	Prof. Anupam Basu, NIT-Durgapur
Industry S4DS Fellow Award	Kaushik Dey, Ericsson
S4DS Data Scientist (Industry) Award	Dipanjan Sarkar, Data Science Lead at Applied Materials Usha Rengaraju, polymath and India's first women Kaggle Grandmaster
S4DS Data Scientist (Academia) Award	Jyoti Prakash Singh, NIT-Patna

Now, it was the time for much awaited event in every researchers life ie. **Award distribution**, as it gives the returns to the efforts put in by them throughout their research endeavor. It gives a sense of achievement and a sense of responsibility towards fulfilling further commitments towards research. Therefore, the Best Paper Awards were declared for each track and the winners were bestowed with a Trophy and Certificate. The details of the same are as follows:

TRACKS	NAME
1. Machine Learning	1.Keerti Kulkarni, 2.Dev Kumar, 3.Sanjeev Manchanda
2. AI and Deep Learning	1. Narinder Singh Punn, 2. K.V.N Rajesh, 3. Shaily Bhatt
3. Data Storage, Management and Innovation	1. A.G Rangaraj, 2. Y. Srinath
4. Enabling Technologies and Applications	1. Pradheep Kumar, 2. Monisha Jhamb, 3. K.V Metre and Shreya Joshi
5. Data Science Techniques for Handling Epidemic, Pandemic	1. Arpan Sardar, 2. Vamsee, Ishita, Kohioor, 3. Vineet Tambe and Nilanjan Sinhababu
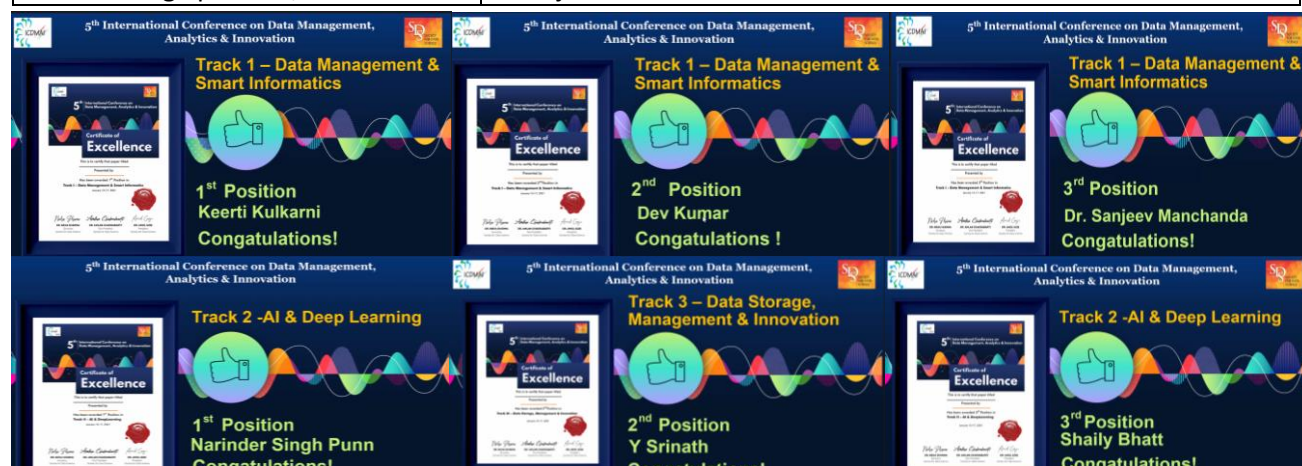
Best Paper Awards Distribution for Track I & II during Valedictory Function on 17th January 2021 at ICDMAI 2021
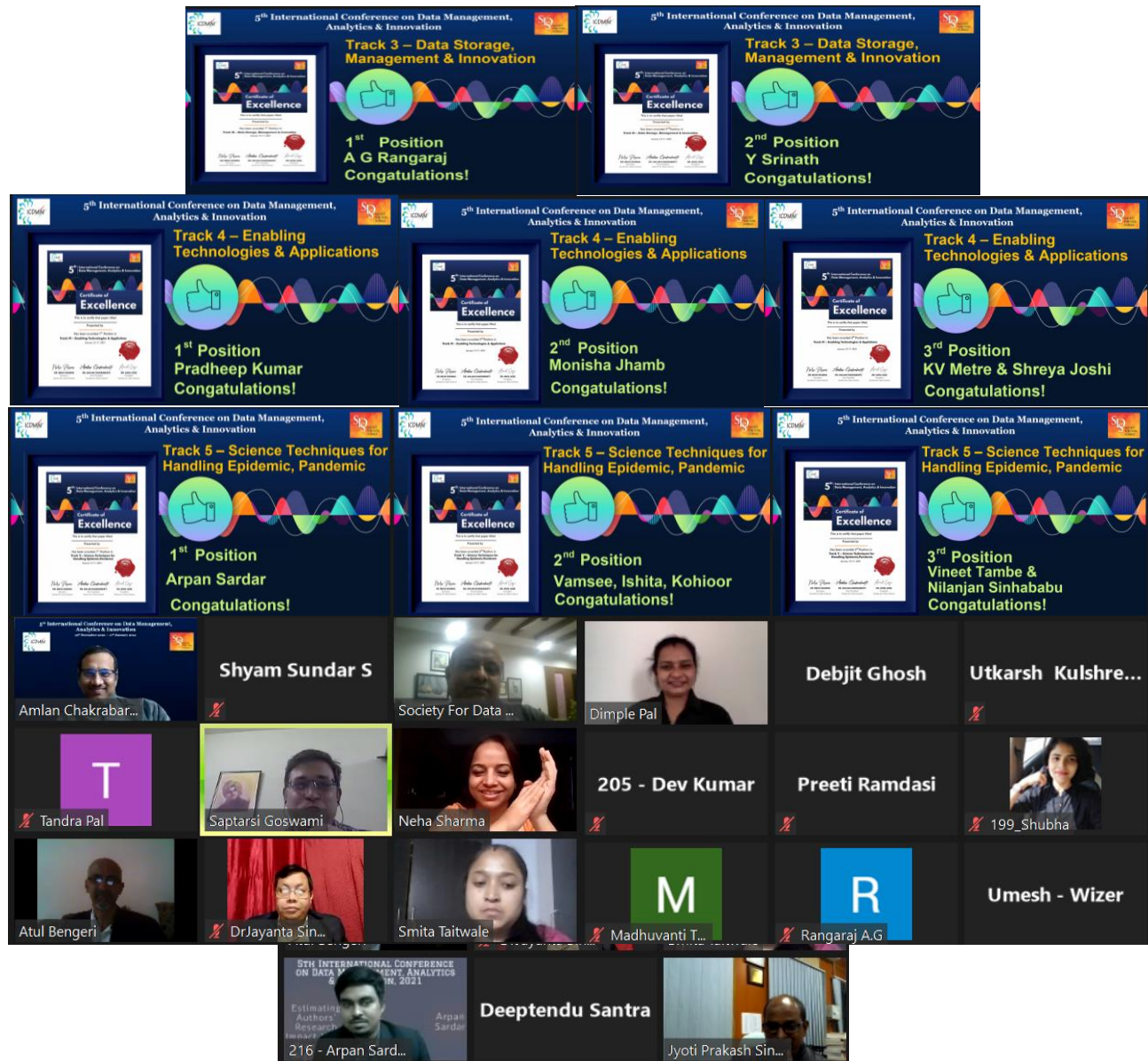
Best Paper Awards Distribution for Track III, IV & V during Valedictory Function on 17th January 2021 at ICDMAI 2021

Finally, Dr. Amol Goje, President, Society for Data Science, delivered a **Vote of Thanks.** Sir payed gratitude to all the session chairs for their un-tiring efforts in evaluating the papers and being unbiased in the selection of papers for awards. He also appreciated authors for their quality submissions and encouraged them to participate in ICDMAI 2022 at Guwahati. Sir, also thanked all the partners and guests for their gracious presence and profuse support. He further shared the plan for next year, the offerings of S4DS and the vision for data science community at national and global level.

