



Rajeev Kumar, PhD (Sheffield Univ.)

Professor, Computer Science & Engineering (CSE)

Formerly: Professor @ IIT Kharagpur, IIT Kanpur, BITS Pilani, JNU Delhi;

Formerly: Scientist @ DRDO (DEAL) Dehradun, DST (Survey) Hyd/Delhi

Voice : 95-9905-3655, 94-3474-7400

E-Connect : RajeevKumar.Cse @ Gmail.com RajeevKumar-cse.GitHub.io

[GitHub](#) | [LinkedIn](#) | [Google Scholar](#) | [Research Gate](#) | [ORCID](#) | [Facebook](#)

Rajeev Kumar is an academician with **four decades** of teaching, research & development. He served Indian Institutes of Technology (IITs) @ **Kharagpur & Kanpur (17y)**, Birla Institute of Technology & Science (BITS) **Pilani (4y)**, and JNU **New Delhi (8y)**. Prior to his academic tenure, he was a Scientist in Defence R & D Organization: **DEAL Dehradun (8y)** and Department of Science & Technology: **Survey of India**, Hyderabad/New Delhi (**3y**). He was a Visiting **Design Engineer** at National Semiconductors (NSC) **Germany**. He visited several universities in USA, UK, Germany, Switzerland, Japan, S. Korea, and Singapore.

He holds a **Ph.D.** degree in Computer Engineering from **Univ. Sheffield**, an **M.Tech.** in Computer Sc. & Tech. from **Univ. Roorkee** (now IIT Roorkee), and an **M.Sc.** in Physics (Electronics) from **Univ. Allahabad**. His primary education was in a river-side *Gurukul*, Shri Dugdheshwar Sanskrit Mahavidyalaya at Pilibhit.

R & D: His initial learning at DRDO culminated in *technology transformation for end-users*. His research interests include machine/deep learning, medical image analysis, multimedia, programming languages, software systems, evolutionary optimization, and scientometrics. He has published over **250 research articles** in international journals and conferences, several in lead venues. He has supervised **nineteen doctoral**, **over eighty master theses**, and a hundred undergraduate projects. He worked on **industry-funded projects from Microsoft USA and NSC USA**; the NSC project was in close collaboration with their USA, Germany, and Israel units. He founded the **Data to Knowledge (D2K)** Lab at JNU, which has produced a few dozen Doctoral/Masters theses. He is a reviewer for journal/conference papers. He delivered several keynote & invited lectures and tutorials at conferences. His h-index on Google Scholar is 25.

Teaching: Rajeev has designed and taught several Computer Science & Engineering courses ranging from freshman to senior graduate level. He has taught programming (C/C++/C#/Java/R/Python), core and advanced (Data Struct., Algorithms, Compiler, Software Engg, Pattern Classification, Machine Learning), application (Image/Video Processing, Computer Vision, Multimedia Sys.), and specialized courses (Statistics, Evolutionary Comp, Research Method, etc.). At JNU, he introduced the *Academic Ethics* course. His teaching focuses **on active learning, thinking, creativity, and innovation** with flexible workloads/assessments.

Academic Leadership: He served as a Senator in IITs Kharagpur/Kanpur and BITS, a member of the Court and Academic Council in JNU, and several other academic bodies, e.g., Board of Studies, Statutory Comm. of Institutes/Universities. He worked for reforms in curriculum, academic structure, regulations, and ordinances. He mostly worked as a **crisis handler with out-of-box solutions for complex problems**.

Public Policy: His contribution to framing public policies for higher education is enormous. He reformed IITs admission examinations, bringing transparency and accuracy through well-defined processes. He pioneered **common examination** and **common counseling (JoSAA/CSAB) for admissions in IITs/NITs/IIITs/CFTIs**. Almost all admissions & competitive examinations of the country in most disciplines have been reformed following this model. His proposal for an independent body led to the setting of the National Testing Agency (NTA). Including common examinations in **NEP 2020** is a testimony of his work, leading to **CUETs** in Central Universities. His prototype for **common counseling in CUs** developed with the Ministry will be used fin 2024. He advocated for the Research Advisory Comm. (RAC) and Ethics course for PhD Students in JNU; UGC adopted both. Recently, IITs adopted several measures from his proposal for preventing suicides. India's Hon'ble Supreme Court hailed him as *one of the many unsung heroes who helped in improving the system*.

He defined quantitative Academic Performance Indices (**APIs**) in 2009. He co-authored/authored *output-based quantifiable* ABET-guided accreditation guidelines for undergraduate engineering programs from 2009 to 2011. These have been in public use since 2011, making the National Board of Accreditation (NBA) an autonomous body. This work led India to join the Washington Accord in June 2014 permanently.

His four decades of academic/administrative expertise acquired across universities and institutions in India and abroad have enriched his passion for **teaching, research, curriculum development, faculty mentoring, and institution building**. His *reform-centric & student-oriented leadership, combined with 24/7 work ethics, open comm., legal acumen, and wider perception* across inst./univ., is an asset. *

1-Page Brief.

▪ Education:

- **Ph.D. (Computer Engg.), Univ. Sheffield**, England. The thesis was nominated for the Distinguished Computer Science thesis award in UK.
- **M.Tech. (Computer Sc. & Tech.), Univ. Roorkee** (now, IIT Roorkee). Awarded the Univ. Medal for being the first ranker.
- **M.Sc. (Physics - Electronics), Univ. of Allahabad**. 3rd ranker.
- **LL.M. (Professional), National Law University, Delhi: Pursuing**

▪ Experience: Teaching, Research & Development: Four Decades.

- **Professor: IIT Kharagpur** (15y), **IIT Kanpur** (2y), **BITS Pilani** (4y), and **JNU** (8y) New Delhi.
- **Scientist: Survey of India (DST)**, Hyd'bad/New Delhi (3y); **DRDO (DEAL)**, Dehradun (8y).
- **Design Engineer: National Semiconductors (NSC)**, Germany (Visiting); Projects with **Microsoft**.

▪ Teaching

- Cover fundamentals with emerging technologies to keep the subject material relevant and employable.
- Focus on student engagement for *active* learning, thinking, creativity, and innovation with enjoyment.
- Introduced a variety of assignments, e.g., tiny (few sentences), 2-pages, and large – covering different aspects, incl. hands-on experiences of course contents at different paces spread throughout semester.
- Introduced parallel evaluation in which students also self-evaluate, followed by closeness match.
- Taught, developed and restructured core and advanced courses for U.G. and P.G. students.
- Introduced new courses, incl. a pan-university course on Academic Ethics at JNU.
- Comfortable in teaching smaller to large classes of a few hundred students.

▪ Research: Research interests include machine/deep learning, medical image analysis, multimedia, medical image analysis, programming language, evolutionary optimization, and scientometrics.

- Published over 250 research articles in international journals and conf. proc. Reviewer.
- Presented papers in lead international conf. in USA, UK, Germany, Canada, Japan, S. Korea, etc.
- Invited/research talks in universities abroad, international conferences, FDPs, STCs, etc.
- Program Chair, Publication Chair, Publicity Chair, etc. in several international conferences.
- Supervised 19 doctoral, 80 master theses.
- Worked on industrial-funded projects from Microsoft and National Semiconductors (NSC).
- Awarded *Test of Time* award in ISCE 2022 for the paper presented in ISEC 2011.
- Founded *Data to Knowledge (D2K)* Lab in School of Computer & Systems Sciences, JNU. The D2K Lab produced quality research papers in decent Journals and conf. proceedings.
- *h-index*, on Google Scholar (from incomplete data), is 25, which is good in sub-fields of C.S.

▪ Industry Collaboration: R & D

- Member, Board's IT Strategy Group and I.T. Advisory Comm., Canara Bank (2022 - Present)
- Core Design Engineer, National Semiconductors Team with members from Germany, Israel & U.S. for developing System S.W. tools, simulators, compilers, etc. for their CR16X series of processors. In this work, Prof. Richard Brown, Univ. Michigan USA was another collaborator. We made per week deliveries for their design engineers, which were regularly used by many categories of stakeholders, from system designers to application users. (2001 – 2006)
- NET/C# Project, Microsoft Inc. USA (2004 – 07).

▪ Industry Collaboration: Teaching

- Developed courseware for .NET/C# as an emerging technology (**Microsoft Inc. USA**). (2004-07)
- Faculty, Multimedia & Object-Oriented System Courses for Wipro/S.W. Industry employees @ Bangalore/Hyderabad under BITS Industry Off-Campus Collaboration Program. (1997- 2000)

Pursuing Adjunct Professor-ship @ Premier Tech. Inst. & Univ.

With his extensive and varied experience in academics — student, faculty, and institution builder — he aims to contribute and advise on value additions for institutions and leaders, going beyond the typical faculty role:

▪ Teaching Specialized / Research Courses & Lectures in Executive Program

- Research courses in emerging technologies to undergraduate/postgraduate/research students
- CS/AI/ML Courses in Core Technologies for an in-depth understanding of concepts
- Lectures in Specialized / Executive Programs to CSE/ECE/EE/General Engg. Students & Faculty

▪ Tech. Talks in FDPs, Conferences, Seminar and Hands-on Workshop Series

- FDP and seminar series on standard technologies with guests/experts and in-house faculty/students.
- Hands-on workshop on the latest tools/technologies with external experts and in-house developers.

▪ Research Advisor for UG Projects / Masters / PhD Thesis / Research Centers

- Inculcating the spirit of the research & publications: identify and catch them early,
- Define Master/PhD thesis dissertation: applicable theory, concept, technology, and applications
- Strengthen technical writing skills and research plans in phases.

▪ Faculty Mentor, In-house Peer Review, & Thesis Evaluation

- Most Institutions have a heavily skewed distribution of young/new faculty,
- Mentoring young faculty for effective teaching, learning, evaluation, and grading (TLEG),
- Teaching workshops and FDPs for TLEG and Institute's services,
- In-house peer review of faculty for self-assessment and feedback. Thesis Evaluation.

▪ Curriculum Revision / Restructuring

- Involved with UG/PG/Research curriculum updates since the 1990s at IITs, BITS, JNU, and others.
- This exercise should be done regularly to prepare graduating students with the latest technologies.

▪ Strengthening Placement Skills & Employability

- Developing code-labs for hands-on coding experience through the process of building applications.
- Working on industry-supported toolkits and developing applications and newer features.

▪ Improving Academic SoPs for Self-Regulatory Administration

- Continuous monitoring of Academic/Administrative SoPs for improvement aimed at zero government
- Shifting towards self-regulatory governance and no-delay grievance redressal system.

▪ Institutional Committee Chair/Member for Out-of-Box Solutions

- Worked in several committees at all levels – department, Institute, national, and international
- In Institutional academic/administrative committees in academic interest as a crisis handler.

▪ Ranking, Accreditation, and Interfacing with External Agencies

- Drafted accreditation guidelines for public use with academicians, government, international agencies
- Practical understanding of ranking/accreditation parameters and their interplay

▪ Academic Leadership with Legal Acumenship for Disciplinary/Inquiry Proceedings

- Handled several types of academic leadership tasks with active participation as a crisis handler,
- Handled several academic legal cases via Special Leave Petitions (SLPs) and Writ Petitions (WPs),
- Excellent in Service/CCS (CCA) Rules, Disciplinary Proc., and Administrative Laws.

▪ Public Policies for Institutional Buildup

- Defining policies for institutional built-up and defining rational & minimal SoPs
- Quality upgradation, Ranking improvement, etc.

Education & Professional Experience

Personal Information

- Nationality : Indian
- Date of birth : March 12, 1959
- Marital Status : Widower with two children:
Son (S.W. Engg: Agoda | ex- Google, Microsoft, Grab | MBA: NUS, NYU | ISB);
Daughter (Faculty, GaTech Atlanta | PDF: Univ Penn | PhD: Rice Univ)

Education

- **Ph.D. in Computer Engineering (1997)**
University of Sheffield, UK
Thesis: Feature Selection, Representation & Classification.
Thesis nominated for best Thesis award in UK.
- **M.Tech. in Computer Science & Technology (1992)**
University of Roorkee (now, IIT Roorkee), India
Dissertation: Performance Study of Simulated Multiprocessor for Functional Programs.
University Medalist being the first ranker
- **M.Sc. in Physics (Electronics) (1979)**
University of Allahabad, India
Third Rank in the University
- **LL.M. (Professional): Pursuing**
National Law University, Delhi India

Research Scholar

- **University of Sheffield, UK:** Commonwealth Research Scholar: March 1994 – March 1997.
- **University of Allahabad, India:** UGC Research Scholar: July 1980 – Dec 1983.

Employment

- **Jawaharlal Nehru University (JNU), New Delhi, India**
School of Computer & Systems Sciences (SC&SS)
Professor: June 2015 – March 2024.
- **Indian Institute of Technology (IIT), Kharagpur, India**
Department of Computer Science & Engineering (CSE)
Professor: April 2007 – June 2017; Assoc. Professor: Dec 2000 – April 2007.
- **Birla Institute of Technology & Science (BITS), Pilani, India**
Department of Computer Science & Information Systems (CSIS)
Professor: Feb 2000 – Dec 2000; Assoc. Professor: April 1997 – Jan 2000.
- **Defense R & D Organization (DRDO), India**
Defense Electronics Applications Lab (DEAL), Dehradun, India
Scientist C: July 1989 – April 1995; Scientist B: June 1986 – June 1989.
R&D: Image Processing, Computer Vision, Machine Learning, Military Intelligence.
- **Department of Science & Technology (DST), India**
Survey of India, Hyderabad / New Delhi, India
Deputy Superintending Surveyor: Dec 1983 – June 1986.

Visiting Positions

- **Indian Institute of Technology (IIT), Kanpur, India**
Department of Computer Science & Engineering,
Visiting Professor: July 2013 – May 2014; Visiting Assoc. Professor: June 2005 – May 2006.
- **National Semiconductors GmbH, Germany.**
Oct. 2001, May – July 2002: Visiting Design Engineer.

Academic Tasks & Leadership

▪ External Academic Institutions

- Advisor, Cyber Security Upskilling Edu. Inst., VMSB Uttarakhand Tech. Univ, Dehradun (2024)
- Ext. Member, CSE Curriculum Revision, IIT Patna (2022, 2024)
- Ext. Member, Faculty of Maths & Computing, Banasthali Univ. (2019 - 22)
- Ext. Member, Board of Studies, Dept. CSE & Dept. CS Applications, Poorvanchal Univ. (2018 - 20)
- Chairman/Expert, National Accreditation Board (NBA) Visiting Committees to Engg. Instt. (2007 - 18)
- Visiting Professor, IIIT Noida (2007-10)
- (several others)

▪ National level:

- CS Expert: NTA Tech. Eval. Comm. (2023 – 24),
- CS Expert: Faculty Selections: ASRB (2022), DRDO (2016-18), UPSC (2014), etc.
- Chair/Member, NBA UG/PG Accreditation Teams (2006 – 2018).
- Chair, NBA UG Engineering Accreditation Guidelines Draft Comm. (2010 – 11).
- Chief Examiner, GATE Computer Science, IITs (2005).
- Professor-In-Charge, JEE Examination Centre(s), IIT Kharagpur (2001 – 04).

▪ Institute/University level: IIT Kharagpur, BITS Pilani, and JNU New Delhi

- JNU: Member, University Court, and Academic Council (2022 - 2024).
- JNU: Member, Intellectual Property Management Comm. (2017)
- JNU: Co-opted Member, Anti-Plagiarism Policy Draft Comm. (2016 - 17).
- JNU: Conceptualized Dual-degree program combining Comp Sc with Social Sc (2016-17).
- IIT Kharagpur: Senator (2007 – 2015)
- IIT Kharagpur: Member, UG Prog. Eval. Senate Sub-Comm. (UGPEC) (2001-05, 2007-11)
- BITS Pilani: Senator (1997 – 2000).
- BITS Pilani: Resource Faculty, Intensive Teaching Workshop (1997 – 2000)
- BITS Pilani: Member, Research & Consultancy Board (1997 - 1999).
- BITS Pilani: Member, Library Comm. (1997 – 1999).

▪ Department/School level: BITS Pilani, IIT Kharagpur, and JNU New Delhi.

- JNU: Founder Director, *Data to Knowledge* (D2K) Lab, SC&SS (2016 – 2024)
- JNU: Member, Special Comm. (a.k.a. Board of Studies), School Comp. Sys. Sc. (2015 – 2024)
- JNU: Member, Student - Faculty Comm., School Comp. & Sys. Sci. (2015 – 2019)
- JNU: Chair, AICTE's MTech. Prog. Approval Comm., School Comp. & Sys. Sci. (2015 – 2016)
- IIT Kharagpur: CSE Academic Comm, (2001-05, 2007 - 11)
- IIT Kharagpur: CSE Administrative Comm., (2004-05, 2006-10)
- IIT Kharagpur: Doctoral Scrutiny Committees: Assorted (2001 – 2011)
- IIT Kharagpur: Faculty Advisor/Counselor/Mentor and Faculty PGDIT and PGDST (2001-08)
- IIT Kharagpur: Professor-in-Charge, CSE Library & Liaison with Central Library (2006 – 08)
- BITS Pilani: Member, C.S. & I.S. Group (1997 – 2000).

Teaching (Undergraduate and Graduate)

- Foundations of Computing (C, C++, Java, Python)
- Data Structures & Algorithms (Core & Adv.)
- Compiler Construction (Core & Adv.)
- Object-Oriented Programming (C++, Java, C#)
- Object-Oriented Analysis & Design
- Programming Methodology
- Multimedia Systems
- Machine/Deep Learning (Core & Adv.)
- Artificial Intelligence
- Academic Ethics
- Research Methodology
- Programming & Data Structures (C, C++, Java)
- Design & Analysis of Algorithms
- Software Engineering (Core & Adv.)
- Object-Oriented Language Implementation
- Object-Oriented Software Engineering
- Software Architecture
- Image & Video Processing
- Pattern Classification
- Evolutionary Computing
- (Bio-)Statistics (with R) @ Life Sciences
- Technical Writing

New Courses Developed / Restructured

- Bio-Statistics [2018] @ JNU – *bringing computation with R*
- Academic Ethics [2016] @ JNU
- Software Engineering [2006] – *bringing synergy with Trusted Computing @ IIT Kharagpur*
- O.O. Sys. Implementation [2005] – *synergy in PLI, S.E., VEE for trusted computing @ IIT Kanpur*
- Foundations of Computing [2005] – *with Java @ IIT Kanpur*
- Multimedia Systems [1998, 2001] @ BITS Pilani, IIT Kharagpur
- Evolutionary Algorithm [1999] @ BITS Pilani
- Programming Language & Compiler Construction [1998] @ BITS Pilani
- Data Structures & Algorithms [1998] @ BITS Pilani
- Computational Intelligence [1998] @ BITS Pilani

Industry Teaching Collaboration: National & International

Microsoft Research USA	Object Oriented (C#/.NET centric) Courseware	2004 – 07
Wipro & S.W. Industries	Object Oriented System Development, Systems @ BITS Multimedia Pilani	1998 – 2000

Awards & Professional Recognition

- ISEC's *Test of Time* Award for the ISEC 2011 Paper (2022)
- Karmaveer Chakra (2013)
- Hon'ble Supreme Court's *Unsung Hero* (2011)
- RTI Citizen's Runner-up Award for Public Services (2009)
- Commonwealth Scholarship (1994 – 97)
- Affiliation with Professional Bodies
 - Fellow, IETE, India
 - Fellow, ISSA (Indian Social Science Academy), India
 - Senior Member, ACM, USA
 - Senior Member, IEEE, USA

Recognition as Student

- Class Representative, MTech (CST), Dept. Electronic & Computer Engg., Univ Roorkee (1991- 92)
- Prefect, Sir GN Jha Hostel, Univ of Allahabad, (1981-83)
- ... (others)

Research: R & D, Industrial Consultancy, and Services

Research Interests

- Machine Learning: Generalization, Outlier Detection, and AI & Ethics.
- Multimedia: Medical Image Analysis, Multi-Modeling, and Social Networks.
- Scientometrics and Edu. Data Mining.
- Programming Language System and Software Engineering.
- Evolutionary Multiobjective Combinatorial Optimization (EMCO) and Nature Inspired Algorithms (NIA).

Publications

Book	1
Edited Books (Conf. Proceedings)	3
Chapters in Edited Books	4
Published Tutorials (USA)	3
Journal Research Articles	~80
International Conference/Workshop Research Articles	~150
National Conference/Workshop Research Articles	~20

Theses & Student Projects Supervision

	Completed	Ongoing
Doctoral	19 (6*)	1
Graduate (by research)	4	--
Graduate (M.Tech., MPhil, MSc)	~ 80 (10*)	---
Undergraduate projects	~ 120 (20*)	--

*: In joint-supervision.

Industry R & D Consultancy

Advisor	IT Advisory Comm. Canara Bank India	Banking SW, Online, Data Analytics Tools, etc.	2022 - Present
Design Engineer	NSC Germany	SW System Tools: Compiler, Simulator etc.	2001 – 06

Services: R & D and Tech. Institutions:

- Member, Selection Board, Recruitment & Assessment Centre (RAC), DRDO, New Delhi (2017, 2024)
- CSE Expert, NTA Tech. Eval. Comm. (2023 – 24)
- Expert, Tech. Comm., Agriculture Scientists Recruitment Board (ASRB), Dept. Agri. Res. Edu. (2022)
- Member, Apex Committee for DRDO Awards (2016)
- CSE Expert, UPSC, New Delhi (2014)
- Secretary cum Treasurer, IEEE Kharagpur Centre (2002 – 04)
- Secretary, IETE Local Centre, Dehradun (1988 – 90, 1992 – 94)
- ... (several more)

Global R & D Projects & Collaboration

Academia Industry Research Projects

University Grants Commission	Educational Data Mining	2018 - 19	INR 500K
Min. Human Resource Dev., Government of India	Virtual Lab – Programming & Data Structure Lab	2010 – 12	INR 1500 K
Min. Human Resource Dev., Government of India	NPTEL Video Course Development – Compiler, Multimedia	2010 – 13	---
Microsoft Corp., USA	Object Oriented (C#/.NET centric) Courseware Development	2004 – 07	USD 22 K
Min. Human Resource Dev., Government of India	Multiobjective Evolutionary Algorithms for Combinatorial Optim.	2002 – 07	INR 1000 K
National Semiconductors Corp., Germany/USA	Software Tools for Embedded Systems (co-PI)	2003 – 06	USD 100 K
National Semiconductors Corp., Germany/USA	Software Tools for C.R. Processors (co-PI)	2001 – 03	USD 225 K
IIT Kharagpur	Convergence of Multiobjective Optim.	2001 – 03	INR 100 K

Visitor @ Universities Abroad

Visitor	GaTech Atlanta, US	ML, PL	Feb.2023, April 2024
Visitor	NUS, Singapore	ML, PL	June, Dec. 2022
Visitor	UPenn, Rice Univ, USA	Prog. Lang., ML	May 2022
Visitor	NUS, Singapore	Multimedia, ML	July 2019
Visitor	Rice Univ., USA	Machine Learning	Mar. 2018
Visitor	Univ. Sheffield, UK	Evo. Algo. Comb. Optim.	July 2007
Visitor	GIST, S. Korea	Evo. Algo. Comb. Optim.	Mar. 2007
Visitor	TU Darmstadt, Germany	Prog. Lang., Multimedia	Sep. 2006
Visitor	Aizu Univ., Japan	Evo. Algo. Comb. Optim.	Jan.2005
Visitor	UIUC, USA	Multimedia, Evo. Algo	July 2003
Visitor	ETH Zurich Switzerland	Multi-obj. Evo. Algo.	June 2002
Visitor	MIT, CMU: USA	Machine Vision	July 1996
PhD, TA	Sheffield Univ., U.K.	Comp. Engg.	Mar 1994 to Apr 1997

Tutorials and Invited Talks in FDPs, Workshops, & Conferences

Tutorials

- Evo. Multi-criteria Optim. @ GECCO-07, London; GECCO-08, Atlanta; GECCO-09, Montréal.
- Architecture exploration for embedded system design @ HiPC-04, Bangalore.
- Multimedia system design for QoS @ HiPC-03, Hyderabad.
- Multimedia system @ ITPC-03, Kathamandu.

Invited Talks / Seminars / FDPs /STCs

Machine Learning & Data Analytics

- FDP: D2K: Machine Learning & Data Intelligence @ IIIT Noida, Jan. 2023.
- Evolution of a perceptron to massively connectionist DL architecture @ UPES Dehradun, Dec. 2021.
- FDP: Evolving massively connectionist DL architecture @ Rajiv Gandhi Univ., Itanagar, Sep. 2021.
- FDP: Intro. to Prob. Theory in ML @ NIT Jalandhar, Sep. 2020.
- The Pedagogy of AI for Multidisciplinary Students @ Huawei AI Educator Symp, Mumbai, Dec. 2019.
- FDP: ML: Research Directions and Applications @ KEIT Ghaziabad, June 2019.
- AI: Issues and Current Trends @ World TelComm. & Info. Society Day, C-DoT Delhi, June 2018.
- ML: Issues & Research Directions @ ML Workshop, IMS Ghaziabad, Jan. 2018.
- Trends in Outlier Detection: Issues & Challenges @ Data Mining STC, NSIT Delhi, Nov. 2017.
- Data-mining by meta-learning @ IARCS Course, Siddhartha Academy, Vijayawada, 2004.
- Meta-learning of high-dim. spaces for scaling and generalization in data mining @ IIIT-H, 2000.
- Scaling and generalization in data mining by meta-learning of data patterns @ IETE Pilani, 1999.
- Hybrid computational intelligent systems @ KanGAL, IIT Kanpur, 1997.
- Hierarchical organization of intelligent models @ TIET Patiala, 1997.
- Hybrid Intelligent models @ BITS Pilani, 1997.

Education, Sc. & Tech., and Ethics & Governance

- FDP: NEP 2020: Transforming the regulatory system of higher education @ ABESIT Gzb, Aug. 2024.
- FDP: Enlightened Edu: Nurturing Minds with Discipline, Ethics, & Joy @ LNMIIT Jaipur, Mar. 2024.
- Ethical Writing: Learning from experiences of day-to-day live examples @ ICARS Delhi, June 2020.
- Scientometrics and Publication Ethics @ VJTI Mumbai, Dec. 2019.
- E-Governance with AI / ML @ Refresher Course, UGC-HRDC, JNU, July 2018, Aug. 2019.
- Crisis in HEIs in India: A Technological Perspective @ Press Club of India, JNUTA, Nov. 2018.
- Evolution of Paperless PhD: A journey from stone age, Decoding Sc. & Tech. @ JNU, Oct. 2018.
- Academy Autonomy: Gurukuls and Today's HEI @ ISSCA Workshop, Delhi Univ., Feb. 2018.
- Academic Autonomy from Gurukul to Today's Institutions @ VBS Purvanchal Univ., Sep. 2017.
- Personal Computers to Personalized Computing for Socializing and Banking: A Paradigm Shift in Computing & Comm. Research, Ind. Social Science Congress (ISSC), Andhra Univ., Mar. 2015.
- NBA Trainer's Workshop on Revised Guidelines for Accreditating UG Engineering Programs: @ Indian States Capitals, Jan – Mar. 2011.
- On Enhanced Quality in Teaching and Research @ IIITU, Noida, Dec. 2009.
- AICTE/NBA Revised Guidelines for Accreditating UG Engineering Programs: Awareness Workshops for Assessors & Managers @SPEC, Mumbai, June 2009; JNTU Hyderabad & UTU Ddn, Aug 2009.
- Towards Value-Added Professionalism @ Maharaja Agrasen Mahavidyalaya, Bareilly, Oct. 2009.
- Quality in Education, Research and Services @ Dhirubhai Ambani IICT Gandhinagar, Nov. 2008.
- A document that serves the reader @ BITS Pilani, Sep. 1997.

Programming Languages & Software Systems

- Software Engineering and Runtime Systems @ NIT Rourkela, May 2009.
- Object-oriented software engg. : concepts and practices @ NIT Durgapur, Thapar Univ., 2008.
- Virtual execution environment for trusted computing @ NIT Rourkela, October 2008.
- Object-oriented software engineering: A Lecture series @ JIITU Noida, September 2008.
- Programming pearls and pitfalls @ JIITU Noida, January 2008.
- Multiple polymorphic arguments in object-oriented lang. @ IIT Delhi, TU-Darmstadt, 2006.
- Object-oriented language implementation course – a working proposal @ Microsoft, 2006.
- Reusable plug-in software components for dependable systems @ EuroIndia, 2004.
- Software tools for extensible CompactRisc processors @ National, Munich, June 2002.
- Message dispatch in object-oriented systems @ IIIT Hyderabad, 2000.

Evolutionary Multiobjective Combinatorial Optimization (EMCO)

- EMCO: Issues and Research Directions @ UGC HRDC, JNU, Sep. 2015.
- EMCO: A keynote talk @ IC3, JIIT Noida, Sep. 2008.
- EMCO - solving hard problems @ UIET Kanpur, Feb. 2007; Gwangju IST, S. Korea, Mar. 2007.
- Solving hard problems in EMO - a practitioner's approach @ KanGAL, IIT Kanpur, 2006.
- Convergence in multiobjective genetic & combinatorial optim. @ IlliGAL UIUC, 2003; IITKgp.
- Convergence in multiobjective genetic optim. using rank-histograms @ ETH Zurich, June 2002.
- Population driven computational paradigm for search and optimization @ BITS Pilani, 2000.
- A practical approach to EMO @ IIT Roorkee, 1997.

Multimedia & Embedded Systems

- Video coding – history & practices: Keynote talk @ Int. Conf. S.P., SATI Vidisha (2016).
- Embedded Systems: Design & Validation @ Gwangju Inst. Sc. & Tech. (GIST), S. Korea. Mar 2007.
- Video transcoding: algorithms and architectures @ TU-Darmstadt, 2006.
- Networked multimedia @ DPN Conf., Kharagpur, 2004.
- Globalization through miniaturized multimedia devices @ Allahabad Univ. (2004).
- Embedded System Design @ Galgotias Noida, 2004.
- Design space exploration tools for embedded systems @ CEERI (2004), EuroIndia (2004).
- Transcoding and QoS for multimedia traffic @ MONET, UIUC (2003).
- Teaching with tech.: multimedia in computer-aided learning @ Kendriya Vidyalaya (2003).
- On QoS: reality check @ HiPC Trusted Internet Workshop, 2002.
- Triplet geometric representation: novel local invariants for robust recognition @ CMU, 1996.
- Triplet point representation and hierarchical neural net classifier @ ESG, Sheffield. Univ., June 1995.