Aristotle quoted that "**Excellence is never an accident. It is always the result of high intention, sincere effort, and intelligent execution; it represents the wise choice of many alternatives - choice, not chance,**

determines your destiny". As per the Technical Programme Committee of ICDMAI 2021, the efforts, innovation, intelligent execution presented by all the delegates were exemplary and an achievement in itself. At the end, Delegates were informed that their certificate would be couriered to their address and requested them to submit their feedback. ICDMAI 2021 concluded with a promise to raise the standards further to create a new benchmark and officially bid adieu to everyone.
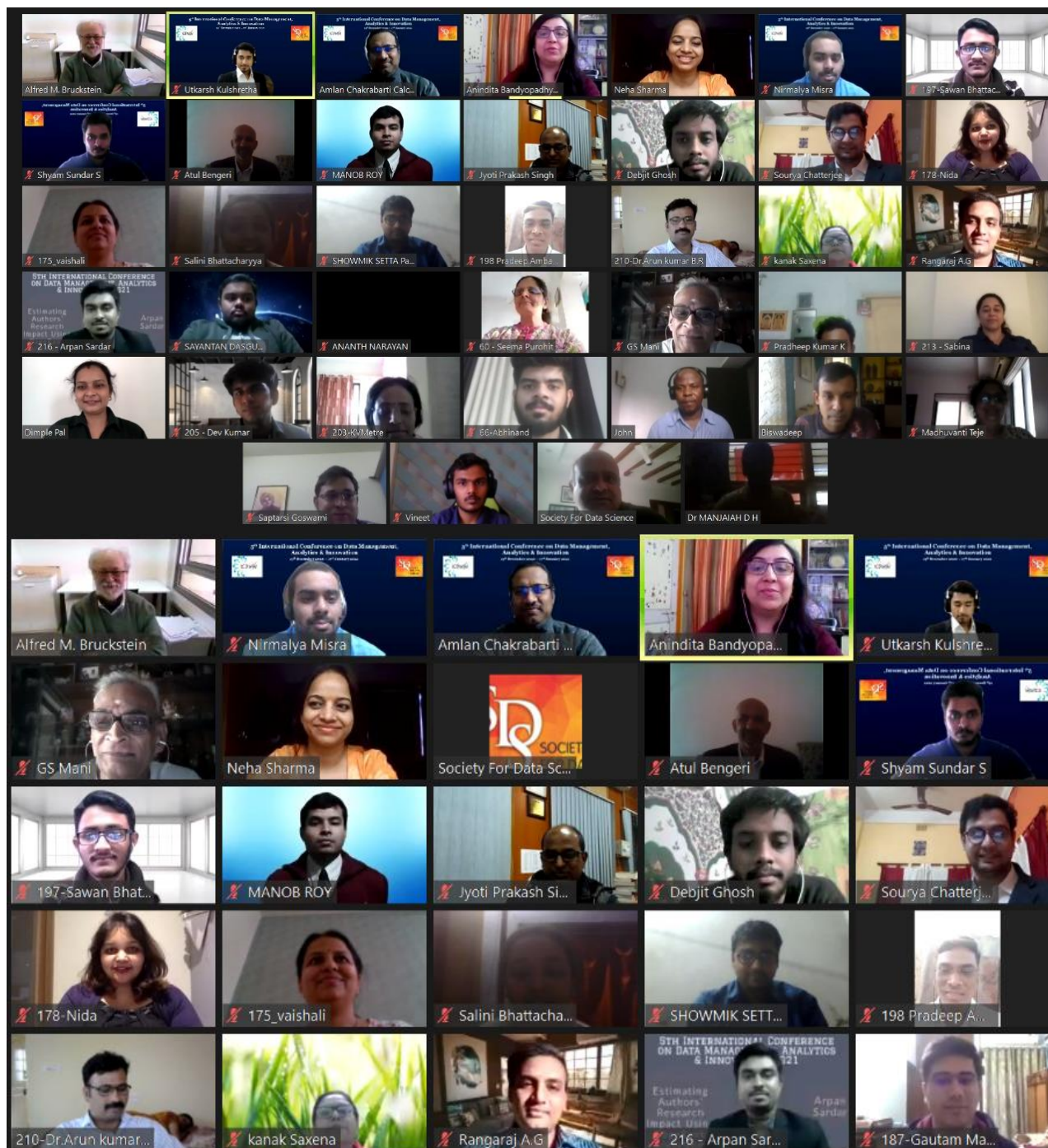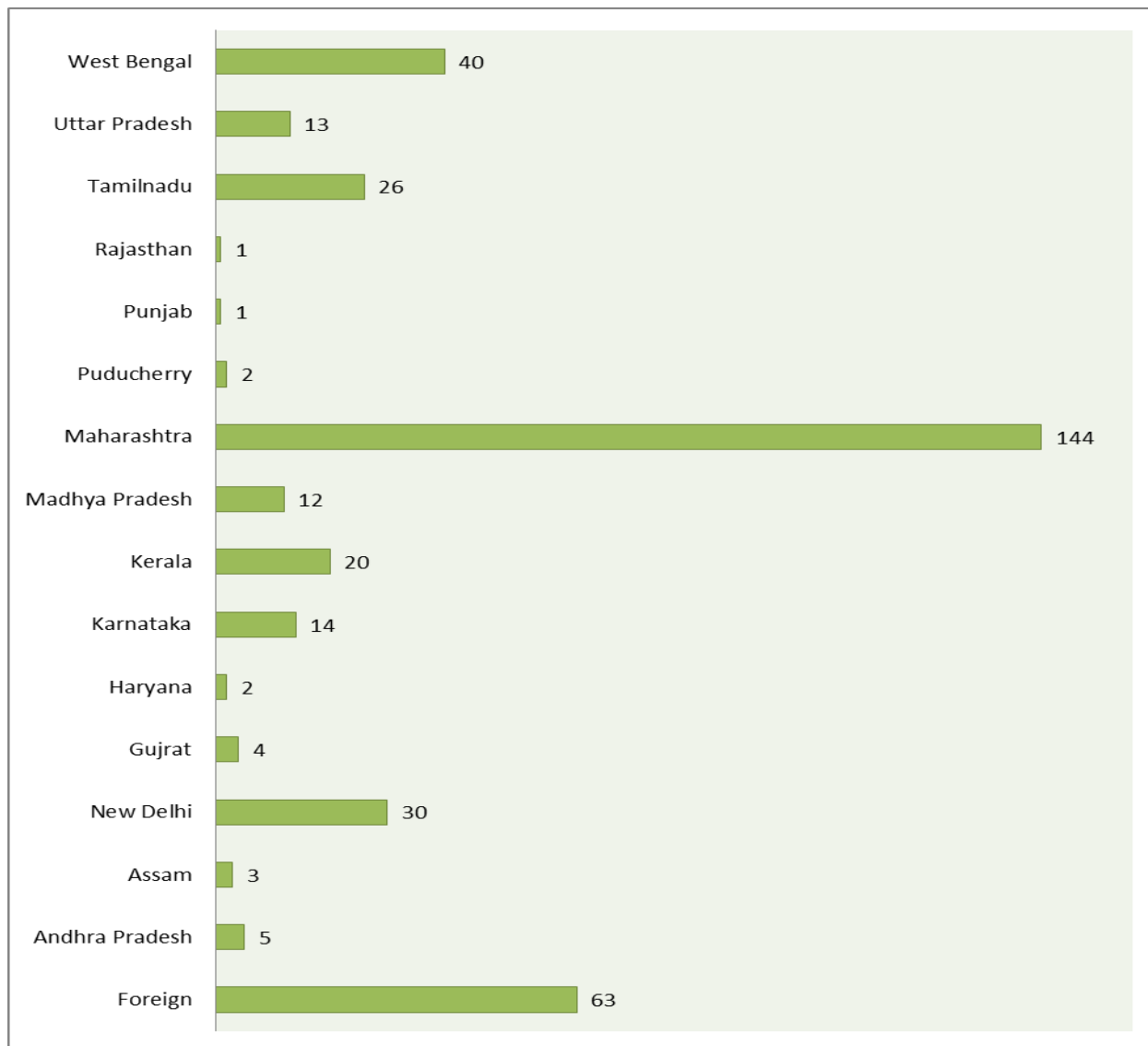

Glimpses of Guests, Delegates and Participants on 17 January 2021 at ICDMAI 2021

12. ICDMAI-2021 PAPER SUBMISSION METRICS

12-A. Response to the Conference

Soon after the **Call for Paper** was announced and information was uploaded on the conference website on 15th March 2020, the conference started receiving overwhelming response from all the states of our country as well as from international community. This response is evident from the fact that total **223 research papers** were submitted to the conference. The graph below shows the statistics of number of participants from abroad, industry, premier institutions of India (NITs, IITs, IIMs and IIITs) and Indian states:

State	Count
West Bengal	40
Uttar Pradesh	13
Tamilnadu	26
Rajasthan	1
Punjab	1
Puducherry	2
Maharashtra	144
Madhya Pradesh	12
Kerala	20
Karnataka	14
Haryana	2
Gujrat	4
New Delhi	30
Assam	3
Andhra Pradesh	5
Foreign	63

12-B. Review Process

1) Solicited papers in five tracks through Call for paper
2) Conducted plagiarism check for the submitted paper in respective track using Turnitin Software.

3) Depending on the result, took appropriate action from the following options: -
   a. If Plagiarism > 50%, then Rejected the submission and informed the author
   b. If Plagiarism < 50 % and > 20%, then asked the author to improve the paper further
   c. If Plagiarism < 20 %, then informed the author regarding provisional acceptance for review
4) Assign each paper to the three appropriate Reviewers for Double Blind-review.
5) Pursue with the reviewers and encourage them to submit timely review report.
6) Shared the reviews with authors and ensured that the suggestions have been incorporated fully.