* * *

Public Policies for IITs/CFTIs/CUs/HEIs

Actively involved in drafting policies for HEIs, maintaining a delicate balance between stakeholders: Government and academicians while developing impact-driven public policies. **Most are in Public Use**

IIT JEE Reforms (2006 – 2015)

Pioneered transparency, common examination (JEE), common counselling (JoSAA/CSAB), and systematic reforms in Engg. admissions for IITs/NITs/IITs/CFTIs. The proposal led to institution of National Testing Agency (NTA). These concepts have been adopted for admissions in most disciplines in the country.

- I. Prior to 2006, IITs admission examination/processes were marred with several types of irregularities, irrationalities, ad hoc-ism, etc., due to the complete opaqueness of the system. For example,
 - (a) **Student(s) with marks as high as 279 were not admitted, though students with fewer marks of 154 were admitted.** The then IIT-JEE subject cut-offs {37, 48, 55} in 2006 became single digits {1, 4, 3} & {5, 0, 3} in subsequent years, respectively in 2007 and 2008 out of 182 in Maths, Physics, Chemistry, making IIT-JEE a laughing stock in public.
 - (b) There were **errors in questions and answer keys**; ambiguous instructions in the question paper led to wide-ranging manipulations.
 - (c) A student was admitted to multiple institutions, leading to a national waste of time, resources, efforts, etc. **Hundreds of seats remained unfilled**, leading to backdoor admissions.

A student was unaware of why one was selected/rejected due to the opaqueness of the system.

- II. As a Professor at IIT Kharagpur, I **discovered several such irregularities through research & analysis of admission-specific data**. The Hon'ble High Court termed the then situation of IITs admissions with "*a proverbial situation of it being darkest beneath the lamp ... if becomes known to the world at large, may make them (IITs) a laughing stock in the eyes of their clients.*"
- III. My **tenacious decade-long efforts** of cleaning up IITs admissions led to wide-ranging reforms in admissions through transparency, well-defined *prior* decision-making, and standardized processes, as
 - (a) **Subject cut-offs were fixed** a priori at 10% of the Max. Marks for GEN category and others;
 - (b) Students were allowed to carry the question paper, **model answer keys were uploaded**, and feedback about correctness was given. The **corrected answer keys** were uploaded and used for final evaluation.
 - (c) A carbon copy of the ORS was made available to candidates, and the **evaluated ORS** was uploaded for verification of marks before the announcement of the final result;
 - (d) Pioneered **Common Examination (JEE (Main))** for UG Engineering admissions;
 - (e) Conceptualized **Common Counselling (JoSAA/CSAB)** for UG engineering admissions in all CFTIs. Multiple rounds of counselling for filling most seats through centralized seat allocation.
 - (f) Institution of National Testing Agency (NTA) for most admission (MCQ-based) examinations.

The above methodologies have been adopted by most UG and PG admissions and MCQ-based examinations across almost **all professional disciplines**, benefitting millions of students every year.

- IV. **The Hon'ble Supreme Court** hailed me as ***one of the many unsung heroes who helped in improving the system.*** The Apex court also asked, "*IITs and the candidates who now participate in the examinations must, to a certain extent, thank the appellants for their efforts in bringing such transparency and accuracy in the ranking procedure.*" Furthermore, inclusion of common examinations in NEP 2020 and the adoption of CUET for UG/PG programs with common counseling are live examples in action.

Quantifiable Accreditation Guidelines: A Paradigm Shift in Regulations: In Public Use (2008 – 2011)

Authored NBA Accreditation ABET Compliance, Guidelines for U.G. Engg. Programs. Conducted National Awareness Workshops (Public use: July 2009 to Jan. 2013).

- V. Co-authored *output-based quantifiable* accreditation guidelines for UG Engg. Programs and defined quantitative Academic Performance Indices (**APIs**) for engineering faculty (2009).
- VI. Authored solely *output-based quantifiable* ABET-guided accreditation guidelines for UG Engg. Programs. Conducted All-India workshops for awareness and training. The National Board of Accreditation (NBA) was made an autonomous body. (2009 – 2011)
- VII. This work led India to join the **Washington Accord** in June 2014. Revised guidelines are in public use.

Misc. Proposals submitted to the Ministry (2018 – 2023)

- VIII. **Grievance Redressal** by a neutral third party in HEIs (Nov. 2018).
- IX. **Common Entrance Examinations** in Central Universities led to **CUET**: My proposal differed from the CUET 2022; however, the current CUET is inching towards my proposal after Delhi University adopted CLAT for its LLB Program 2023 (March 2021). Including Common Examinations in **NEP 2020** is a testimony of this work.
- X. **Prevent suicides** in IITs, resulting in a draft OM in Feb. 2023: Proposed measures and processes for mental well-beings, early alert generations with the involvement of several stakeholders, and grievance redressals (GR) for preventing unfortunate incidences in IITs. Most of these measures have been adopted by IITs for the prevention of suicides (2022 - 23). This proposal was an extension of my Grievance Redressal Proposal for CFTIs (Nov. 2022 – Feb. 2023)
- XI. **Implementation of Common Counselling** for CUET (Oct. 2022 – Apr 2023). The Prototype developed with the 'Samarth' (DU) was planned for Common Counselling 2024 and onward.

Academic Services at JNU (2015 – 2024)

- (a) Proposed **dual-degree programs** in engineering with social sciences and admissions and counselling through **JEE (Mains)** and **JoSAA** (2016–17), led to the School of Engineering in JNU.
- (b) Drafted JNU's **anti-plagiarism** policy (2016-17); replaced by UGC Regulations, 2018. Initiated IPR policy (2017).
- (c) **AICTE recognition** of the M.Tech. Program (2016 – 17),
- (d) Addition of **laboratory courses** in the academic programs of the School (2015 – 16),
- (e) Institution of Research Advisory Committee (**RAC**) for every PhD student in the School (2015– 16). It was later adopted by JNU and subsequently adopted in **UGC Regulations, 2018**.
- (f) Introduced **Academic Ethics** course for thesis students (2016–18),
- (g) Initiated a **seminar series** combining sciences and social sciences (2018),
- (h) Suggested to have a **common protesting venue** in JNU for minimizing disruptions in work (later, Hon'ble High Court directed for the same), etc. (2016),
- (i) Suggested adopting the existing national level entrance examination be considered for admissions for all postgraduate and doctoral admissions, e.g., **GATE and NIMCET** for admissions in MTech and MCA of the School of Computer & Systems Sciences (2018 – 21),
- (j) **Adopted a new work culture** in Feb. 2016, through which no teaching or research guidance has been interrupted due to any lockdown, strikes, protests, etc. (2016 onwards).

Most of the above are in public use. **Some of these are/were being counted as flagship initiatives** of the former Vice-Chancellor, Prof. M. Jagadesh Kumar (now, Chairman UGC).

Articles, Opinions, & News: In Media

Opinion / Op-Ed / Blog Pages

- [1] [Times of India Opinion Blog: Rajeev Kumar](#)
- [2] [Hindu Opinion & Op-Ed Pages: Rajeev Kumar](#)
- [3] [Eklavya JEE 2006](#)

Opinion / Op-Ed Articles and Interviews

- [4] Rajeev Kumar. [Decoding SC judgment: NEET skeletons tumble, unanswered questions persist](#). Times of India Opinion. Aug, 12, 2024.
- [5] Rajeev Kumar. [Pen'n'paper just won't pass](#). Economics Times (Opinion). June 27, 2024.
- [6] Rajeev Kumar. [Preventing another NEET fiasco](#). Hindu (Op-Ed). June 26, 2024.
- [7] Rajeev Kumar. [Behind the NEET 2024 fiasco: Move from 'select few' to 'appease all.'](#) *Indian Express*, June 15, 2024.
- [8] Rajeev Kumar. [Tackling the 'left-behind syndrome: Student suicides cannot be addressed without talking about young people's isolation](#). *Indian Express*, Sep 12, 2023.
- [9] Rajeev Kumar. Student suicides: [Despite complaint mechanisms in place in higher educational institutions, many suffer in silence](#). *Indian Express*, Mar 16, 2023.
- [10] [AI can further reform the admission process in IITs](#) (Interview) CXO TV. Dec. 13, 2019.
- [11] [This professor's campaign reformed the opaque IIT admissions](#) (Interview) *Scroll-In*. Aug. 10, 2018.
- [12] Know Your Rights (Interview). *The Scholars' Avenue*. IIT Kharagpur. Mar 17, 2010.

Comments / Opinion

- [13] [NEET 2024 Judgment: On SOPs](#). Telegraph: August 04, 2024
- [14] [Coaching industry minting money](#). Telegraph: August 04, 2024.
- [15] [NEET 2024: small-town candidates rival toppers from coaching hubs](#). Telegraph: July 22, 2024.
- [16] [B.Tech. in Hindi Medium @ IITJ](#). Telegraph: July 10, 2024.
- [17] [On Public Examination \(Prevention of Unfair Means\) Act, 2024](#). Telegraph: June 22, 2024.
- [18] [NTA's composition and competence](#). Telegraph: June 21, 2024.
- [19] Center rolls out, One Nation One Student ID: Telegraph: Feb. 14, 2024.
- [20] Coaching rein-in bid scepticism. Telegraph: Feb. 05, 2024.
- [21] Efforts to prevent suicides in IITs. Telegraph: April 19, 2023.
- [22] IIT Madras scholar found dead. Telegraph: April 01, 2023.
- [23] Grim data on suicides at IITs. Telegraph: March 17, 2023.
- [24] IIT panel rules out caste bias. Telegraph: March 07, 2023.
- [25] Post of professors most among teaching vacancies in C.U.s. *Indian Express*: Dec. 13, 2022.
- [26] Academia split over UGC decision to award PhD without published papers. Telegraph: Nov 14, 2022.
- [27] IIT plan diploma as a valve for stress: exit option after 2 years. Telegraph: Nov 01, 2022.
- [28] Temple crops up inside university of Hyderabad: Telegraph: April 13, 2022.
- [29] UGC backs education tech for online courses. Telegraph: April 03, 2022.
- [30] Masters and PhD courses face vacancies in IITs. Telegraph: Feb. 10, 2022.
- [31] Central Universities scrap common counselling for seat allotment. Telegraph: Jan. 25, 2022.

- [32] JNU Academic Council approves centralized entrance test proposal. Telegraph: Jan. 13, 2022.
 - [33] External affairs ministry withdraws widely criticised int. webinar order. Telegraph: Feb. 26, 2021.
 - [34] IIT Guwahati makes permission mandatory for all webinars. Telegraph: Feb. 25, 2021.
 - [35] Academics raise quality questions, virtual varsity plan worry. Telegraph: Jan. 31, 2021.
 - [36] Central varsity teacher hiring frozen. Telegraph: Aug. 28, 2020.
 - [37] Humanities, social sciences to be included in GATE. Telegraph: July 27, 2020.
 - [38] IITs crowd-fund to bridge digital divide. Telegraph: July 25, 2020.
 - [39] Academic question UGC exam order. Telegraph: July 08, 2020.
 - [40] Pitfalls of JNU online classes. Telegraph: June 22, 2020.
 - [41] PMR Fellowship bar lowered. Telegraph: May 08, 2020.
 - [42] Seven IITs Times ranking. Telegraph: April 19, 2020.
 - [43] Varsities mull innovative online tests. Telegraph: April 18, 2020.
 - [44] IIT appeal to recruiters. Telegraph: April 06, 2020.
 - [45] Home-truth question for JNU VC: 2 official accommodations for the past 4y. Telegraph: Jan. 13, 2020.
 - [46] JNU springs email examination. Telegraph: Dec. 22, 2019.
- ... many more.

Research Publications: Books, Edited Books, Edited Book Articles, & Tutorials

Book

- [1] Soham S. Chakraborty, Rajeev Kumar, and PP Chakrabarti (2012) Static Analysis and Optimization of Object-Oriented Systems – Concepts and Approaches. Lap Lambert Academic Publishing GmbH, Germany. ISBN 978-3-8484-1353-9.

Edited Books (Conf. Proceedings)

- [2] Sanjay Kumar Jena, Rajeev Kumar, Ashok Kumar Turuk, and Manoranjan Dash (2011) Proc. Int. Conf. Communication, Computing, and Security (ICCCS-11), Rourkela, India, Feb. 12-14, 2011. ACM, New York. ISBN: 978-1-4503-0464-1
- [3] Sanjay Ranka, Srinivas Aluru, Rajkumar Buyya, Yeh-Ching Chung, Sumeet Dua, Ananth Grama, Sandeep K. S. Gupta, Rajeev Kumar, Vir V. Phoha (2009) Proc. Contemporary Computing – 2nd Int. Conf., IC3 2009, Noida, India, August 17-19, 2009. Springer Inc. ISBN:978-3-642-03546-3
- [4] Ajit Pal, Ajay Kshemkalyani, Rajeev Kumar, and Arobinda Gupta (2005) Distributed Computing - Proc. Int. Workshop Distributed Computing (IWDC). LNCS vol. 3741, Dec. 2005. ISBN 3-540-309-59-4. Springer.

Edited Book Articles

- [5] Sonal Tuteja and Rajeev Kumar (2020) An Architecture for Data Unification in E-commerce using Graph. In: Kapur P. et al. (eds) *Strategic System Assurance and Business Analytics. Asset Analytics* (Performance and Safety Management), chapter 30, pages 407-417. Springer, Singapore. doi: 10.1007/978-981-15-3647-2_30
- [6] Akanksha Mukhriya and Rajeev Kumar (2018) Exploring Ensembles for Unsupervised Outlier Detection: An Empirical Analysis. In: Chakraverty S., Goel A., Misra S. (eds) *Towards Extensible and Adaptable Methods in Computing*, pages 225 – 237. Springer. doi: 10.1007/978-981-13-2348-5_17
- [7] Rajeev Kumar and PK Singh (2007) Pareto Evolutionary Algorithm Hybridized with Local Search for Biobjective TSP. In Hybrid Evolutionary Systems: Chap 6, 2007. Studies in Computational Intelligence Series, Springer.
- [8] Rajeev Kumar (2004) On Machine Learning with Multiobjective Genetic Optimization. In Carlos A. Coello Coello, and Gary B. Lamont (Eds.), *Applications of Multiobjective Evolutionary Algorithms*, Chap. 17: 393 - 425, December 2004. ISBN 981-256-106-4. World Scientific.

Published Tutorials

- [9] Rajeev Kumar (2009) A Tutorial on "Evolutionary Multiobjective Combinatorial Optimization (EMCO)" -- A Specialized Tutorial. In Proc. Genetic and Evolutionary Computation Conference (GECCO-2009), Montréal, pp. 3413-3436, 09 July 2009. ACM.
- [10] Rajeev Kumar (2008) A Tutorial on "Evolutionary Multiobjective Combinatorial Optimization." A Specialized Tutorial. In Proc. Genetic and Evolutionary Computing Conference (GECCO), Atlanta, pp. 2805 - 2828, 13 July 2008. ACM.
- [11] Rajeev Kumar (2007) A Tutorial on "Evolutionary Multiobjective Combinatorial Optimization." A Specialized Tutorial. In Proc. Genetic and Evolutionary Computing Conference (GECCO), London, pp. 3366 - 3390, 08 July 2007. ACM.