12-C. ICDMAI 2021 Metrics

223 Research papers have been submitted for ICDMAI 2021 and out of them only 62 papers ie. 27% papers are selected for oral presentation. The details of the paper selection and registration statistics are given below:-

Particulars	Information
Total paper received	223
Paper selected after double blind review	**62 (27%)**
Number of participants (Listener + Session Chairs + Speakers + Volunteers)	62
Total Delegates registered for ICDMAI 2021	**70**
Total papers presented at the conference	62
Absenteeism	00
Total attendance at ICDMAI 2021	136
Number of Indian States from where papers were received	15

Participation of Industries in ICDMAI 2021

Optimum Data Analytics
Acceltree Software Pvt. Ltd., Pune, India.
Analytics and Insights, Tata Consultancy Services
Ericsson
JP Morgan Chase
PAIRS Foundation
Innoventic Research and Business (p) ltd.
Hubert Curien Laboratory
Nife Labs Pte Ltd., Singapore
Software Technology Parks
TCS Research & Innovation Lab.
Wipro Technology Ltd, Kolkata
CDAC
Rakuten

Participation of Countries in ICDMAI 2021

India
United Kingdom
Malaysia
Germany
France
Ethiopia
Singapore
United States
Tanzania
Romania
Finland
Israel
Brazil

Participation of International Universities in ICDMAI 2021

DHBW Heidenheim, Germany
Hubert Curien Laboratory, France

Department of Information Technology, Debretabor University, Debretabor, Ethiopia
Nife Labs Pte Ltd., Singapore
Westfield High School, United States
Staffordshire University, United Kingdom
Local Government Training Institute, Dodoma, Tanzania
Academy of Economic Studies, , Romania
Åbo Akademi University, Finland
Lappeenranta-Lahti University of Technology, Finland
TCS, United Kingdom
Universiti Teknologi PETRONAS, Malaysia
Lincoln University College, Malaysia
Avinashilingam Institue for Home Science and Higher Education for Women University, Malaysia

Participation of Indian Institutes / Universities in ICDMAI 2021

A.K Choudhury School Of Information Technology, University of Calcutta	**West Bengal**
Acharya Motibhai Patel Institute of Computer Studies, Ganpat University	Gujrat
Aliah University, Department of Mathematics and Statistics	West Bengal
Amal Jyothi College of Engineering	Kerala
Amity Business School, Amity University, Greater Noida	**Delhi**
Amity University Madhya Pradesh	Maharashtra
Andhra University College of Engineering (Autonomous)	**Andhra University**
Assam Don Bosco University	Assam
Department of Information Technology, Dr. B. C. Roy Engineering College	West Bengal
B.N.M Institute of Technology, Bangalore	Karnataka
Bangabasi Morning College, University of Calcutta	West Bengal
Bangalore Institute of Technology	Karnataka
Bharati Vidyapeeth's College of Engineering, New Delhi	Delhi
Bharti Vdyapeeth College of Engineering	Maharashtra
BITS Pilani, Chennai	**Tamil Nadu**
BMS institute of Technology and Management	Karnataka
Calcutta University	**West Bengal**
Career Point University, Kota, Rajasthan	Rajasthan
Chitkara University	Punjab
College of Engineering Pune	**Maharashtra**
Computer Science & Engineering Department, Amity University, Kolkata	West Bengal
Cummins College of Engineering for Women, Pune	Maharashtra
Department of Applied Science, RDEC Ghaziabad	Uttar Pradesh
Department of Botany, U.P.College, Varanasi,	Uttar Pradesh
Department of Chemistry KNIPSS	Uttar Pradesh
Department of Civil Engineering. MIET Engineering College	Uttar Pradesh
Department of Civil, R D Engineering College	Uttar Pradesh
Department of Computer Science, Mangalore University	Karnataka
Department of Physical Sciences, MGCGV, Chitrakoot, Satna-India	Madhya Pradesh
Dr D Y Patil Institute of Management and Research, Pune	Maharashtra
Dr. Babasaheb Ambedkar Technological University, Lonere, Raigad, India	Maharashtra
DSPM IIIT- Naya Raipur, India	**Madhya Pradesh**

Electronic Science Department, Savitribai Phule Pune University, Pune	Maharashtra
Fergusson College (Autonomous), Pune	Maharashtra
GEC Bhopal, India,	Madhya Pradesh
Government Polytechnic, Amravati	Maharashtra
IGKV, Raipur	Madhya Pradesh
Indian Institute of Technology, Bombay	**Maharashtra**
Indian Institute of Information Technology Allahabad	**Uttar Pradesh**
Indian Institute of Technology, Kharagpur	**West Bengal**
Institute for Development and Research in Banking Technology	**Maharashtra**
International Management Institute, Kolkata	West Bengal
Jawaharlal Nehru Technological University, Hyderabad	**Tamil Nadu**
JIS College of Engineering	West Bengal
JS College of Engineering	Maharashtra
Jyothi Engineering College, Thrissur	Kerala
K. K. Wagh Institute of Engineering Education & Research	Maharashtra
Kirti M. Doongursee College of Arts, Commerce an	Maharashtra
KNIT Sultanpur	West Bengal
L.B.H.S.S.T's ICA, Bandra E	Maharashtra
LJ Institute of Engineering and Technology	Gujrat
Maharaja Agrasen Institute of Technology	Delhi
Manav Rachna University	Haryana
MET's Institute of Engineering, Nashik	Maharashtra
MIT Academy of Engineering	Maharashtra
MKSSS's Cummins College of Engineering for Women, Pune	Maharashtra
MOP Vaishnav College for Women, Chennai	Tamilnadu
MPSTME, NMIMS, Mumbai	Maharashtra
National Institute of Electronics and Information Technology	**Assam**
National Institute of Technology, Durgapur	**West Bengal**
National Institute of Wind Energy	**Chennai**
Neville Wadia Institute of Management Studies abd Research, Pune	Maharashtra
Oriental University	Madhya Pradesh
P. E. S. Modern College of Engineering, Pune	Maharashtra
PCT's A. P. Shah Institute of Technology, Thane, India, 400615	Maharashtra
Pondicherry Engineering College	Puducherry
Pune Institute Of Computer Technology, Pune	Maharashtra
R D Engineering College	Uttar Pradesh
R. A. Podar College of Commerce and Economics	Maharashtra
RAIT	Maharashtra
Rajagiri School of Engineering and Technology, Kochi	Kerala
Rajalakshmi Institute of Technology	Chennai
Rajiv Gandhi Business School, Pune	Maharashtra
Ramakrishna Mission Vivekananda Centenary College	West Bengal
S.A.T.I., Vidisha	Madhya Pradesh
Savitribai Phule Pune University	**Maharashtra**
School of Computer Engineering and Technology, MIT World Peace University, Pune	Maharashtra
School of Mobile Computing and Communication, Jadavpur University, Kolkata, India	West Bengal
SGBAUARAVATI	Maharashtra
Siliguri Institute of Technology	West Bengal

Sinhgad Academy of Engineering, Kondhwa Pune	Maharashtra
Sinhgad Institute of Business Administration and Research, Kondhwa, Pune	Maharashtra
Sinhgad Technical Education Society Smt. Kashibai Navale College of Engineering	Maharashtra
Sipna College of Engineering & Technology, Amravati	Maharashtra
SVERI, College of Engineering, Pandharpur	Maharashtra
Symbiosis Institute of Digital and Telecom Management	Maharashtra
Symbiosis International: Deemed University	Maharashtra
Symbiosis Statistical Institute, Symbiosis International (Deemed University)	Maharashtra

12-D. Paper Presentation Session Summary

Paper presentations were carried out in four sessions, and each session was further divided into five different tracks of 60 mins each.

Track 1: Machine Learning
Track 2: AI and Deep Learning
Track 3: Data Storage, Management and Innovation
Track 4: Enabling Technologies and Applications
Track 5: Data Science Techniques for Handling Epidemic, Pandemic

Session 01 and 02 happened on 16 January 2021, whereas Session 03 and 04 happened on 17 January 2021. Total 62 papers were presented in different tracks. Each track had a dedicated track coordinator and two Session chairs to evaluate the papers presented, one for S4DS and other from academia or corporate.

| Venue -->				Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5
Date	Time	Min(s)	Session	**Track 1** MACHINE LEARNING	**Track 2** AI & DEEP LEARNING	**Track 3** DATA STORAGE, MANAGEMENT AND INNOVATION	**Track 4** ENABLING TECHNOLOGIES AND APPLICATIONS	**Track 5** DATA SCIENCE TECHNIQUES FOR HANDLING EPIDEMIC, PANDEMIC
				Session Coordinator **Dimple Pal**	Session Coordinator **Smita Taitwale**	Session Coordinator **Anindita Banerjee**	Session Coordinator **Jagriti Singh**	Session Coordinator **Shafique Khan**
				Students Volunteer **Sayantani / Debjit**	Students Volunteer **Salini / Triparna**	Students Volunteer **Utkarsh / Shyam**	Students Volunteer **Nirmalya / Deepandu**	Students Volunteer **Aritra / Sayantan**
				S4DS Session Chair **Inderjit Barara**	S4DS Session Chair **Atul Bengiri**	S4DS Session Chair **Amlan Chakrabarti**	S4DS Session Chair **Saptarsi Goswami**	S4DS Session Chair **Himadri Nath Saha**
16-Jan-21	12:15 - 13:15	60	Session 1	Session Chair: **Kranti Athalye**	Session Chair: **Dr. Jyoti Singh**		Session Chair: **Prof. Anuradha**	Session Chair: **Kaushik Dey**
16-Jan-21	16:00 - 17:15	75	Session 2	Session Chair: **Dr. Jayati Bhadra**	Session Chair: **Prof. Rhymend Uthariaraj**		Session Chair: **Sudeshna Choudhury**	Session Chair: **Biswadeep Chatterjee**
17-Jan-21	11:00 - 12:00	60	Session 3	Session Chair: **Dr. Soumya Sen**	Session Chair: **Prof. Mary Saujanya**	Session Chair: **Prof. Pradipta Kumar Nanda**	Session Chair: **Dr. Alok Ranjan Prusty**	Special Session - Chair: **Prof. Prasenjit Choudhury Prof. Tandra Pal**
17-Jan-21	14:30 - 15:30	60	Session 4	Session Chair: **Birupaksha Choudhuri**	Session Chair: **Prof. Juergen Seitz**	Session Chair: **Amol Dhonse**	Session Chair: **Prof. Hafizur Rahaman**	Special Session - Chair: **Prof. Prasenjit Choudhury Prof. Tandra Pal**

The evaluation parameters to evaluate the paper presentation were - Depth of Literature survey, Material Methods Used, Experimental Result, Conclusion Drawn and Relevance to the Industry/Society. Time allotted was 10 mins for presentation and 05 mins for Question & Answer.

The details of the track wise paper presentations are given below:

Track 1: Machine Learning

Date/Time	Min(s)	Paper ID	Attendee Name	Paper Title
			Track I: MACHINE LEARNING	
			Virtual Venue: Zoom| Room No. 1	
ICDMAI 2021-Day 1 16 January 2021	12:15-13:15 Session I (60 Min)	60	Krantee M. Jamdaade, Seema Purohit	Verification, Validation and Evaluation of Medicinal Prescription System
		62	Shreya Shinde, Shubhangi Gaherwar, Avani Sathe, Malvika Menon, Sheetal Barekar	Creation of Knowledge Graph for Client Complaint Management System
		68	Sanjeev Manchanda	Automation of Bid Proposal Preparation through AI Smart Assistant
		140	Deepti Gupta, Susmita Ray	A Review on Application of Machine Learning and Deep Learning Algorithms in Head and Neck Cancer Prediction and Prognosis
	16:00 - 17:15 Session II (75 Min)	168	Keerti Kulkarni, Vijaya PA	Multi-Index Validation Mechanisms for the Land Cover Classification of Multispectral Images: A Case-Study of Kabini Reservoir.
		171	Vadlamani Ravi, Vadlamani Madhav	Optimizing the reliability of a bank with Logistic Regression and Particle Swarm Optimization
		174	Daniel Mesafint, Manjaiah DH	Performance Evaluation of Classification Models for HIV/AIDS Dataset
		176	Harshita Jain, Nekkunj Pilani, Ruchi Goel	Impact of clustering algorithms in catastrophe management: A task-technology appropriate perspective
ICDMAI 2021-Day 2 17 January 2021	11:00-12:00 Session I (60 Min)	180	Ankit Roy	Simulation of Lotka-Volterra Equations using Differentiable Programming in Julia
		204	John William Kasubi, Manjaiah D. H	Feature Selection Strategy for Multi Residents Behavior Analysis in Smart Home Environment
		205	Dev Kumar, Shruti Kumar , Vidhi Khathuria	A Comparative Study on Self-learning Techniques for Securing Digital Devices
		206	Annwesha Banerjee Majumder, Sourav Majumder, Somsubhra Gupta, Dharmpal Singh	An intelligent, Geo-Replication, Energy Efficient BAN Routing algorithm under Framework of Machine Learning and Cloud Computing
	14:30 - 15:30 Session II (60 Min)	209	Irina Georgescu, Jani Kinnunen, Mikael Collan	New Credibilistic Real Option Model Based on the Pessimism-Optimism Character of a Decision-Maker
		212	Sajal Jain, Shrivatsa Krishna, Saksham Pruthi, Rachna Jain, Preeti Nagrath	Analysis of Road Accidents in India and Prediction of Accident Severity
		220	Sourya Chatterjee, Saptarsi Goswami	Mining Opinion Features & Sentiment Analysis with Synonymy Aspects
		221	Agnibho Hom Chowdhury, Sourav Malakar, Dibyendu Bikash Seal, Saptarsi G	Understanding Employee Attrition Using Machine Learning Techniques
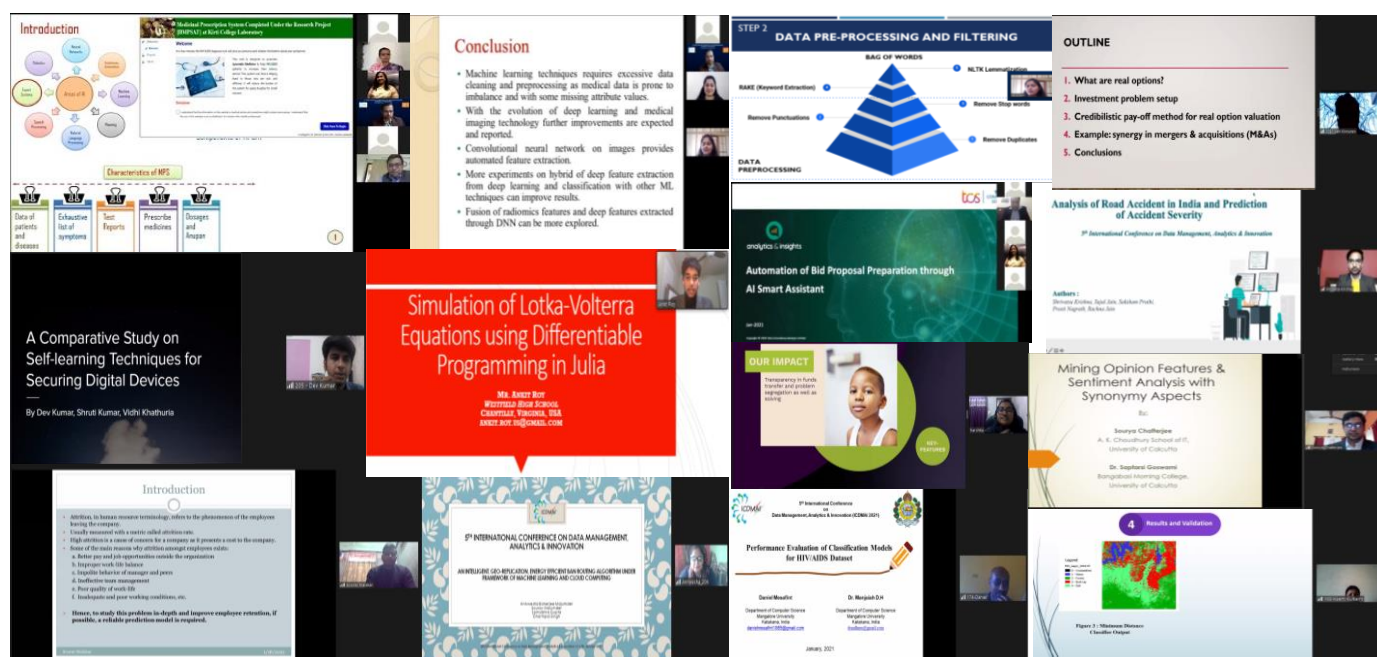
Glimpses of Paper Presentation of Track 1 at ICDMAI 2021

Glimpses of Delegates, Session Coordinator, Session Chairs and Participants on 16 January 2021 at ICDMAI 2021
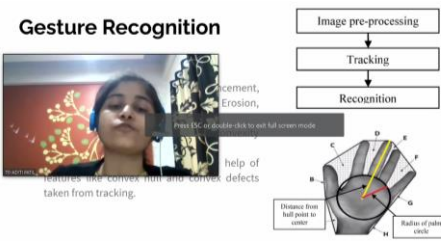
Track 2: AI and Deep Learning