Journal Research Publications: Peer Reviewed Articles and Newsletters

- [12] Akhilesh Rawat and Rajeev Kumar (2025) 3D U-Net-Norm architecture for improving generalization of BraTS images. *Multimedia Tools & Applications*. Springer. Online Aug. 02, 2024. <https://doi.org/10.1007/s11042-024-19955-6>
- [13] Gouranga Duari and Rajeev Kumar (2024) Decomposition for Outlier Detection using Space Partitioning. *InfoCom J. Computer Science*: 23(1) June 2024.
- [14] Farheen and Rajeev Kumar (2024) Composition of feature selection for time-Series prediction with deep learning. *Procedia Computer Science* 235(C): 1477 – 1488. <https://doi.org/10.1016/j.procs.2024.04.139>. Elsevier. May 2024.
- [15] Akhilesh Rawat and Rajeev Kumar (2024) A hybrid DL architecture for improved generalizability with self-adaptive Jaya optimizer for diabetic retinopathy. *Procedia Computer Science* 235 (C): 2090 – 2100. <https://doi.org/10.1016/j.procs.2024.04.198>. Elsevier. May 2024
- [16] Gouranga Duari and Rajeev Kumar (2024) Attribute subspace partitioning with neural regression for contextual outlier detection. *Procedia Computer Science* 235(C): 1892 – 1902. <https://doi.org/10.1016/j.procs.2024.04.180>. Elsevier. May 2024.
- [17] Om Prakash and Rajeev Kumar (2024) A unified generalization enabled ML architecture for manipulated multi-modal social media. *Multimedia Tools & Applications* (23 pages). Springer. <https://doi.org/10.1007/s11042-023-16198-9> (Published Online Aug. 08, 2023). March 2024.
- [18] Bhupendra Kumar and Rajeev Kumar (2024) Generalizing Clustering Inferences with ML Augmentation of Ordinal Survey Data. *Computer Science Journal* 25(1): 47 – 77. Jan. 2024. <https://doi.org/10.7494/csci.2024.25.1.5685>
- [19] Akhilesh Rawat and Rajeev Kumar (2023) Deep-CodecG*: A generalized deep autoencoder for robust segmentation of left atrium in cardiac MRIs. *InfoCom Journal of Computer Science* **22**(2): December 2023.
- [20] Akanksha Mukhriya and Rajeev Kumar (2023) Combination fairness with scores in outlier detection ensembles. *Information Sciences* **645**: 119337 (17 pages), Oct. 2023. Elsevier. <https://doi.org/10.1016/j.ins.2023.119337>
- [21] Gargi Mishra and Rajeev Kumar (2023) An individual fairness based outlier detection ensemble. *Pattern Recognition Letters* **171**: 76–83, July 2023. Elsevier. <https://doi.org/10.1016/j.patrec.2023.05.010>
- [22] Sonal and Rajeev Kumar (2023) Query driven graph models in E-commerce. *Innovations in Systems & Software Engineering* **19**, 177–195, June 2023. Springer. <https://doi.org/10.1007/s11334-021-00421-7>
- [23] Om Prakash and Rajeev Kumar (2023) Multi-modal social networks with IoT-enabled wearable devices for healthcare. *InfoCom Journal of Computer Science* **22**(1): June 2023.
- [24] Bhupendra Kumar and Rajeev Kumar (2023) Unification of numerical and ordinal survey data for clustering-based inferencing. *InfoCom Journal of Computer Science* **22**(1): June 2023.
- [25] Priti Kumari and Rajeev Kumar (2023) Clustering scientometrics of computer science journals for subarea decomposition. *Journal of Scientometrics Research* **12**(2): 383-394, May – June 2023. <https://doi.org/10.5530/jscires.12.2.034>
- [26] Sonam Chhikara and Rajeev Kumar (2023) Information theoretic steganalysis of processed image LSB Steganography. *Multimedia Tools & Applications* **82**: 13595 – 13615, April 2023. Springer. <https://doi.org/10.1007/s11042-022-13931-8>
- [27] Priti Kumari and Rajeev Kumar (2023) Collaborative authorship patterns in computer science publications. *Annals of Information & Library Studies* **70**(1): 22-32, March 2023. CSIR India. <https://doi.org/10.56042/alis.v70i1.70536>
- [28] Neeraj Pathak and Rajeev Kumar (2023) Entropy guided evolutionary search for solving Sudoku. *Progress in Artificial Intelligence* **12**: 61–76, March 2023. Springer. <https://doi.org/10.1007/s13748-023-00297-7>

- [29] Roopam Sadh and Rajeev Kumar (2023) Transformation and classification of ordinal survey data. *Computer Science Journal* **24**(2): 211-230, March 2023. AGH Univ Sc. Tech, Poland. <https://doi.org/10.7494/csci.2023.24.2.4871>
- [30] Roopam Sadh and Rajeev Kumar (2022) Dimensional inadequacy of rankings: Exploring substantial and meta-quality dimensions for HEIs. *Academia* 26: 25-48. Higher Edu. Policy (HEP) Net, Europe. <https://doi.org/10.26220/aca.3948>
- [31] Mahesh Shirole and Rajeev Kumar (2022). Concurrent behavioral coverage criteria for sequence diagrams. *Innovations in Systems & Software Engineering* 19: 157–176, June 2023. Springer. <https://doi.org/10.1007/s11334-021-00413-7>
- [32] Sonal and Rajeev Kumar (2022) A unification of heterogeneous data sources into a graph model in e-commerce. *Data Science & Engineering* 7(1): 57-70, March 2022. Springer. <https://doi.org/10.1007/s41019-021-00174-0>.
- [33] Sonal and Rajeev Kumar (2021) Graph Model based recommendation architecture for e-commerce applications. *Infocomp Journal Computer Science* 20(2), Dec. 2021.
- [34] Mahesh Shirole and Rajeev Kumar (2021). Constrained Permutation-Based Test Scenario Generation from Concurrent Activity Diagrams. *Innovations in Systems & Software Engineering* 17: 343–353, Dec. 2021. Springer. <https://doi.org/10.1007/s11334-021-00389-4>
- [35] Sonam Chhikara and Rajeev Kumar (2021) Image steganalysis with entropy hybridized with chaotic grasshopper optimizer. *Multimedia Tools and Applications* 80: 31865-31885, Sep. 2021. Springer. <https://doi.org/10.1007/s11042-021-11118-1>.
- [36] Akanksha Mukhriya and Rajeev Kumar (2021) Building outlier detection ensembles by selective parameterization of heterogeneous methods. *Pattern Recognition Letters* 146C: 126 – 133, June 2021. <https://doi.org/10.1016/j.patrec.2021.03.008>
- [37] Roopam Sadh and Rajeev Kumar (2021) Directional Pattern-based Clustering for Quantitative Survey Data: Method and Application. *Survey Research Methods* 15(2): 169-185, 2021. European Research Survey Association. <https://doi.org/10.18148/srm/2021.v15i2.7773>
- [38] Mahesh Shirole and Rajeev Kumar (2021) Concurrency coverage criteria for activity diagrams. *IET Software* 15(1): 43-54, Feb. 2021. John Wiley (OAJ). <https://doi.org/10.1049/sfw2.12009>
- [39] Roopam Sadh and Rajeev Kumar (2020) Clustering of quantitative survey data based on marking patterns. *Infocomp Journal Computer Science* 19(2): 109-119, Dec. 2020.
- [40] Neeraj Pathak and Rajeev Kumar (2020) Hybrid evolutionary algorithm for travelling thief problem. *Infocomp Journal Computer Science* 19(2): 132-140, Dec. 2020.
- [41] Sonam Chhikara and Rajeev Kumar (2020) MI-LFGOA: Multi-island levy-flight based grasshopper optimization for spatial image steganalysis. *Multimedia Tools and Applications* 79(39): 29723-29750, Oct. 2020. Springer. <https://doi.org/10.1007/s11042-020-09328-0>
- [42] Sonam Chhikara and Rajeev Kumar (2020) An Information theoretic image steganalysis for LSB steganography. *Acta Cybernetica* 24(4): 593-612, Oct. 2020. <https://doi.org/10.14232/actacyb.279174>.
- [43] Priti Kumari and Rajeev Kumar (2020) Scientometric analysis of computer science publications in journals and conferences with publication patterns. *Journal of Scientometric Research* 9(1): 54-62, Jan-Apr 2020. <https://doi.org/10.5530/jscires.9.1.6>.
- [44] Soma Saha, Rajeev Kumar and Gyan Baboo (2013) Characterization of graph properties for improved Pareto fronts using heuristics and E.A. for bi-objective graph coloring problem. *Applied Soft Computing* 13(5): 2812 – 2822, May 2013. Elsevier.
- [45] Pravanjan Choudhury, PP Chakrabarti and Rajeev Kumar (2012) Online Scheduling of Dynamic Task Graphs with Communication and Contention for Multiprocessors. *IEEE Trans. Parallel and Distributed Systems* 23(1): 126 – 133, Jan. 2012.
- [46] Rajeev Kumar and Nilanjan Banerjee (2011) Multiobjective network topology design. *Applied Soft Computing* 11 (8): 5120 - 5128, Dec. 2011. Elsevier.

- [47] Rajeev Kumar and PK Singh (2010) Assessing solution quality of biobjective 0-1 Knapsack problem using evolutionary and heuristic algorithms. *Applied Soft Computing* 10(3): 711 - 718, June 2010. Elsevier.
- [48] Dipankar Das, PP Chakrabarti, and Rajeev Kumar (2010) Thermal analysis of multiprocessor SoC applications by simulation and verification. *ACM Trans. Design Automation of Electronic Systems (TODAES)* 15(2), Article 15, Pages 52, Feb. 2010. ACM.
- [49] Sandip Aine, PP Chakrabarti and Rajeev Kumar (2010) Heuristic search under contract. *Computational Intelligence* 26 (4); 386-419. Blackwell.
- [50] Dipankar Das, PP Chakrabarti, and Rajeev Kumar (2009) Scenario based timing verification of multiprocessor embedded applications. *ACM Trans. Design Automation of Electronic Systems (TODAES)* 14(3), Article 37, Pages 58, May 2009. ACM.
- [51] Sandip Aine, Rajeev Kumar, and PP Chakrabarti (2009) Adaptive parameter control of evolutionary algorithms to improve quality-time trade-off. *Applied Soft Computing* 9 (2): 527-540, Mar. 2009. Elsevier.
- [52] S.K. Panda, Arnab Roy, PP Chakrabarti and Rajeev Kumar (2008) Simulation Based Verification using Temporally Attributed Boolean Logic. *ACM Trans. Design Automation of Electronic Systems (TODAES)* 13(4), Article 63, Pages 52, Sep. 2008. ACM Press.
- [53] Rajeev Kumar and Dipankar Das (2008) Code compression for performance enhancement of variable length embedded processors. *ACM Trans. Embedded Computing Systems* 7(3), Article 35, Pages 36, Apr 2008. ACM Press.
- [54] Vasant Patil and Rajeev Kumar (2008) A fast inverse motion compensation algorithm for DCT-domain video transcoder. *IEEE Trans. Circuits and Systems for Video Technology* 18(3): 394 – 399, Mar. 2008. IEEE Press.
- [55] Pravanjan Choudhury, Rajeev Kumar and PP Chakrabarti (2008) Conditional and unpredicted task scheduling with selective duplication for embedded multiprocessors under memory and time constraints. *IEEE Trans. Parallel and Distributed Systems* 19 (7): 967 - 980, July 2008. IEEE CS Press.
- [56] DP Mohapatra, M. Sahu, Rajeev Kumar, and R. Mall (2008) Dynamic slicing of aspect-oriented programs. *Informatica* 32 (3): 261 - 274, Oct. 2008. Slovene Informatika.
- [57] Dipankar Das, PP Chakrabarti, and Rajeev Kumar (2007) Functional verification of task partitioning for multiprocessor embedded systems. *ACM Trans. Design Automation of Electronic Systems* 12(4), Article 44, Pages 53, Sep 2007. ACM Press.
- [58] Sandip Aine, PP Chakrabarti, and Rajeev Kumar (2007) An automated meta-level control framework for optimizing the quality-time trade-off of VLSI algorithms. *IEEE Trans. Computer-Aided Design of Integrated Circuits and Systems* 26(11): 1992 – 2008, Nov 2007. IEEE Press.
- [59] Rajeev Kumar (2007) A statistical approach to robust video temporal indexing and segmentation. *Int. Journal Wavelets, Multiresolution and Information Processing* 5 (5): 769 – 783, Sep 2007. World Scientific.
- [60] Rajeev Kumar and Vikram Agrawal (2007) Multiple dispatch in reflective runtime environment. *Computer Languages, Systems & Structures* 33 (2): 60 – 78, 2007. Elsevier.
- [61] DP Mohapatra, R. Mall, and Rajeev Kumar (2007) A parallel algorithm for dynamic slicing of distributed Java programs in non-DSM systems. *Int. J. Information & Communication Technology*, 1(1): 38 – 49, 2007.
- [62] DP Mohapatra, Rajeev Kumar, R. Mall, DS Kumar, and M. Bhasin (2006) Distributed dynamic slicing of Java programs. *Journal Systems & Software* 79 (12): 1661 – 1678, Dec 2006. Elsevier.
- [63] Rajeev Kumar and Vasant Patil (2006) An efficient motion vector composition scheme for arbitrary frame down-sampling video transcoder. *IEEE Trans. Circuits and Systems for Video Technology* 16 (9): 1164 – 1171, Sep 2006. IEEE Press.
- [64] Vasant Patil, Rajeev Kumar and Jayanta Mukherjee (2006) A fast arbitrary factor video re-sizing algorithm. *IEEE Trans. Circuits and Systems for Video Technology* 16 (9): 1148 - 1152, Sep. 2006. IEEE Press.