Track II: DEEP LEARNING & AI					
Virtual Venue: Zoom | Room No. 2					
ICDMAI 2021-Day 1 16 January 2021	12:15-13:15	Session I (60 Min)	40	Vivek T, Himanshu P, Ritvik Muttreja, Mayank G, Muneendra O, Shailendra G, Ravi S., Swati J	Real-Time Soybean Crop Insect Classification using Customized Deep Learning Models
			44	Dipti Pawar, Vivek Mannige	Writer Independent Offline Signature Verification using Deep Siamese Neural Network
			50	Pushkar Kurhekar, Shivani Nigam, Shriram Pillai	Automated Text and Tabular Data Extraction from Scanned Document Images
			66	Abhinand A, Aparna P.A, Anu C Jaison, Anil Antony, Jaison Mulerikkal	Detection of Moving Objects in a Metro Rail CCTV Video using YOLO Object Detection Models
	16:00 - 17:15	Session II (75 Min)	70	Aditi Patil, Anagha Kulkarni, Harshada Yesane, Minal Sadani, Prajakta Satav	Literature Survey: Sign Language Recognition using Gesture Recognition and Natural Language Processing
			134	Pranjali Barve, Namita Mutha, Anagha Kulkarni, Yashshree Nigudkar, Yael Robert	Application of Deep Learning Techniques on Sign Language Recognition - A Survey
			169	Nikhil V. Khatekar, Shivkumar R. Gaikwad, Raju S. Gaikwad	Modelling of Surface Roughness using ANN and Correlation with Acoustic Emission Signals in Turning of AISI 303 Steel
			172	K.V.N.Rajesh, Lalitha Bhaskari D.	Optimum Dataset size for Ayurvedic Plant Leaf Recognition using Convolution Neural Networks
ICDMAI 2021-Day 2 17 January 2021	11:00-12:00	Session I (60 Min)	173	Sakshi K, Shaily B, Naman G, Yashvardhan S	Fake News Detection: Experiments and Approaches beyond Linguistic Features
			178	Nida Sahar Rafee, Aditi Patil	Object recognition and classification for Robotics using Virtualization and AI acceleration on Cloud and Edge
			182	Ananth Narayan Tripurari	Neural Networks Application in Predicting Stockprice of Banking Sector Companies : A Case Study Analysis of ICICI Bank
			187	Gautam Manocha, Harit Rustagi, Sang Pri Singh, Rachna Jain, Preeti Nagrath	Epilepsy Seizure Classification using 1-Dimensional Convolutional Neural Networks
	14:30 - 15:30	Session II (60 Min)	201	Sudeshna Jana, Abir Naskar, Tirthankar Dasgupta, Lipika Dey	Syntactic and Semantic Knowledge Aware Paraphrase Detection for Clinical Data
			211	Narinder Singh Punn, Uppala Sumanth, Sanjay Kumar Sonbhadra, Sonali Agarwal	Enhanced Behavioral Cloning Based self-driving Car Using Transfer Learning
			213	Sabina Tandon, Saurav Verma	Early Detection of Parkinsons Disease using Computer Vision
			219	Chetan Nain, Ankit Dwivedi, Rishi Gupta, Preeti Ramdasi	Sense the Pulse through a Customized NLP based Analytical Platform for Large Organization - A data maturity journey at TCS

Glimpses of Paper Presentation of Track 2 at ICDMAI 2021

Glimpses of Paper Presentation of Track 2 at ICDMAI 2021

Track 3: Data Storage, Management and Innovation

Track III: DATA STORAGE, MANAGEMENT AND INNOVATION					
Virtual Venue: Zoom | Room No. 3					
ICDMAI 2021-Day 2 17 January 2021	11:00-12:00	Session I (60 Min)	135	Sonam Sharma	Fact-finding Knowledge-aware Search Engine
			138	Srinath Yelchuri, Krithika Vijayakumar, Revathy S M, Rangaraj A G, Sheelarani N, Boopathi K, Balaraman K	Automated data quality mechanism and analysis of meteorological data obtained from wind monitoring stations of India
			139	Rangaraj A.G, Shobanadevi A, Srinath Y, Boopathi K, Balaraman K	Efficient and secure storage for renewable energy resource data using parquet for data analytics
			192	Gullapuram Mani	Data Processing and Analytics for National security intelligence: An Overview
	14:30 – 15:30	Session II (60 Min)	198	Pradeep Ambavane, Sarika Zaware, Nitin Zaware	Framework of EcomTDMA for Transactional Data Mining using Frequent Itemset for E-Commerce Application

Glimpses of Paper Presentation of Track 3 at ICDMAI 2021

Track 4: Enabling Technologies and Applications
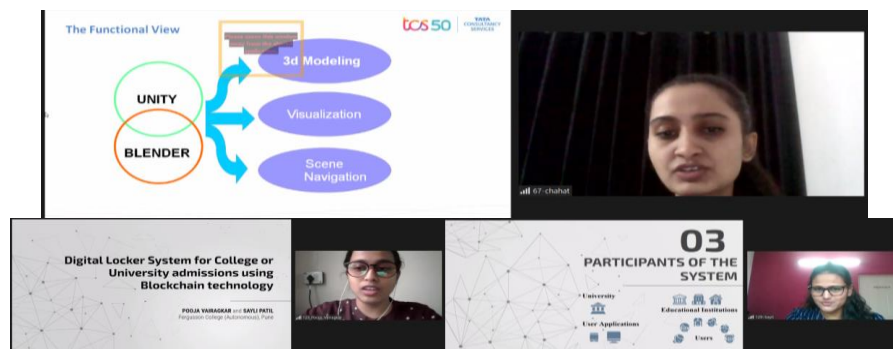
Glimpses of Paper Presentation of Track 4 at ICDMAI 2021