- [65] Arnab Sarkar, PP Chakrabarti, and Rajeev Kumar (2006) Frame based proportional round-robin. *IEEE Trans. Computers* 55 (9): 1121 – 1129, Sep. 2006. IEEE CS Press.
- [66] Ashok Turuk and Rajeev Kumar (2006) A flexible contention resolution scheme for QoS provisioning in optical burst switching networks. *Computer Communications* 29 (12): 2361 – 2376, Aug 2006. Elsevier.
- [67] Rajeev Kumar and Nilanjan Banerjee (2006) Analysis of a multiobjective evolutionary algorithm on the 0-1 knapsack problem. *Theoretical Computer Science* 358(1), 104 - 120, July 2006. Elsevier.
- [68] DP Mohapatra, R. Mall, and Rajeev Kumar (2006) An overview of slicing techniques for object-oriented programs. *Informatika* 30 (2): 253 – 277, 2006. Slovene Informatika.
- [69] Ashok Turuk and Rajeev Kumar (2005) QoS provisioning in WDM ring networks with tunable transceivers. *Journal of High-Speed Networks* 14 (4): 317 – 339, Nov 2005. IOS Press.
- [70] DP Mohapatra, R. Mall, and Rajeev Kumar (2005) Computing dynamic slices of concurrent object-oriented programs. *Information & Software Technology* 47 (12): 805 – 817, Sep 2005. Elsevier.
- [71] Ashok Turuk and Rajeev Kumar (2005) Delay-on-Demand: A signaling protocol to reduce blocking probability in optical burst switching networks. *Photonic Network Communications* 10 (2): 253 – 266, Sep 2005. Kluwer/Springer.
- [72] Sujoy Ghosh, Rajeev Kumar, Nilanjan Banerjee, and Raja Datta (2005) Multihop virtual topology design in WDM optical networks for self-similar traffic. *Photonic Network Communications* 10 (2): 199 – 214, Sep 2005. Kluwer/Springer.
- [73] Rajeev Kumar and Vishnu Makkapati (2005) Encoding of multispectral and hyperspectral image data using wavelet transform and gain shape vector quantization. *Image & Vision Computing* 23 (8): 721 – 729, Aug 2005. Elsevier.
- [74] Arnab Roy, SK Panda, Rajeev Kumar, and PP Chakrabarti (2005) A framework for systematic validation and debugging of pipelined simulators. *ACM Trans. Design Automation of Electronic Systems* 10 (3): 462 – 491, July 2005. ACM Press.
- [75] Raja Datta, Ashok Turuk, Sujoy Ghose, Rajeev Kumar, and IS Gupta (2005) New schemes for connection establishment in GMPLS environment for WDM networks. *Int. Journal Wireless & Optical Communications* 2005. World Scientific.
- [76] Ashok Turuk and Rajeev Kumar (2004) A token based distributed algorithm to support QoS in a WDM ring network. *Optics Communications* 240 (1-3): 99 - 121, Oct 2004. Elsevier.
- [77] Ashok Turuk and Rajeev Kumar (2004) A scalable and collision-free MAC protocol for all optical ring networks. *Computer Communications* 27 (15): 1453 – 63, Sep 2004. Elsevier.
- [78] Ashok Kumar Turuk, Rajeev Kumar and R. Badrinath (2004) A token based distributed algorithm for medium access in an optical ring network. *Optics Communications* 231(1-6): 199 – 212, Feb 2004. Elsevier.
- [79] Rajeev Kumar and Peter Rockett (2002) Improved sampling of the Pareto front in multiobjective genetic optimisation by steady state evolution: a Pareto Converging Genetic Algorithm. *Evolutionary Computation* 10 (3): 283 – 314, July 2002. MIT Press.
- [80] N. Chakraborty, Rajeev Kumar, and Dilip Jain (2001) A study of continuous casting mold using a Pareto converging genetic algorithm. *Applied Mathematical Modelling* 25 (1): 287 – 297, Jan 2001. Elsevier.
- [81] Rajeev Kumar (2000) *ANCHOR* – a connectionist architecture for partitioning feature spaces and hierarchical nesting of neural nets. *Int. J. Artificial Intelligence Tools* 9 (3): 397 – 416, Sep 2000. World Scientific.
- [82] Rajeev Kumar and P.I. Rockett (1998) Multiobjective genetic algorithm partitioning for hierarchical learning of high dimensional pattern spaces: a Learning follows Decomposition strategy. *IEEE Trans. Neural Networks* (Special issue on Hybrid Intelligent Models) 9(5): 822 – 830, Sep 1998. IEEE Press.
- [83] Rajeev Kumar and P.I. Rockett (1998) Decomposition of high dimensional pattern spaces for hierarchical classification. *Kybernetika*, 34(4): 435 – 442, Sep 1998. Academy Sciences, Czech Republic.

- [84] Rajeev Kumar and P.I. Rockett (1997) Triplet geometric representation: a novel scale, translation and rotation invariant feature representation based on geometric constraints for recognition of 2D object features. *Image & Vision Computing* 15(3): 235 – 249, Mar 1997. Elsevier.

Journal Research Publications: Newsletters & Others

- [85] Neha Kumari and Rajeev Kumar (2023) Finding recursive generics in Java source code using machine learning. *Int. Journal Engineering Trends & Technology* 71 (8): 76-84, Aug. 2023. Seventh Sense Res. Group. <https://doi.org/10.14445/22315381/IJETT-V71I8P207> (with APC)
- [86] Neha Kumari and Rajeev Kumar (2019) Evolution of generic programming in OOPs. *ACM SIGSOFT Software Engineering Notes* 44(1): 35 – 43, Jan. 2019. ACM. <https://doi.org/10.1145/3310013.3310033>
- [87] Mahesh Shirole and Rajeev Kumar (2013) UML behavioral model based test case generation: A survey. *ACM SIGSOFT Software Engineering Notes* 38(4): July 2013. ACM.
- [88] Mahesh Shirole and Rajeev Kumar (2012) Testing for concurrency in UML diagrams. *ACM SIGSOFT Software Engineering Notes* 37(5), Sep. 2012. ACM Press.
- [89] Surender Kumar and Rajeev Kumar (2012) Precise Static Analysis for Generic Programs in Object Oriented Languages. *ACM SIGSOFT Software Engineering Notes* 37(3): May 2012. ACM Press.
- [90] S. Harikrishnan and Rajeev Kumar (2012) Space efficient non-constant time multi-method dispatch in object-oriented systems. *ACM SIGSOFT Software Engineering Notes* 37(2): Mar. 2012. ACM Press.
- [91] Soma Saha and Rajeev Kumar (2011) Bounded-diameter MST instances with hybridization of multi-objective E.A. *J. Computer Applications* 18(4): 17 – 25, 2011. (with APC)
- [92] Rajeev Kumar and Soham S. Chakraborty (2007) Precise static type analysis for object oriented programs. *ACM SIGPLAN Notices* 42 (2): 17 – 27, Feb 2007. ACM Press.
- [93] Rajeev Kumar, Vikram Agrawal, and Anil Mangolia (2005) Realization of multimethods in single dispatch object-oriented languages. *ACM SIGPLAN Notices* 40 (5): 18 – 27, May 2005. ACM Press.
- [94] Rajeev Kumar, Amit Gupta, BS Pankaj, Mrinmoy Ghosh, and PP Chakrabarti (2005) Post-compilation optimization for multiple gains with pattern matching. *ACM SIGPLAN Notices* 40 (12): 14 – 23, Dec 2005. ACM Press.
- [95] Rajeev Kumar (2001) A neural network compiler system for hierarchical organization. *ACM SIGPLAN Notices* 36 (2): 26 – 36, Feb 2001. ACM Press.
- [96] Mayur Naik and Rajeev Kumar (2000) Efficient message dispatch in object-oriented systems. *ACM SIGPLAN Notices* 35(3): 49 – 58, Mar 2000. ACM Press.
- [97] Mayur Naik and Rajeev Kumar (1999) Object oriented symbol management in syntax directed compiler systems. *ACM SIGPLAN Notices* 34(6): 58 – 67, June 1999. ACM Press.
- [98] Rajeev Kumar and SD Mehta (1994) An open vision system for cartographic informatics. *Indian Cartographer Journal*, vol XIII. Indian Cartographic Association. 1994.
- [99] Rajeev Kumar and GK Hariharan (1993) EXVIS: a knowledge-based system for understanding of multispectral image data. Newsletter of Computer Society of India, pp. 57-58, 1993.
- [100] Rajeev Kumar and SD Mehta (1989). Image understanding techniques for onboard cartography. *Indian Cartographer Journal*, vol. IX(II): 536-546. Indian Cartographic Association. 1989.

* * *

Conference Research Publications: Peer Reviewed International

- [101] Farheen and Rajeev Kumar (2024) Composition of feature selection for time-Series prediction with deep learning. 2nd Int. Conf. Machine Learning & Data Engineering (ICMLDE), Nov. 2023. Elsevier.
- [102] Akhilesh Rawat and Rajeev Kumar (2024) A hybrid DL architecture for improved generalizability with self-adaptive Jaya optimizer for diabetic retinopathy. 2nd Int. Conf. Machine Learning & Data Engineering (ICMLDE), Nov. 2023. Elsevier.
- [103] Gouranga Duari and Rajeev Kumar (2023) Attribute subspace partitioning with neural regression for contextual outlier detection. 2nd Int. Conf. Machine Learning & Data Engineering (ICMLDE), Nov. 2023. Elsevier.
- [104] Law Kumar and Rajeev Kumar (2023) Feature-based anomaly detection in static social networks. In Proc. Artificial-Business Analytics, Quantum and Machine Learning: Trends, Perspectives, and Prospects (Com-IT-Con). July 2023. Springer.
- [105] Biraja Mishra and Rajeev Kumar (2023) Empirical analysis of variable thresholding for autoencoder anomaly detector in ECG. In Proc. 7th Int. Conf. Info. Comm. Tech. for Intelligent Systems (ICTIS). April 2023. Springer.
- [106] Law Kumar and Rajeev Kumar (2023) Community detection algorithms in social networks: an empirical evaluation. In Proc. 3rd Int. Conf. Information Technology. March 2023. Springer.
- [107] Sai Teja Tangudu and Rajeev Kumar (2023) Analysis of cost-sensitive algorithms for degree of imbalancing. In Proc. Int. Conf. Computational Intelligence in Data Science (ICCIDS). Feb. 2023. Springer.
- [108] Gargi Mishra and Rajeev Kumar (2023) Group fairness in outlier detection ensembles. In Proc. Int. Conf. Computer Vision & Robotics (CVR), May 2022. *Algorithms for Intelligent Systems*, 493-502. Springer. https://doi.org/10.1007/978-981-19-7892-0_39 {Best Paper Award in Emerging Technology}
- [109] Anish Sharma and Rajeev Kumar (2023) Imbalanced learning of regular grammar for DFA extraction from LSTM architecture. In Proc. 11th Int. Conf. Soft Computing for Problem Solving (SocProS). May 2022. Lecture Notes in Networks and Systems (LNNS), vol 547: 85 - 95. Springer Singapore. https://doi.org/10.1007/978-981-19-6525-8_8
- [110] Junaciya K, Akhilesh Rawat, and Rajeev Kumar (2023) Performance assessment of normalization in CNN with retinal image segmentation. In Proc. 11th Int. Conf. Soft Computing for Problem Solving (SocProS), May 2022. Lecture Notes in Networks and Systems (LNNS), vol 547: 159 - 170. Springer Singapore. https://doi.org/10.1007/978-981-19-6525-8_13
- [111] Pooja Singh and Rajeev Kumar (2023) Assessing imbalanced datasets in binary classifiers. In Proc. 11th Int. Conf. Soft Computing for Problem Solving (SocProS), May 2022. Lecture Notes in Networks and Systems (LNNS), vol 547: 291 - 303. Springer Singapore. https://doi.org/10.1007/978-981-19-6525-8_23
- [112] Trishita Mukherjee and Rajeev Kumar (2023) Localized community-based node anomalies in complex networks. In Proc. 11th Int. Conf. Soft Computing for Problem Solving (SocProS), May 2022. Lecture Notes in Networks and Systems (LNNS), vol 547: 679 - 689. Springer Singapore. https://doi.org/10.1007/978-981-19-6525-8_52
- [113] Akhilesh Rawat and Rajeev Kumar (2023) Assessing layer normalization with BraTS MRI data in a CNN. In proc. Int. Conf. Computational Intelligence in Data Science (ICCIDS), vol. IFIP AICT 654, pp. 124-135, March 2022, Springer Nature, Switzerland. https://doi.org/10.1007/978-3-031-16364-7_10
- [114] Farheen and Rajeev Kumar (2023) Correlated features in air pollution prediction. In Proc. Int. Conf. Artificial Intelligence: Advances and Applications (ICAIAA 2022). *Algorithms for Intelligent Systems*. Pp 527-536. Springer, Singapore. https://doi.org/10.1007/978-981-19-7041-2_44
- [115] Om Prakash and Rajeev Kumar (2023) Fake account detection in social networks with supervised learning. In Proc. Int. Conf. IoT, Intelligent Computing & Security, 2021 (IICS). Lecture Notes in Electrical Engineering (LNEE) 982: 287 - 295. Springer. https://doi.org/10.1007/978-981-19-8136-4_24
- [116] Bhupendra Kumar and Rajeev Kumar (2022) Difference-attribute based clustering for ordinal survey data. In Proc. 9th Int. Conf. Signal Processing & Integrated Networks (SPIN). Aug. 2022. Springer.
- [117] Farheen and Rajeev Kumar (2022) Parametrization of sequential neural networks for predicting air pollution. 3rd Proc. Int. Conf. Data Intelligence & Cognitive Informatics (ICDICI). July 2022. Springer.

- [118] Bhupendra Kumar and Rajeev Kumar (2022) Entropy based clustering for subspace pattern discovery in ordinal survey data. In Proc. 10th Int. Conf. Frontiers of Intelligent Computing: Theory and Applications (FICTA). June 2022. Springer.
- [119] Gournga Duari and Rajeev Kumar (2022) Hierarchical learning of outliers. In Proc. 5th Int. Conf. Communications & Cyber-Physical Engineering (ICCCE). April 2022. Springer.
- [120] Gournga Duari and Rajeev Kumar (2022) Clustering for global and local outliers. In Proc. 4th Int. Conf. Machine Intelligence and Signal Processing (MISP). March 2022. Springer.
- [121] Om Prakash and Rajeev Kumar (2022) Fake news detection in social networks using attention mechanism. In Proc. Int. Conf. Cognitive & Intelligent Computing (ICCIC). Springer Nature. https://doi.org/10.1007/978-981-19-2358-6_42
- [122] Mahesh Shirole, Amit Suthar, and Rajeev Kumar (2022) Generation of improved test cases from UML state diagram using genetic algorithm. *Test of Time Award* presentation in 15th Innovations in Software Engineering Conf. (ISEC) as the most impactful paper from amongst the published paper 10 (+1) years ago in ISECs, Feb. 26, 2022. ACM *iSoft/SigSoft*.
- [123] Priti Kumari and Rajeev Kumar (2021) Scientometrics and publications: a comparative study of ranking of multisource databases. In Proc. Int. Conf. Data Science, Machine Learning & Applications (ICDSMLA). Springer
- [124] Neha Kumari and Rajeev Kumar (2021) Type Inference in Java: Characteristics and Limitations. In Proc. ICCMLA 2020: *Cybernetics, Cognition, & Machine Learning Applications*, Algorithms for Intelligent Systems Series: 131-138. Springer.
- [125] Akanksha Mukhriya and Rajeev Kumar (2020) Homogeneous pools to heterogeneous ensembles for unsupervised outlier detection. In: Proc. Information, Communication & Computing Technology (ICICCT). Communications in Computer & Information Science, vol. 1170, 2020. Springer.
- [126] Neha Kumari and Rajeev Kumar (2020) Profiling JVM for A.I. applications using deep learning libraries. In: Proc. ICTIS 2020. Springer.
- [127] Roopam Sadh and Rajeev Kumar (2020) Clustering of Quantitative Survey Data: A Subsystem of EDM Framework. In Proc. Int Conf. Computational Methods & Data Engineering (ICDME). Advances in Intelligent Systems and Computing. Springer.
- [128] Roopam Sadh and Rajeev Kumar (2019) EDM framework for knowledge discovery in educational domain. In Recent Trends in Communication, Computing, and Electronics, pages 409–417. Springer.
- [129] Neeraj Pathak and Rajeev Kumar (2019) Improved Wisdom of Crowds Heuristic for Solving Sudoku Puzzles. In Proc. Soft Computing and Signal Processing. Conf. Advances in Intelligent Systems & Computing, vol 900, pp. 369-377. Springer, Singapore. https://doi.org/10.1007/978-981-13-3600-3_34
- [130] Sonam Chhikara and Rajeev Kumar (2019) An adaptive frequency based steganography technique. In Proc. Int. Conf. Information, Communication and Computing (ICICC), May 2018. *Communications in Computer and Information Science*, vol. 839, pp 139-149. Springer. https://doi.org/10.1007/978-981-13-5992-7_12
- [131] Akanksha Mukhriya and Rajeev Kumar (2018) Exploring Ensembles for Unsupervised Outlier Detection: An Empirical Analysis. TEAMC, NSIT Delhi, March 2018. Springer.
- [132] Sonal Tuteja and Rajeev Kumar (2018) An Architecture for Data Unification in E-commerce using Graph. 9th Int. Conf. Quality, Reliability, Infocom Tech & Business Operations (ICQRIT), Dec 2018.
- [133] Sonam Chhikara and Rajeev Kumar (2018) An information theoretic steganalysis for object based LSB steganography. Fourth Int. Conf. Next Generation Computing Technology (NGCT), Dehradun, Nov. 2018.
- [134] Sonal Tuteja and Rajeev Kumar (2017) A System Architecture for Mapping Application Data into Complex Graph. In Proc. Information, Communication and Computing Technology (ICICCT). *Communications in Computer and Information Science*, vol. 750: pp. 148 – 155. Springer.
- [135] Neeraj Pathak and Rajeev Kumar (2017) A hybridized evolutionary algorithm for bi-objective bi-dimensional bin-packing problem. In Proc. Information, Communication and Computing Technology. ICICCT. Communications in Computer and Information Science, vol. 750: pp. 296 – 304. Springer.

- [136] Mahesh Shirole and Rajeev Kumar (2015) Test scenario selection for concurrency testing from UML models. In Proc. Int. Conf. Contemporary Computing (IC3), pp. 531-536. IEEE Press.
- [137] Mahesh Shirole, Mounika Kommuri, and Rajeev Kumar (2012) Transition sequence exploration of UML activity diagram using evolutionary algorithm. In Proc. India Software Engineering Conf., pp. 97 – 100. ACM.
- [138] Mahesh Shirole, Amit Suthar, and Rajeev Kumar (2011) Generation of improved test cases from UML state diagram using genetic algorithm. In Proc. India Software Engineering Conf., pp. 125-134. ACM.
- [139] Soma Saha, Gyan Baboo, Rajeev Kumar (2011) An Efficient E.A. with Multipoint Guided Crossover for Bi-objective Graph Coloring Problem. In Proc. 4th Int. Conf. Contemporary Computing (IC3), August 2011. Communications in Computer and Information Science (CCIS) 168, pp. 135 – 145, 2011. Springer.
- [140] Soma Saha and Rajeev Kumar (2011) Improvement of bounded-diameter MST instances with hybridization of multi-Objective E.A. In Proc. Int. Conf. Comm. Comput. Sec. (ICCCS), Rourkela, February 2011. ACM.
- [141] Sandip Aine, P. P. Chakrabarti, Rajeev Kumar (2010) Contract Search: Heuristic Search under Node Expansion Constraints. In Proc. Euro. Conf. AI (ECAI), Lisbon, Portugal, pp. 733-738. IOS Press.
- [142] Mahesh Shirole and Rajeev Kumar (2010) A hybrid genetic algorithm-based test case generation using sequence diagrams. In Proc. Int. Conf. Contemporary Computing (IC3), pp. 53-63, 2010. Springer.
- [143] Abhiram Kasina, Amit Suthar and Rajeev Kumar (2010) Detection of polymorphic viruses in windows executables. In Proc. Int. Conf. Contemporary Computing (IC3), pp. 120-130, 2010. Springer.
- [144] Soma Saha, Mohammad Aslam and Rajeev Kumar (2010) Assessing the Performance of Bi-objective MST for Euclidean and Non-Euclidean Instances. In Proc Int. Conf. Contemporary Computing (IC3), pp. 229-240, 2010. Springer.
- [145] Sandip Aine, PP Chakrabarti, and Rajeev Kumar (2009) Contract Search: An adaptive heuristic search strategy under node expansion constraints, In Sym. Combinatorial Search (SoCS-09), Los Angeles. AAAI Inc.
- [146] Rajeev Kumar, Bipul K. Bal and Peter Rockett (2009) Multiobjective genetic programming approach to evolving heuristics for the bounded diameter minimum spanning tree problem. In Proc. Genetic and Evolutionary Computation Conference (GECCO), Montréal, pp. 309 – 316, July 2009. ACM.
- [147] Paresh Tolay and Rajeev Kumar (2009) Evolution of hyperheuristics for the biobjective graph coloring problem using multiobjective genetic programming. In Proc. Genetic and Evolutionary Computation Conference (GECCO), Montréal, pp. 1939-1940, July 2009. ACM.
- [148] Pranith Kumar D., Anchal Nema and Rajeev Kumar (2009) Hybrid analysis of executables to detect security vulnerabilities. In Proc. 3rd Hackers' Workshop, Kanpur, pp. 9 - 16, March 2009. Also, in Proc. 2nd India Software Engineering Conference (ISEC), Pune, pp. 141 - 142, February 2009. ACM.
- [149] Rajeev Kumar, Ashwin Joshi, Krishna Banka and Peter Rockett (2008) Evolution of hyperheuristics for biobjective 0/1 knapsack problem by multiobjective genetic programming. In Proc. Genetic and Evolutionary Computation Conference (GECCO), Atlanta, pp. 1227 – 1234, July 2008. ACM
- [150] Rajeev Kumar, Paresh Tolay and Siddharth Tiwary (2008) Enhancing solution quality of the biobjective graph coloring problem using hybridization of E.A. In Proc. Genetic and Evolutionary Computation Conference (GECCO), Atlanta, pp. 547 – 554, July 2008. ACM.
- [151] Soham S. Chakraborty and Rajeev Kumar (2008) Precise static type analysis in component based programming environment. In Proc. 1st India Software Engineering Conference (ISEC), Hyderabad, pp. 133 - 134, February 2008. ACM.
- [152] Sandip Aine, PP Chakrabarti, and Rajeev Kumar (2007) AWA* - A window constrained anytime heuristic search algorithm. In Proc. 12th Int. Jt. Conf. Artificial Intelligence (IJCAI), Hyderabad, pp. 2250 - 2255, January 2007. IJCAI, Inc.
- [153] Soham S. Chakraborty and Rajeev Kumar (2007) Static analysis based application specific dispatch table compaction. In Proc. 15th Int. Conf. Advance Computing and Communication (ADCOM), Guwahati, December 2007. IEEE CS Press

- [154] Vasant Patil and Rajeev Kumar (2007) Compressed domain inverse motion compensation in H.264/AVC video. In Proc. 10th Int. Symp. Wireless Personal Multimedia Communications (WPMC-07), Jaipur. December 2007. IEEE Press
- [155] Vasant Patil and Rajeev Kumar (2007) A fast arbitrary factor H.264/AVC video re-sizing algorithm. In Proc. IEEE Int. Conf. Image Processing (ICIP), San Antonio, Texas, USA. September 2007. IEEE Press.
- [156] S.K. Panda, VG Kasturi, PP Chakrabarti, and Rajeev Kumar (2007) Scenario driven test case generation for functional verification of pipelined processors. In Proc. 11th IEEE VLSI Design and Test Symposium (VDAT), Kolkata, India, August 2007.
- [157] Nilanjan Banerjee and Rajeev Kumar (2007) Multiobjective network design for realistic traffic models. In Proc. Genetic and Evolutionary Computation Conference (GECCO), London, pp. 1904 - 1911, July 2007. ACM. **[Best Paper Nominee]**
- [158] Rajeev Kumar and PK Singh (2007) On quality performance of heuristic and evolutionary algorithms for biobjective minimum spanning trees. In Proc. Genetic and Evolutionary Computation Conference (GECCO), London, pg. 2259, July 2007. ACM.
- [159] Avik Paul and Rajeev Kumar (2007) Precise dynamic slicing using execution summary. In Proc. 22nd Annual ACM Symposium on Applied Computing (SAC) (Programming Languages Track), Seoul, Korea, pp. 1330 - 1331, March 2007. ACM
- [160] Rajeev Kumar and PK Singh (2007) Evolutionary local search for biobjective intersecting spanning trees from geometric graphs. In LBP Proc. Fourth Int. Conf. Evolutionary Multi-Criterion Optimization (EMO), Matsushima/Sendai, Japan, pp. 1 - 6, March 2007.
- [161] Vasant Patil and Rajeev Kumar (2007) An effective motion re-estimation in frame-skipping video transcoding. In Proc. Int. Conf. Computing: Theory and Applications (ICCTA): Platinum Jubilee of the Indian Statistical Institute, Kolkata, India. March 2007. IEEE CS Press
- [162] Rajeev Kumar, PK Singh, and Bhargab B. Bhattacharya (2007) A local search heuristic for biobjective intersecting geometric graphs. In Proc. Int. Conf. Computing: Theory and Applications (ICCTA): Platinum Jubilee of Indian Statistical Institute, Kolkata, India. March 2007. IEEE CS Press.
- [163] S.K. Panda, Arnab Roy, PP Chakrabarti, and Rajeev Kumar (2007) Simulation based verification using temporally attributed boolean logic. In Proc. 20th Int. Conf. VLSI Design/ 6th Int. Conf. Embedded System, Bangalore, Jan. 2007. IEEE CS Press.
- [164] Pravanjan Choudhury, PP Chakrabarti, and Rajeev Kumar (2007) Online dynamic voltage scaling analysis using task graph mapping for multiprocessors. In Proc. 20th Int. Conf. VLSI Design/ 6th Int. Conf. Embedded System, Bangalore, Jan. 2007. IEEE CS Press.
- [165] Dipankar Das, Rajeev Kumar, and PP Chakrabarti (2006) Timing verification of UML activity diagram based code block level models for real-time multiprocessor system-on-chip Applications. In Proc. 13th Asia Pacific Software Engineering Conference (APSEC), Bangalore, pp. 199 - 206, December 2006. IEEE CS Press.
- [166] Sandip Aine, Rajeev Kumar, and PP Chakrabarti (2006) Improving standard cell placement through adaptive parameter control. In Proc. IEEE Int. Conf. Industrial Technology (ICIT), Mumbai, Dec, 2006.
- [167] Vasant Patil, Tummala Kalyani, Atul Bhartia, Rajeev Kumar, and Jayanta Mukherjee (2006) DCT domain transcoding of H.264/AVC video. In Proc. 5th Indian Conference on Computer Vision, Graphics, and Image Processing (ICVGIP), Madurai, India. LNCS 4338: 696 - 707, December 2006. Springer.
- [168] Vasant Patil, Rajeev Kumar, Jayanta Mukherjee, and SS Prasad (2006) A fast arbitrary down-sampling algorithm for video transcoding. In Proc. IEEE Int. Conf. Image Processing (ICIP), Atlanta, GA, USA. October 2006. IEEE Press.
- [169] Rajeev Kumar, Rahul Chaudhry, Dipankar Das, Vibha Rathi, S.K. Panda, and P.P. Chakrabarti (2006) SystemC Modeling and Validation of a Pipelined RISC Processor Based System. In Proc. Forum of Specification & Design Languages (FDL), Darmstadt, Germany, pp. 189 - 196, September 2006.
- [170] Rajeev Kumar, PK Singh, and Bhargab B Bhattacharya (2006) Biobjective evolutionary and heuristic algorithms for intersection of geometric graphs. In Proc. Genetic and Evolutionary Computation Conference (GECCO), Seattle, USA, pp. 1689 - 96, July 2006. ACM.

- [171] Rajeev Kumar, PK Singh, AP Singhal, and Atul Bhartia (2006) Evolutionary and heuristic algorithms for multiobjective 0-1 knapsack problem. In Proc. 10th Online World Conf. Soft Computing in Industrial Applications (WSC10), September/October 2005. In A. Tiwari, J. Knowles, E. Avineri, K. Dahal, and R. Roy (Eds.), Applications of Soft Computing: Recent Trends, May 2006. ISBN 3-540-291-23-7. Springer.
- [172] Sandip Aine, Rajeev Kumar, and PP Chakrabarti (2006) Adaptive parameter control of evolutionary algorithms under time constraints. In Proc. 10th Online World Conf. Soft Computing in Industrial Applications (WSC10), September/October 2005. In A. Tiwari, J. Knowles, E. Avineri, K. Dahal, and R. Roy (Eds.), Applications of Soft Computing: Recent Trends, May 2006. ISBN 3-540-291-23-7. Springer.
- [173] Sandip Aine, PP Chakrabarti, and Rajeev Kumar (2006) Improving the performance of CAD optimization algorithms using on-line meta-level control. In Proc. 19th Int. Conf. VLSI Design/ 5th Int. Conf. Embedded System, Hyderabad, pp. 683 - 688, January 2006. IEEE CS Press.
- [174] Arnab Sarkar, PP Chakrabarti, and Rajeev Kumar (2006) Frame based fair multiprocessor scheduler: a fast fair algorithm for real-time embedded systems. In Proc. 19th Int. Conf. VLSI Design/ 5th Int. Conf. Embedded System, Hyderabad, pp. 677 - 682, January 2006. IEEE CS Press.
- [175] Sandip Aine, Rajeev Kumar, and PP Chakrabarti (2005) An adaptive framework for solving multiple hard problems under time constraints. In Proc. Int. Conf. Computational Intelligence and Security (CIS), Xi'an, China, LNCS 3801: 57 - 64, Dec 2005. Springer.
- [176] Sandip Aine, Rajeev Kumar, and PP Chakrabarti (2005) Adaptive control of anytime algorithm parameters. In Proc. 2nd Indian Int. Conf. Artificial Intelligence (IICAI), Pune, pp. 72 - 87, Dec. 2005.
- [177] Vasant Patil and Rajeev Kumar (2005) A DCT domain frame skipping video transcoder. In Proc. IEEE Int. Conf. Image Processing (ICIP), Genova, Italy. September 2005. IEEE Press.
- [178] Arnab Sarkar, PP Chakrabarti, and Rajeev Kumar (2005) Boundary fair round-robin: a fast fair scheduler. In Proc. 9th VLSI Design & Test Symp. (VDAT), Bangalore, pp. 81 - 91, August 2005. Elite Publishing.
- [179] Sanjay Chatterjee, PP Chakrabarti, and Rajeev Kumar (2005) An optimal algorithm for register renaming: a post compilation technique. In Proc. 9th VLSI Design & Test Symp. (VDAT), Bangalore, pp. 102 - 111, August 2005. Elite Publishing.
- [180] Vasant Patil and Rajeev Kumar (2005) An arbitrary frame-skipping video transcoder. In Proc. IEEE Int. Conf. Multimedia and Expo (ICME), Amsterdam, The Netherlands. July 2005. IEEE Press.
- [181] Rajeev Kumar and Nilanjan Banerjee (2005) Running time analysis of a multiobjective evolutionary algorithm on simple and hard problems. In Proc. Foundations of Genetic Algorithms (FoGA) Workshop, AizuWakamatsu, Japan, January 2005. LNCS 3469: 112 - 131, March 2005. Springer.
- [182] Rajeev Kumar, PK Singh and PP Chakrabarti (2005) Multiobjective E.A. approach for improved quality of solutions for spanning tree problem. In Proc. 3rd Int. Conf. Evolutionary Multi-Criterion Optimization (EMO), Guanajuato, Mexico. LNCS 3410: 811- 825, March 2005. Springer.
- [183] DP Mohapatra, R. Mall, and Rajeev Kumar (2005) A parallel algorithm for dynamic Slicing of distributed Java programs in non-DSM systems. In Proc. 8th Int. Conf. Information Technology (CiT), Bhubaneswar, pp 3 - 6, December 2005.
- [184] Dipankar Das, Rajeev Kumar, and PP Chakrabarti (2005) Dictionary based code compression for variable length instruction encodings. In Proc. 18th Int. Conf. VLSI Design/ 4th Int. Conf. Embedded System, Kolkata, pp. 545 - 550, January 2005. IEEE CS Press.
- [185] Rajeev Kumar, PK Singh, and PP Chakrabarti (2004) Improved quality of solutions for multiobjective spanning tree problem using evolutionary algorithm. In Proc. 11th Int. Conf. High Performance Computing (HiPC), Bangalore. LNCS 3296: 494 - 503, December 2004. Springer.
- [186] Rajeev Kumar, PK Singh, and PP Chakrabarti (2004) Distributed evolutionary algorithm search for multiobjective spanning tree problem. In Proc. 6th Int. Workshop Distributed Computing (IWDC), Kolkata. LNCS 3326: 538, December 2004. Springer.
- [187] Ashok Turuk and Rajeev Kumar (2004) A novel scheme to reduce burst-loss and provide QoS in optical burst switching networks. In Proc. 11th Int. Conf. High Performance Computing (HiPC), Bangalore. LNCS 3296: 309 - 318, December 2004. Springer.