Track IV: ENABLING TECHNOLOGIES AND APPLICATIONS					
Virtual Venue: Zoom | Room No. 4					
ICDMAI 2021-Day 1 16 January 2021	12:15-13:15	Session I (60 Min)	3	HM Moyeenudin, Bindu. G., Anandan. R.	An Analysis on Occupancy by OTA using IoT through Exploiting Latest Technology at Hotels Infrastructure
			41	Pradheep Kumar K, Dhinkaran K	Shortest Distance Lattice Cryptographic Algorithm for Data Points using Quantum Processors
			49	Mishita Sharma, Arpan Sil, Monisha Jhamb, Aboli Marathe, Neha Sharma	Exploring the Correlation between Green Cover and Air Pollution by Data Democratization: A Case Study
			61	Shreyas Joshi, Vaishnavi Nair, Manoj Patil, Neha Sharma	Supply Chain Management during the Time of Pandemic
	16:00 – 17:15	Session II (75 Min)	67	Chahat Bhatia	Augmented Reality Based Supply Chain Management System
			71	Neelam Chandolikar, Vikas Nagare, Pushkar Joglekar, Swati Shilaskar	Devanagari Handwritten Word Recognition for extended character set using Segmented character strokes
			129	Sayli Suresh Patil, Pooja Vairagkar	Digital Locker system for College or University admissions using Blockchain technology
			132	Samiul Mamud, Saubhik Bandyopadhyay, Punyasha Chatterjee, Suchandra Bhandari, Nilanjan Chakraborty	DietSN: A Body Sensor Network for Automatic Dietary Monitoring System
ICDMAI 2021-Day 2 17 January 2021	11:00-12:00	Session I (60 Min)	175	Vaishali Joshi, Kishor Patil	A survey on Energy Efficient Task Offloading and Virtual Machine Migration for Mobile Edge Computation
			195	Matthew Willetts, Anthony Atkins, Clare Stanier	Quantitative study on Barriers of adopting Big Data Analytics for UK and Eire SMEs
			197	Sawan Bhattacharyya, Amlan Chakrabarti	Post Quantum Cryptography - A brief survey of classical cryptosystems, their fallacy and the advent of post-quantum cryptography with the deep insight into hashed based signature scheme
			199	Shubha R Shetty, Manjaiah D.H.	A Comprehensive Study of Security Attack on VANET
	14:30 – 15:30	Session II (60 Min)	203	K. V. Metre, M.U. Kharat, S.V. Gumaste	Efficient Processing of Spatial-textual Queries on Streaming Data
			210	Dr Arun kumar B R, Shoyal Khan	Developing B2B private blockchain smartcontract with security,privacy,transparency,and hence trust in logistics SCM using Hyperledger Fabric
			214	Nivedita Pradip Wagh, Sudhir Agashe	Data Driven Frameworks for System Identification of a Steam Generator
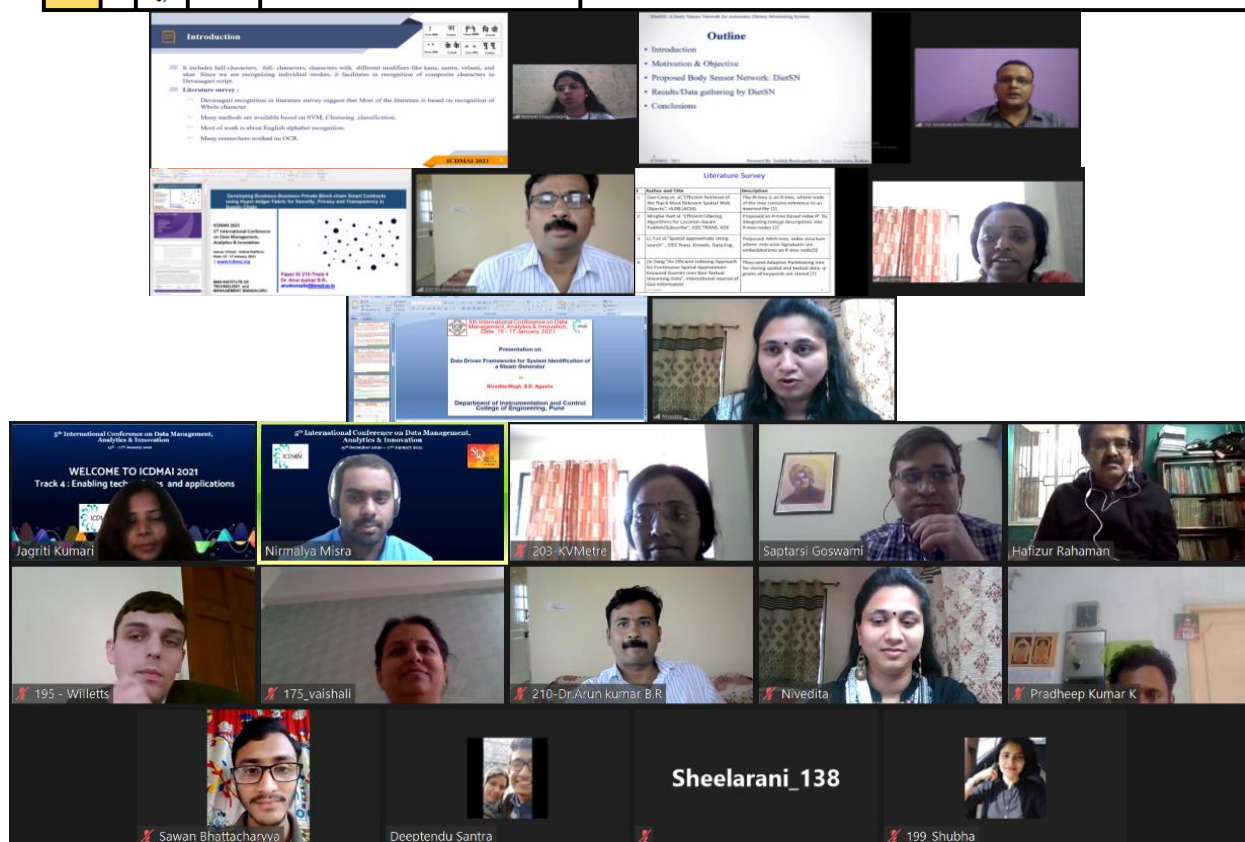
Glimpses of Paper Presentation, Delegates, Session Chair, Participants of Track 4 at ICDMAI 2021
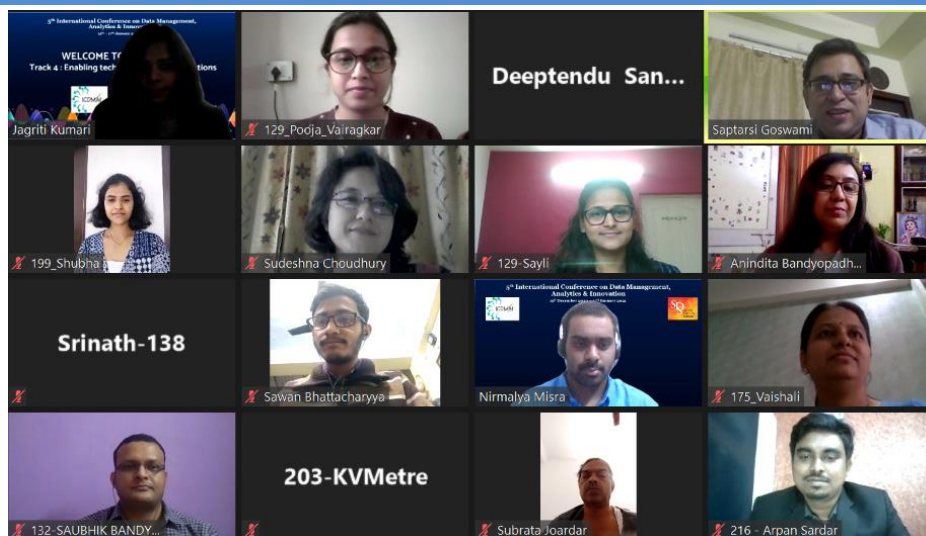
Glimpses of Delegates, Session Chair, Participants of Track 4 at ICDMAI 2021

Track 5: Data Science Techniques for Handling Epidemic, Pandemic

Track V: DATA SCIENCE TECHNIQUES FOR HANDLING EPIDEMIC, PANDEMIC					
Virtual Venue: Zoom | Room No. 5					
ICDMAI 2021-Day 1 16 January 2021	12:15-13:15	Session I (60 Min)	45	Vineet Tambe, Arjun Ghose, Atrayee Saha, Aman Pande, Neha Sharma	Analyzing the Supply of Healthcare Human Resource and Infrastructure of India to Handle COVID-19 Cases and Building a Prediction Model
			58	Kanak Saxena, Umesh Banodha	Cognitive Computing Strengthen the Healthcare Domain
			82	Prithwis De, Tuhin Subhra Dey	An Alternative Approach to Propensity Score Matching Technique in Real World Evidence
			190	Vamsee Sonti, Ishita Karna, Kohinoor Chatterjee	Correlation between Air Quality Index and COVID-19 Recovery Period in India
	16:00 - 17:15	Session II (75 Mi	207	Yumnam Somananda Singh, Yumnam Jayanta Singh, Yumnam Kirani	An Analytical System: Data modelling practices for handling an epidemic
ICDMAI 2021-Day 2 17 January 2021 (Special Session)	11:00-12:00	Session I (60 Min)	215	Nilanjan Sinhababu, Pijush Kanti Dutta Pramanik	An Efficient Obstacle Detection Scheme for Low-Altitude UAVs using Google Maps
			216	Arpan Sardar, Pijush Kanti Dutta Pramanik	Authors' Research Impact Assessment using PageRank Algorithm
			217	Joyita Chakraborty, Dinesh K. Pradhan, Subrata Nandi	Research misconduct and citation gaming: A critical review on characterization and recent trends of research manipulation
			218	Tumpa Banerjee, Shreyashee Sinha, Prasenjit Choudhury	Dynamic Pricing Mechanisms for the Agricultural Produce: A Linear Regression Model
	14:30 - 15:30	ession II (60 Mi	222	Showmik Setta, Shreyashee Sinha, Pradeep Kumar Singh, Monalisa	Real Time Facial Recognition using SURF-FAST
			223	Manob Roy	Microblog Analysis with Machine Learning for Indic Languages: A Quick Survey

Glimpses of Delegates, Session Chair, Participants of Track 5 at ICDMAI 2021

Glimpses of Delegates, Session Chair, Participants of Track 5 at ICDMAI 2021

All the Tracks were brilliantly managed by Track Coordinators and Volunteers.

13. **FEEDBACK**

Obtaining feedback from the conference guests/delegates helps the organizer of the conference to strengthen the retrospection aspects to conduct similar kind of event in future. The feedback that we received in the form of video clip from all the conference participants was overwhelming and the same has been compiled and depicted in below given table which was collected through the feedback form.

Category	About conference theme, arrangements, guest speakers, etc.	Ideas / improvements for the next conference	Overall Remarks
Guests	Innovative ideas discussed, Topical theme, Excellent arrangements	Separate track for research scholars & students	Excellent Event Management, Cohesive Team
Paper Presenters	Very much contemporary Conference, Excellent keynote speakers, overall good arrangements		Overall very good Experience

Takeaways from the International Conference

Students:

The students and research scholars got the exposure to various national and international guests and speakers. Some of the student volunteers also got the opportunity to have one-to-one (face-to-face) interaction with all the invited speakers of the conference.

Professionals from Academia and Corporate:

Professionals got the opportunity to exchange their knowledge, thoughts, innovations and research experiences in the broad field of Data Management, Analytics and Innovation on the common platform with the renowned experts from India and abroad. Thought provoking discussions and interactions with the keynote speakers of international repute and the delegates from different parts of the country, had already sown the seeds which will start sprouting in due course by way of academic and research collaborations, faculty exchange, invited talks, panel discussion events, etc. The research paper presented by the professionals will be soon published in the world's most read digital resource, SPRINGER.