- [188] Ashok Turuk and Rajeev Kumar (2004) A distributed contention resolution scheme to reduce blocking probability in optical burst-switching networks. In Proc. 6th Int. Workshop Distributed Computing (IWDC), Kolkata. LNCS 3326: 361 - 372, December 2004. Springer.
- [189] Rajeev Kumar, PK Singh, and PP Chakrabarti (2004) Multiobjective genetic search for spanning tree problem. In Proc. 11th Int. Conf. Neural Information Processing (Iconip), Kolkata. LNCS 3316: 218 - 223, November 2004. Springer.
- [190] Nilanjan Banerjee and Rajeev Kumar (2004) Expected running time analysis of a multiobjective evolutionary algorithm on pseudo-boolean function. In Proc. 11th Int. Conf. Neural Information Processing (Iconip), Kolkata. LNCS 3316: 193 - 198, November 2004. Springer.
- [191] Rajeev Kumar and P.I. Rockett (2004) Effective evolutionary multimodal optimization by multiobjective reformulation without explicit niching/sharing. In Proc. Asian Applied Computing Conference (AACC), Kathmandu. LNCS 3285: 1 - 8, October 2004. Springer.
- [192] Dipankar Das, Rajeev Kumar, and PP Chakrabarti (2004) Code compression using unused encoding space for variable length instruction encodings. In Proc. 8th VLSI Design & Test Workshop (VDAT), Mysore, August 2004.
- [193] Vasant Patil and Rajeev Kumar (2004) A generic video transcoder for MPEG streams by arbitrary frame dropping. In Proc. IEEE India Council Conference (INDICON), Kharagpur. December 2004. Available online at IEEE Digital Library.
- [194] DP Mohapatra, R. Mall, and Rajeev Kumar (2004) A novel method for computing dynamic slices of concurrent C++ program. In Proc. 12th Int. Conf. Advanced Computing & Communications (ADCOM), Ahmedabad, Dec 2004.
- [195] DP Mohapatra, R. Mall, and Rajeev Kumar (2004) A novel approach for dynamic slicing of distributed object-oriented programs. In Proc. 1st Int. Conf. Distributed Computing & Internet Technology (IcDCIT), Bhubaneswar. LNCS 3347: 304 - 309. Dec 2004. Springer.
- [196] DP Mohapatra, R. Mall, and Rajeev Kumar (2004) An efficient technique for dynamic slicing of concurrent Java programs. In Proc. Asian Applied Computing Conference (AACC), Kathmandu. LNCS 3285: 255 - 262, October 2004. Springer.
- [197] DP Mohapatra, R. Mall, and Rajeev Kumar. (2004) An edge marking technique for dynamic slicing of object-oriented programs. In Proc. Int. Computer Software & Applications Conf. (CompSAC), Hongkong. Design and Assessment of Trustworthy Software-Based Systems, 60 - 65, Sep 2004. IEEE CS Press.
- [198] DP Mohapatra, R. Mall, and Rajeev Kumar (2004) A novel method for computing dynamic slices of object-oriented programs with conditional statements. In Proc. IEEE India Council Conference (INDICON), Kharagpur. December 2004. Available online at IEEE Digital Library.
- [199] Rajeev Kumar (2003) Multicriteria network design using distributed evolutionary algorithm. In Proc. Int. Conf. High Performance Computing (HiPC), Hyderabad. LNCS 2913: 343 - 352, December 2003. Springer.
- [200] Ashok Turuk, Rajeev Kumar, and R. Badrinath (2003) A token based distributed algorithm for medium access in an optical ring. In Proc. Int. Workshop Distributed Computing (IWDC), Kolkata. LNCS 2918: 340 - 349, December 2003. Springer.
- [201] Rajeev Kumar (2003) A rate adaptation transcoding to support QoS over internet for multimedia traffic. In Proc. IEEE Region 10 Conference on Convergent Technologies (Tencon), Bangalore, pp. 313 - 318, October 2003. Available online at IEEE Digital Library.
- [202] Rajeev Kumar and Nilanjan Banerjee (2003) Multicriteria network design using evolutionary algorithm. In Proc. Genetic and Evolutionary Computing Conference (GECCO), Chicago, IL. LNCS 2723: 2179 - 2190, July 2003. Springer.
- [203] Rajeev Kumar and P.I. Rockett (2003) Evolutionary multimodal optimization revisited. In Proc. Genetic and Evolutionary Computing Conference (GECCO), Chicago, IL. LNCS 2723: 1592 - 1593, July 2003. Springer.

- [204] Rajeev Kumar (2003) A protocol with transcoding to support QoS over internet for multimedia traffic. In Proc. IEEE Int. Conf. Multimedia and Expo (ICME), Baltimore, MD. I.465 - I.468, July 2003. IEEE Press.
- [205] Rajeev Kumar (2003) Scaling and generalisation in data-Mining by meta-learning of data-partitions. In Proc. Int. Conf. Info. Tech. - Prospects and Challenges (ITPC), vol. 2: 27 - 34, Kathmandu, 23- 26 May 2003.
- [206] DP Mohapatra, R. Mall, and Rajeev Kumar (2003) Dynamic slicing of object-oriented programs". In Proc. Int. Conf. Info. Tech. - Prospects and Challenges (ITPC), pages 283 - 290, Kathmandu, 23- 26 May 2003.
- [207] DP Mohapatra, R. Mall, and Rajeev Kumar (2003) A novel approach for slicing of object-oriented programs. In Proc. 6th Int. Conf. Information Technology (CiT), Bhubaneswar, pp. 110 - 115, Dec 2003.
- [208] DP Mohapatra, R. Mall, and Rajeev Kumar (2003) "Dynamic slicing of object-oriented programs". In Proc. Eleventh Int. Conf. Advanced Computing & Communications (ADCOM), Coimbatore, pp. 1 - 14, Dec. 2003.
- [209] Rajeev Kumar and V. Devatha (2002) Statistical approach to robust video temporal segmentation. In Proc. 3rd Indian Conference Computer Vision, Graphics & Image Processing (Icvgip), pages 91 - 96, 16 - 18 December 2002.
- [210] V. Makkapati and Rajeev Kumar (2002) Improved encoding of wavelet coefficients extracted from multispectral and hyperspectral image data. In Proc. 3rd Indian Conference Computer Vision, Graphics & Image Processing (Icvgip), pages 191 - 196, 16 - 18 December 2002.
- [211] Ashok Turuk, R. Badrinath, and Rajeev Kumar (2002) A collision-free MAC protocol for all-optical ring networks. In Proc. HiPC Trusted Internet Workshop, Co-located with Int. Conf. High Performance Computing (HiPC), Bangalore, 18 Dec 2002.
- [212] Rajeev Kumar, JS Rao, S. Chattopadhyay, and GK Rao (2002) A protocol to support QoS for multimedia traffic over Internet with transcoding. HiPC Trusted Internet Workshop, Co-located with Int. Conf. High Performance Computing (HiPC), Bangalore, 18 December 2002.
- [213] Rajeev Kumar, PP Parida, and M. Gupta (2002) Topological design of communication networks using multi-objective genetic optimization. In Proc. Congress Evolutionary Computation (CEC), pages 425 - 430, May 2002. IEEE Press.
- [214] Rajeev Kumar and P.I. Rockett (2002) A bootstrapped modular learning approach for scaling and generalization of grey-level corner detection. In Proc. Advances in Soft Computing, LNCS (Subseries LNAI), 2275: 395 - 400, Feb 2002. Springer.
- [215] Rajeev Kumar (2000) A grey-level image corner detector using a modular neural network. In 2nd Indian Conf. Computer Vision, Graphics & Image Processing (Icvgip), Bangalore, 20-22 Dec 2000.
- [216] Rajeev Kumar (2000) Codebook design for vector quantisation using multiobjective genetic algorithms. In Proc. PPSN/SAB Workshop Multiobjective Problem Solving from Nature (MPSN), College de France, Paris, Sep 2000.
- [217] Rajeev Kumar, S. Prasanth, and MS Sudarshan (2000) Topological design of mesh communication networks using multiobjective genetic optimisation. In Proc. PPSN/SAB Workshop Multiobjective Problem Solving from Nature (MPSN), College de France, Paris, Sep 2000.
- [218] Rajeev Kumar, Mayank Gupta, and Bhanu Prakash (2000) A hybrid learning algorithm for vector quantisation design. In Proc. IEEE Regional Int. Conf. Control, Communication & Signal Processing (CCSP), Bangalore, 25-28 July 2000.
- [219] MC Agarwal and Rajeev Kumar (2000) Edge detection using statistical self-similarity approach to the fractal brownian motion model. In Proc. IEEE Regional Int. Conf. Control, Communication & Signal Processing (CCSP), Bangalore, 25-28 July 2000.
- [220] Rajeev Kumar, VP Krishnan, and SK Santhanakrishnan (2000) Design of an optimal communication network using multiobjective genetic optimisation. IEEE Int. Conf. Industrial Technology (ICIT), 19-22 January 2000, Goa, pp. 515-520. IEEE Catalog Number 00TH 8482.

- [221] Rajeev Kumar (1999) On generalization of machine learning with neural-evolutionary computations. In Proc. 3rd Int. Conf. Computational Intelligence & Multimedia Applications (ICCIMA), New Delhi, pp. 112-116, Sept 1999. IEEE CS Press.
- [222] Rajeev Kumar, N. Vijay Kumar, and IJ Nagrath (1999) Object oriented toolkit for multiobjective genetic optimization. In Proc. 3rd Int. Conf. Computational Intelligence & Multimedia Applications (ICCIMA), New Delhi, pp. 96-100, September 1999. IEEE CS Press.
- [223] M. Prashant, R. Siddharth, and Rajeev Kumar (1999) Formulation of an encryption algorithm on the basis of molecular genetics and image patterns. In Proc. 3rd Int. Conf. Computational Intelligence & Multimedia Applications (ICCIMA), New Delhi, pp. 76-80, September 1999. IEEE CS Press.
- [224] MC Agarwal, KL Arvind, Rajeev Kumar, and IJ Nagrath (1999) Vibratory tactile display - a fractal brownian approach. In Proc. 3rd Int. Conf. Computational Intelligence & Multimedia Applications (ICCIMA), New Delhi, pp. 442-446, September 1999. IEEE CS Press.
- [225] Rajeev Kumar (1998) Propagating errors into feature representation for robustness of local invariants. In Proc. Indian Conf. Computer Vision, Graphics & Image Processing (Icvgip), New Delhi, pp.159-165, December 98.
- [226] MC Agarwal, KL Arvind, Rajeev Kumar, and IJ Nagrath (1998) Dimension estimation of image based textures for a vibratory tactile display using a fractal Brownian model. In Proc. Int. Conf. Knowledge Based Computer Systems (KBCS), Mumbai, pp.333-344, December 1998.
- [227] Rajeev Kumar (1998) A connectionist architecture for scaling neural computation. In Proc. Int. Symp. Intelligent Robotic Systems (ISIRS), Bangalore, pp. 215-218, 10-12 January 1998.
- [228] Rajeev Kumar (1997) Superneuron: A generalisation of neuron for partitioning and nesting in modular neural systems. In Proc. 6th IEEE Regional Symp. Intelligent Systems, Bangalore, pp. 150-154, 20-21 November 1997.
- [229] Rajeev Kumar and P.I. Rockett (1997) Assessing the convergence of rank-based multiobjective genetic algorithms. In Proc. IEE/ IEEE 2nd Int. Conf. Genetic Algorithms in Engineering Systems: Innovations & Applications (GALESIA), Glasgow UK, pp. 19-23, 2-4 September 1997. IEE Conference Publication No. 446.
- [230] Rajeev Kumar, WC Chen, and P.I. Rockett (1997) Bayesian labelling of image corner features using a grey-level corner model with a bootstrapped modular neural network. In Proc. IEE 5th Int. Conf. Artificial Neural Networks (ANN-97), Cambridge UK, pp. 82-87, 7-9 July 1997. IEE Conference Publication No. 440.
- [231] Rajeev Kumar and P.I. Rockett (1997) Decomposition of high dimensional pattern spaces for hierarchical classification. In Proc. IAPR Workshop Statistical Techniques in Pattern Recognition (STIPR-97), Institute of Information Theory & Automation, Academy of Sciences of Czech Republic. Prague Czech Republic, pp. 97-102, 9-11 June 1997.
- [232] Rajeev Kumar and P.I. Rockett (1997) Multiobjective genetic algorithm partitioning for hierarchical learning of high dimensional spaces. In Proc. IEE Colloquium Pattern Recognition, London UK, pp. 6/1-6/6, 26 February 1997. IEE Publication Ref. No. 1997/018.
- [233] Rajeev Kumar and P.I. Rockett (1996) *ANCHOR* - A connectionist architecture for hierarchical nesting of multiple heterogeneous neural nets. In Proc. AAAI Workshop Integrating Multiple Learned Models (IMLM 96), Portland Oregon USA, pp. 59-65, 4-5 August 1996. Menlo Park, Calif.: AAAI Press.