Society for Data Science:

We have been striving to create a collaborative platform to promote Innovation around Data Science, for bringing together technical experts across Industry, Academia, Government Labs and Professional Bodies. The main focus is on strengthening the student community and enhancing the industry participation in S4DS activities across globe. We at S4DS are committed to take out at least some time to apply our skills and strengths in bringing positive difference in the community. The conference has further strengthened the overall brand image across globe. The society could successfully make a mark of its Excellence by holding this prestigious event.

Annexure A

Conference Brochure

Annexure B

TECHNICAL PROGRAMME COMMITTEE

Technical Programme Committee – International

Ahmad Taher Azar	Faculty of Computers and Information, Benha University, Egypt
Akbar Sheikh Akbari	Leeds Beckett University, Leeds/UK
Al Marcella	Walker School of Business and Technology, Webster University, St. Louis, Missouri, USA
Anand Paul	Kyungpook National University, Daegu, South Korea
Anca Ralescu	University of Cincinnati, USA
Andreja Pucihar	University of Maribor, Kranj, Slovenia
Andrey V. Savchenko	National Research University Higher School of Economics, Russia
Angelo Genovese	Università degli Studi di Milano, Italy
Anna Forster	University of Bremen, Germany
Arthur Tatnall	Victoria University, Melbourne, Australia
Asadullah Shaikh	Associate Professor, College of Computer Science, Najran University, Saudi Arabia
Biju Issac	School of Computing, Media and the Arts, Teesside University Middlesbrough, England, UK
Birjodh Tiwana	Linkedin, California
Cenap Ozel	Department of Mathematics, King Abdulaziz University, Kingdom of Saudi Arabia
Cheickna Sylla	New Jersey Institute of Technology, Newark, NJ, USA
Chuan-Ming Liu	Purdue University
Damien Hanyurwimfura	University of Rwanda
Doug Vogel	Chief Academic Director, Management Science and Engineering, Harbin Institute of Technology, Harbin, P. R. of China
Emil Pricop	Oil & Gas University of Ploiești, Romania
Ernst Leiss	University of Houston, USA
Fuqian Shi	Rutgers Cancer Institute of New Jersey, Brunswick, USA
Gabor Kiss	Obuda University, Budapest, Hungary
George A Tsihrintzis	University of Piraeus, Greece
Guido Ongena	University of Applied Sciences Utrecht, The Netherlands
Guneratne Wickremasinghe	College of Business, City Flinders Campus, Victoria University, Melbourne, Australia
Günter Fahrnberger	Ing. Dipl.-Inform., Faculty of Mathematics and Computer Science
Guojun Wang	School of Computer Science and Educational Software, Guangzhou University, Guangzhou, P. R. China

Hanaa Hachimi	Ibn Tofail University, National School of Applied Sciences "UIT-ENSA", Kenitra, Morocco
Helen Cripps	Edith Cowan University, Perth, Australia
Imed Kacem	Directeur du LCOMS, Université de Lorraine
Indrit Troshani	University of Adelaide, Australia
Jafar Ahmad Abed Alzubi	Wake Forest University, North Carolina – USA
Jan Martinovic	IT4 Innovations National Supercomputing Centre of the Czech Republic, VŠB Technical University of Ostrava
Janusz Kacprzyk	Fellow of IEEE, IET, IFSA, ECCAI, SMIA Full Member, Polish Academy of Sciences Member, Academia Europaea Member, European Academy of Sciences and Arts Foreign Member, Bulgarian Academy of Sciences Foreign Member, Foreign Member, Spanish Royal Academy of Economic and Financial Sciences (RACEF) President, Polish Operational and Systems Research Society Past President of IFSA (International Fuzzy Systems Association)
Jiří Dvorský	IT4Innovations, VSB – Technical University of Ostrava, Czech Republic
Joerg Leuke	University of Hohenheim, Stuttgart, Germany
Johan Versendaal	University of Applied Sciences Utrecht, The Netherlands
Juergen Seitz	Baden-Wuerttemberg Cooperative State University, Heidenheim, Germany
Jyotir Moy Chatterjee	Lord Buddha Education Foundation (Asia Pacific University of Technology & Innovation), Kathmandu, Nepal
Kateřina Slaninová	IT4Innovations, VŠB – Technical University of Ostrava, Czech Republic
Kazumi Nakamatsu	University of Hyogo, Himeji, Japan
Madhav Sigdel	Data Scientist, CareerBuilder, LLC, Atlanta, USA
Marek Lampart	IT4Innovations, VSB – Technical University of Ostrava, Czech Republic
Mario Jose Divan	Universidad de La Pampa, Argentina
Marius M. Balas	Aurel Vlaicu University of Arad, Romania
Masoud Mahammadian	University of Canberra, Australia
Matt Glowatz	University College Dublin, Ireland
Md Asri Bin Ngadi	Universiti Teknologi Malaysia, Johor, Malaysia
Mohd Helmy Abd Wahab	University Tun Hussein Onn Malaysia, Batu Pahat, Johor
Naveen Chilamkurti	La Trobe University, Melbourne, Australia
Nicolae Paraschiv	Oil & Gas University of Ploiești, Romania
Nilmini Wickramasinghe	Swinburne University in Melbourne
Oana Geman	Stefan Cel Mare Suceava University, Romania
Ozen Ozer	

	Kırklareli University,Turkey
Pascal Ravesteijn	University of Applied Sciences Utrecht, The Netherlands
Pierre Borne	FIEEE, Central School of Lille, France
Pr. Pascal Lorenz	University of Haute Alsace IUT - 34 rue du Grillenbreit 68008 Colmar - France
Reima Suomi	University of Turku, Finland
Richard D. Evans	University of Westminster, UK
Roger Bons	FOM University, Germany
Saman Halgamuge	Melbourne India Postgraduate Program (MIPP)
Sanjay Misra	College of Science and Technology, Covenant University, Nigeria
Sheng-Lung Peng	National Dong Hwa University, Hualien, Taiwan
Shukor Sanim Mohd Fauzi	Universiti Teknologi MARA, Malaysia
Soumya Banerjee	CEDRIC Lab. Paris, France
Subramaniam Ganesan	Director, Real Time Embedded DSP Systems Lab, Oakland University, Rochester, USA
Surinder Dhanjal	Thompson Rivers University, KAMLOOPS, CANADA
Tatjana Goraeva	Yanka Kupala State University of Grodno, Belarus
Tsung-Chih Lin	Feng Chia University, Taichung, Taiwan
Zhen Zhu	China University of Geosciences, Wuhan, P. R. of China

Technical Programme Committee – National (Indian)

A. S. Hiwale	MIT College of Engineering, Pune
Archana Chougule	Sanjay Ghodawat University, Kolhapur
Ambikapathy	Galgotia College of Engineering and Technology,Greater Noida, UP. India
A.C.Suthar	L J Institute of Engineering & Technology, Ahmedabad,Gujarat
Abdul Quaiyum Ansari	Department of Electrical Engineering, Jamia Millia Islamia, New Delhi
Abhay Bansal	Amity School Of Engineering & Technology E3 Block, Third Floor, Amity University Campus
Abhishek Shukla	R.D. Engineering College, Duhai, Ghaziabad
Alok Ranjan Prusty	Government of India
Amit Doegar	National Institute of Technical Teachers Training & Research (NITTTR) Chandigarh
Amit Ganatra	Faculty of Technology and Engineering, Chandubhai S. Patel Institute of Technology, Charotar Institute of Technology- Changa, CHARUSAT
Amol Dhondse	IBM
Anagha Kulkarni	Cummins College of Engineering for Women

Ankur Singh Bist	KIET, Gaziabad
Annappa B	National Institute of Technology Karnataka Surathkal, Mangalore
Anupama R	Amity Business School | Amity University
Ashok Kumar	Model Institute of Engineering and Technology, Jammu
B. V. Pawar	North Maharashtra University Jalgaon, India
Bharati P. Vasgi	IT, Sinhgad College of Engineering, Pune
Bhuneshwari Melinamath	Sanjay Ghodawat Group of Institutions, Atigre, Kolhapur
Bindeshwar Singh	Kamla Nehru Institute of Technology (KNIT) Sultanpur-(U. P.), India
Biswajit Patra	Qualcomm Technologies, Banglore, India
C R S Kumar	DRDO, Minstry of Defence, Govt of India, Girinagar, Pune, India
Chetana Hegde	RNS Institute of Technology, Bangalore
Chittaranjan Pradhan	Kalinga Institute of Industrial Technology Deemed to be University, Bhubaneswar
D. T. Mane	JSPM's Rajarshi shahu College of Engineering, Tathawade, Pune.
Deepak Garg	Bennett University, Greater Noida, U.P.
Dilip Singh Sisodia	National Institute of Technology Raipur , G.E. Road, Raipur(C.G.)
G.Suseendran	VELS University, Chennai
G.Varaprasad	BMS College of Engineering, Bangalore
Garje G.V.	PVG's COET, Pune
Gaurav Kumar	Magma Research and Consultancy Pvt. Ltd., Ambala, Haryana
Geeta Rana	Swami Rama Himalayan University, Dehradun
Gitanjali Shinde	Doaba Group of Colleges, Nawanshahr
Hardeep Singh	Dept. of Computer Science & Engineering,Guru Govind Singh University, Amritsar, Punjab
Jabbar M. A.	Vardhaman College of Engineering, Hyderabad
Jatinderkumar R. Saini	Symbiosis Institute of Computer Studies and Research (SICSR), Pune
Jaya Sinha	Galgotia College of Engineering and Technology, Greater Noida (U.P)
Jayanta Yumnam Singh	National Institute of Electronics and Info Technology (NIELIT), Kolkata, (Ministry of Electronics and IT, Govt. of India)
Jitendra Agrawal	Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, MP
Jyoti Gautam	J.S.S. Academy of Technical Education, Noida
K. Kalaiselvi	Vels Institute of Science, Technology and Advanced Studies (VISTAS) Chennai
K. Santhi Sree	Jawaharlal Nehru Technological University Hyderabad Kukatpally, Hyderabad
K. V. Arya	ABV-IIITM, Gwalior

K.A. Selvaradjou	Pondicherry Engineering College, Puducherry
K.Chandra Sekharaiah	Jawaharlal Nehru Technological University Hyderabad, Kukutpally, Hyderabad
Kalyani Joshi	Modern College of Engineering, Pune, India
Kanak Saxena	Department of Computer Science & Information Technology, S.A.T.I., Vidisha (M.P.)
Kishor R. Kolhe	MIT College of Engineering, Pune
Leena R Ragha	Computer Engineering Department, RAIT, Nerul.
Linesh Raja	Department of CSE, Amity University, Jaipur
M. S. Wakode	PICT, Pune
Madhuri Hingane	PDEA's College of Engineering,Manjari, Hadapsar, Pune
Malini M. Patil	J S S Academy of Technical Education, Dr.Vishnuvardhan Road, Bengaluru
Manik Sharma	DAV University Jalandhar.
Manish Bali	UST Global
Manjaiah D. H.	Department of Computer Science, Mangalore University, Mangalore
Manjula Sanjay	Sir M. Visvesvaraya Institute of Technology, Bangalore
Manoj Patil	Dept. of Computer Studies, North Maharashtra University, Jalgaon
Manuj Darbari	School of Engineering, BBD University, Lucknow
Maulika Patel	G H Patel College of Engineering & Technology, Gujarat
Milind U. Nemade	K. J. Somaiya Institute of Engineering and Information Technology Sion
Misha Kakkar	Amity University, Noida
Mrinal Kanti Bhowmick	Dept. of CSE, Tripura University
N. Bhalaji	SSN College of Engineering Kalavakkam
N.Sathish Kumar	Sri Ramakrishna Engineering College, Coimbatore-22 TN, India
Nandana Prabhu	K J Somaiya College of Engineering, Mumbai
Naresh kumar reddy	*ICFAI Tech, Faculty of Science & Technology, Hyderabad, India.*
Naveen Kumar Sharma	I.K.G. Punjab Technical University, Kapurthala, Punjab
Nilakshi Jain	Kutchhi Engineering College , Chembur Mumbai , India
Niranjanamurthy M	MS Ramaiah Institute of Technology, Bangalore
Nisarg Gandhewar	SB Jain Institute of Technology, Management & Research Nagpur
Nishant Kumar	Gurukula Kangri Vishwavidyalaya, Haridwar.
Nitish Pathak	Bharati Vidyapeeth's Institute of Computer Applications and Management (BVICAM), New Delhi
P Deepa Shenoy	UVCE, K R Circle, Bangalore
P K Mishra	Banaras Hindu University, Varanasi, India

Pallavi Ahire	Sinhgad Institute of Technology, Lonavala
Pallavi saha	Tata Consultancy Services
Parameshachari B D	GSSS Institute of Engineering and Technology for Women, Karnataka
Partha Pratim Ray	Sikkim University, Gangtok, India
Poornalatha G.	Manipal Institute of Technology (MIT) , Manipal University
Pradeep Singh	National Institute of Technology, Raipur
Pradnya V. Chitrao	Symbiosis Institute of Management Studies (SIMS), Khadki, Pune
Prakash Jayant Kulkarni	Walchand College of Engineering, Sangli
Prashant R. Nair	Amruta University
Prateek Agrawal	Department of ITEC, University of Klagenfurt, Austria
Priyadarshi Kanungo	C.V. Raman College of University, Bhubaneswar
Puneet Sivananda	Chateaux Podshore, Bangalore
Pushpa C N	University Visvesvaraya College of Engineering, Bangalore
R. P. Maheshwari	IIT, Roorkee
R. Umarani	Sri Sarada College for Women, Salem
Rajashree Jain	Symbiosis Institute Of Computer Studies And Research
Rajeeva Karandikar	Chennai Mathematical Institute, Siruseri, Kelambakkam
Rajesh Arora	TQMS Global
Rajeshwar Singh	Doaba Group of Colleges, Nawanshahr
Rakesh Patil	Sandip Institute of Tech & Research Centre, Nasik
Ramar Kadarkaraiyandi	Muthayammal Engineering College, Rasipuram
Ranjeet Vasant Bidwe	Pune Institute of Computer Technology, Pune.
Rashmi Phalnikar	MIT world Peace University, Pune
S. S. Sane	K.K. Wagh College of Engineering, Nashik
S.Sathiya Devi	Anna University, Trichy - 24, Tamilnadu
Sabyasachi Mohanty	Bhubaneswar, Odisha
Sandeep Kumar	Amity University, Jaipur, Rajasthan
Sangram Ray	National Institute of Technology, Sikkim
Santanu Koley	Budge Budge Institute of Technology, Budge Budge, Kolkata-(WB)
Santosh B. Rane	Sardar Patel College of Engineering, Mumbai
Satish Chand	Jawaharlal Nehru University
Satya Ghrera	Jaypee University of Information Technology Waknaghat, HP, India
Satyendra Singh	Bhartiya Skill Development University Jaipur Rajasthan
Shanti Verma	L.J. Institute of Computer Applications, Ahmadabad
Shashidhar Koolagudi	National Institute of Technology Karnataka Surathkal, Mangalore
Shikha Agrawal	University Institute of Technology Rajiv Gandhi Proudyogiki

	Vishwavidyalaya, Bhopal, MP
Shraddha Oza	Army Institute of Technology Pune
Shruti Jain	JUIT, Solan
Sivaram Sunkara	Analytics at UnitedHealth Group (Optum), Hyderabad, Telangana
Sobhana N V	Rajiv Gandhi Institute of Technology, Government Engineering College, Kottayam, Kerala
Sree Ranjani R.	RISE Lab, Indian Institute of Technology Madras, Chennai
Sudeep Tanwar	NIRMA University, Gujarat
Sudip Roy	Indian Institute of Technology Roorkee, Uttarakhand, India.
Sunil Gautam	University and Institute of Advanced Research Gandinagar, Gujarat
Sunita Kumawat	Amity School of Applied Sciences, Haryana, Gurugram
Surekha Deshmukh	PVG's COET, Pune
Suresh Kumar	Manav Rachna International Institute of Research and Studies (Deemed to be University), Faridabad
Swati V. Shinde	Pimpri Chinchwad College of Engineering Pune.
T C Thanuja	Vishveshwaraya Technological University, Belgavi
Tandra Pal	Department of Computer Science and Engineering NIT Durgapur
Tanuja Mahajan	Computer Department,Kces's IMR Jalgaon
V. Vijayakumar	VIT University, Chennai
Vandana Inamdar	COEP Pune
Varun Menon	SCMS School of Engineering and Technology, Kerala
Vidya A	Vivekananda Institute of Technology, Bangalore, Karnataka
Vidya Ananth	VKIT, Bangalore
Vijay Kumar	Manav Rachna International University, Faridab, Haryana
Vijay Narhar Pande	College of Engineering, Pune
Vijayalata Yellasiri	Gokaraju Rangaraju Institute of Engineering and Technology
Vinayak Bairagi	AISSMS-IOIT, Pune
Vishnu Narayan Mishra	Indira Gandhi National Tribal University, Lalpur, Amarkantak, Madhya Pradesh
Vishwanath R Hulipalled	REVA University, Rukmini Knowledge Park, Bangalore, Karnataka,
Vrinda Tokekar	Institute of Engineering & Technology (IET), Devi Ahilya University, Indore (M.P.)
Yogesh H.Dandawate	Vishwakarma Institute of Information Technology, Pune
Zakiyabanu Malek	Faculty of Computer Technology, GLS University, Ahmedabad

Please visit

https://www.icdmai.org/

https://s4ds.org/