Conference Research Publications: Non-Reviewed / National

- [234] Rajeev Kumar (2020) Academic Autonomy in HEIs: The Most Used, Misused yet the Least Understood Term? Int. Summit in Quality Indices in Higher Edu., DTU Delhi, Nov 2020.
- [235] Priti Kumari, Roopam Sadh, and Rajeev Kumar (2020) Research criteria for measuring quality: Do they promote genuine research or manipulation? Int. Summit in Quality Indices in Higher Edu., DTU Delhi, Nov 2020.
- [236] Roopam Sadh and Rajeev Kumar (2020) Quality Indicators of HEIs: Are they adequate in Indian Context. Int. Summit in Quality Indices in Higher Edu., DTU Delhi, Nov 2020.

- [237] Soham S. Chakraborty and Rajeev Kumar (2006) Prioritizing methods for optimal method inlining. In Web Proc. [13th Int. Conf. High Performance Computing Conference \(HiPC\)](#), Bangalore, Dec 2006.
- [238] Anshuman Mishra, Rajeev Kumar, and PP Chakrabarti (2005) [A method-based whole-program watermarking scheme for Java class files](#). In Web Proc. [12th Int. Conf. High Performance Computing Conference \(HiPC\)](#), Goa, Dec 2005. [**Best Poster Award**]
- [239] DP Mohapatra, R. Mall, and Rajeev Kumar (2005) A parallel algorithm for dynamic Slicing of distributed Java programs in non-DSM systems. In Proc. [8th Int. Conf. Information Technology \(CiT\)](#), Bhubaneswar, pp 3 - 6, Dec 2005.
- [240] PK Singh, Rajeev Kumar, and PP Chakrabarti (2005) Solving hard real-world problems using multiobjective evolutionary algorithm. Int. Conf. Challenges & Opportunities in IT Industry, Ludhiana, Nov. 2005.
- [241] Dipankar Das, SK Panda, Rajeev Kumar, and PP Chakrabarti (2004) SystemC modeling of a pipelined RISC processor based system. In Web Proc. [Performance Issues in Mobile Devices Workshop](#), Co-located with [11th Int. Conf. High Performance Computing Conference \(HiPC\)](#), Bangalore, Dec 2004.
- [242] BS Pankaj, Amit Gupta, Rajeev Kumar, and PP Chakrabarti (2004) Optimizing binaries for multiple gain factors using state-based model. In Web Proc. [11th Int. Conf. High Performance Computing Conference \(HiPC\)](#), Bangalore, Dec 2004.
- [243] M Ghosh, Rajeev Kumar, and PP Chakrabarti (2004) FSM Matchers: A Post Compilation Optimization technique for Extensible Architectures. In Web Proc. Int. High Performance Computing Conference. Bangalore.
- [244] Vasant Patil and Rajeev Kumar (2004) Transcoding for QoS aware distributed multimedia applications. In Proc. Conf. *Distributed Processing & Networking*, Kharagpur, pp. 38 - 43, June 2004.
- [245] Ashok Turuk and Rajeev Kumar. (2004) A novel approach to contention resolution in optical burst-switch networks. In Proc. Conf. *Distributed Processing & Networking*, Kharagpur, pp. 106 - 110, June 2004.
- [246] DP Mohapatra, R. Mall, and Rajeev Kumar (2004) A node marking technique for dynamic slicing of object-oriented programs. In Proc. Int. Workshop *Software Development & Architecture (SoDA)*, Bangalore, pp. 1 - 15, January 2004.
- [247] SS Gupta, Dipankar Das, SK Panda, Rajeev Kumar, and PP Chakrabarty (2003) Code compression for RISC processors with variable length instruction encoding. [Int. Conf. High Performance Computing \(HiPC\)](#), Hyderabad. [Web Proceedings](#), Dec 2003.
- [248] DP Mohapatra, R. Mall, and Rajeev Kumar (2003) An efficient technique for slicing of object-oriented programs. In Proc. [Nat. Conf. Object-Oriented Technology \(NCOOT\)](#), Lonere, pp. 27 - 42, August 2003.
- [249] Rajeev Kumar, Mayank Gupta, and Bhanu Prakash (2000) A hybrid learning algorithm for vector quantisation design. In Proc. IEEE Regional Int. Conf. *Control, Communication & Signal Processing (CCSP)*, Bangalore, 25-28 July 2000.
- [250] Rajeev Kumar (1999) Image corner detection using a modular neural network. In Proc. IETE Regional Conf. *Digital Signal Processing & Computer Vision*, Allahabad, 12-14 March 1999.
- [251] A. Mukherjee, S. Nayak, and Rajeev Kumar (1999) A natural language processor for information retrieval from object attributes. In Proc. 30th IETE Mid-Term Symposium *Data Warehousing and Data Mining Applications*, Pilani, 3-4 April 1999.
- [252] M. Prashant, R. Siddharth, and Rajeev Kumar (1999) Cryptography with molecular genetics and image patterns. In Proc. IETE Regional Conf. *Digital Signal Processing & Computer Vision*, Allahabad, 12-14 March 1999.
- [253] KL Arvind, MC Agarwal, Rajeev Kumar, and I.J. Nagrath (1998) A weighted scheme to extract and map textures from multi-resolution images. In Proc. *CSI Conf. Information Technology*, New Delhi, Sep 1998.
- [254] Sachin Goyal and Rajeev Kumar (1998) A garbage collector for C/C++. In Proc. Nat. Conf. in *Information Technology & Applications: Emerging Trends*, Roorkee, pp. 98-103, Dec 98.

- [255] Rajeev Kumar (1997) Natural sampling of the Pareto-front in multiobjective genetic optimisation. In Proc. 3rd *Int. Conf. Cognitive Systems (ICCS)*, New Delhi, 13-15 Dec 1997.
- [256] Rajeev Kumar and SD Mehta (1993) An open vision system for cartographic informatics. In Proc. Indian National Cartographic Association (INCA) Congress on *Technological Transitions in Cartography*, p72. Survey of India Dehradun. Nov. 1993.
- [257] Rajeev Kumar and GK Hariharan (1993) EXVIS: a knowledge-based system for understanding of multispectral image data. In Proc. INSA and CSI Seminar on PR, AI & NN, pp 41-43. ONGC Dehradun. Mar 1993.
- [258] GK Hariharan and Rajeev Kumar (1993) A neural net implementation of invariant shape recognition. In Proc. INSA and CSI Seminar on PR, AI & NN, pp 31-33. ONGC Dehradun. Mar 1993.
- [259] Rajeev Kumar and SD Mehta (1989) Image understanding techniques for onboard cartography. In Proc. 9th Indian National Cartographic Association (INCA) Int. Seminar on *Digital Cartography & Potential Users*, pp. 183-184. Survey of India Dehradun Nov. 1989.

Theses and Technical Reports: Unpublished

- [260] Rajeev Kumar (1997) *Feature Selection, Representation & Classification*. PhD Thesis. Dept. Electronic & Electrical Engineering, Univ. Sheffield, England. April 1997. {Nominated for best CS thesis in UK.}
- [261] Rajeev Kumar (1992) Design and Development of Machine Learning System for Ship-Wake Detection from SAR Images. Project Report. Defence Electronics Applications Lab (DEAL), Defence R&D Orgn. (DRDO), Dehradun. July 1992.
- [262] Rajeev Kumar (1992) *Performance Study of Simulated Multiprocessor for Functional Programs*. M.Tech. Dissertation. Dept. Electronic & Computer Engineering, Univ. Roorkee. March 1992.
- [263] Rajeev Kumar (1992) Scheduling of arbitrary task trees on a simulated multiprocessor net. Project Report. Dept. Electronic & Computer Engineering, Univ. Roorkee. Feb. 1992.
- [264] Rajeev Kumar (1991) Knowledge-based image understanding system. Seminar Report. Dept. Electronic & Computer Engineering, Univ. Roorkee. Oct. 1991.
- [265] Rajeev Kumar and G Chakravorty (1991) Design and implementation of shared memory multiprocessor system using multibus. Project Report. Dept. Electronic & Computer Engineering, Univ. Roorkee. July 1991.
- [266] Rajeev Kumar, S Massomi, and G Chakravorty (1991) IBM 370 System: architecture and operating system. Technical Report. Dept. Electronic & Computer Engineering, Univ. Roorkee. May 1991.
- [267] Rajeev Kumar (1989) Invariant moments and normalized quadtree representation. Technical Report. Defence Electronics Applications Lab (DEAL), Defence R&D Orgn. (DRDO), Dehradun. July 1989.
- [268] Rajeev Kumar (1988) Simulation imagery of future earth observation satellite. Technical Report. Defence Electronics Applications Lab (DEAL), Defence R&D Orgn. (DRDO), Dehradun. Sep 1988.

* * *

Doctoral (PhD) Thesis Supervision

In progress @ JNU

- [1] Farheen. Deep learning for sequential data: architecture, algorithms, & applications. (by June 2024).

Graduated @ JNU

- [2] Bhupendra Kumar. Pattern discovery & clustering in ordinal survey data: algorithms and applications. Jan 2024.
- [3] Gouranga Duari. Decomposition for outlier detection. Jan 2024.
- [4] Akhilesh Rawat. Assessing generalization in deep learning architecture with medical image analysis. Jan 2024.
- [5] Neha Kumari. A safe generic type system for Java. Nov. 2023.
- [6] Priti Kumari. Scientometrics of computer science research publications. July 2023.
- [7] Akanksha Mukhriya. Ensemble learning for unsupervised outlier detection: algorithms and applications. Oct. 2022.
- [8] Neeraj Pathak. Hybrid evolutionary algorithms for solving hard combinatorial problems. Aug. 2022.
- [9] Sonal Tuteja. Graph model for schema and data mapping. July 2022.
- [10] Roopam Sadh. Knowledge discovery from quantitative survey data with pattern clustering and machine learning. March 2022.

Not Completed @ JNU

- [11] Om Prakash. Machine intelligence with multi-modal media for social welfare. Under Investigation: Publication Misconduct: March 2024.
- [12] Irfan Zaboo. FSA Extraction from Sequential Neural Networks. (Registration Cancelled: Feb. 2024)
- [13] Sonam Chhikara. Information theoretic image steganalysis for LSB steganography. (deceased Dec. 2019).

Graduated @ IIT Kharagpur

- [14] Mahesh Shirole. Concurrency Test Scenario Generation using UML Transition Sequences. Feb. 2021.
- [15] Soma Saha. Unifying Heuristics and Evolutionary Computing for Characterizing and Solving Certain Combinatorial Optimization Problems, Sep. 2014.
- [16] Pravanjan Choudhury. Task Scheduling on Embedded Multiprocessors, Jan. 2013. (with Prof. P.P. Chakrabarti)
- [17] Subrat Kumar Panda. Simulation-Based Verification of Pipelined Processors, May 2010. (with Prof. P.P. Chakrabarti)
- [18] Vasant Patil. Efficient Algorithms for Video Transcoding, October 2009.
- [19] Dipankar Das. Functional and Performance Verification for Multiprocessor Embedded Applications, July 2009. (with Prof. P.P. Chakrabarti)
- [20] Sandip Aine. Design and Control of Anytime Algorithms, September 2008. (with Prof. P.P. Chakrabarti)
- [21] Pramod Singh. Multiobjective Combinatorial Optimization with Hybridization of E.A., March 2008. (with Prof. P.P. Chakrabarti)
- [22] Durga Prasad Mohapatra. Dynamic Slicing of Object-Oriented Programs, September 2005. (with Prof. R. Mall)
- [23] Ashok Turuk. QoS Provisioning in WDM Networks, February 2005.

* * *

Master Thesis Supervision: MTech, MS & MPhil

Graduated @ JNU

- [1] Biraja Mishra. Anomaly Detection from Medical Time-Signals with Deep Learning. June 2023.
- [2] Law Kumar. Hybridized Anomaly Detectors for Social Networks. June 2023.
- [3] Sai Teja Tangudu. Cost-Sensitive Learning for Class Imbalance Data. June 2023.
- [4] Khumaningthou Khumanthem. Interpreting outlier detection scores in ensembles. Jan. 2023.
- [5] Saurabh Tewari. Social network for blended learning model. Jan. 2023.
- [6] Junaciya K. Assessing generalization in medical image data. Oct. 2022.
- [7] Anish Sharma. Automata modelling with recurrent neural networks. Sep. 2022.
- [8] Trishita Mukherjee. Anomaly detection in complex graphs. Aug. 2022.
- [9] Pooja Singh. Assessing generalization in imbalanced datasets. Aug. 2022.
- [10] Gargi Mishra. Fairness in outlier detection ensembles. Aug. 2022.
- [11] Surabhi Shrivastav. Abnormality detection in medical images with deep learning. Oct. 2021.
- [12] Suresh Vyas. Meta-learning in ensembles. Oct. 2021.
- [13] Anjali Gautam. Time series prediction with deep learning. Sep. 2021.
- [14] Dipanjana De. Modelling automata by sequential neural networks. Aug. 2021.
- [15] Om Prakash. Anomaly detection in social networks. July 2021.
- [16] Akhilesh Rawat. Outlier detection in high dimensional datasets. June 2021.
- [17] Aditya Kumar. Assessing generalization in deep learning networks. April 2021.
- [18] Priti Kumar. Scientometrics of computer science publications in journals and conferences. July 2018.
- [19] Neha Kumari. A framework for runtime type genericity in Java generics. July 2018.
- [20] Akanksha Mukhriya. Unsupervised outlier detection ensembles. July 2016.
- [21] Neeraj Pathak. Hybrid evolutionary bi-objective optimization. July 2016.

Graduated @ IIT Kharagpur

- [22] Mounika Kommuri. Test-case generation for concurrent sequence transitions, May 2012.
- [23] Surender Kumar. Static analysis of generic object oriented programs, May 2012.
- [24] S. Harikrishnan. Space efficient multi-method dispatch in object oriented languages, May 2012.
- [25] Gyan Baboo. Multiobjective combinatorial optimization with EA, May 2012.
- [26] Swadhin Barisal. Safer Java Programming Language Environment, May 2011.
- [27] Krunal Modi. Graph Topology Generation, May 2011. (with Nilanjan Banerjee, Univ. Ark., USA)
- [28] Amit Suthar. Generation of test cases from UML diagrams using EAs, May 2010.
- [29] Abhiram Kasina. Trusted Computing, May 2010.
- [30] Mohammad Aslam. Multiobjective combinatorial optimization with GP, May 2010
- [31] Sri Harsha Dandibhotle. Multiobjective combinatorial optimization with EAs, May 2010
- [32] Siddharth Tiwary. Register Allocation May 2009. (with Prof. Jens Palsberg, UCLA, USA)
- [33] Anchal Nema. Concurrent Programs, May 2009.
- [34] Neeraj Kumar. OO Testing, May 2009.
- [35] Kundan Singh. Synchronization and Race Condition, May 2009
- [36] Paresh Tolay. Multiobjective combinatorial optimization for Graph Coloring with GP, May 2009.
- [37] Bipul Kumar Bal. Multiobjective combinatorial optimization for BDMST with GP, May 2009
- [38] Krishna Banka. Multiobjective combinatorial optimization with GP, May 2008
- [39] Ashwin Joshi. Multiobjective combinatorial optimization with GP, May 2008
- [40] Soham Chakraborty. Type analysis & optimization of O.O. Systems, Feb. 2008. [with Prof. P.P. Chakrabarti]
- [41] Sanjay Chatterjee, Algorithms for post-compilation power optimization in embedded processors, Dec. 2006. [with Prof. P.P. Chakrabarti]
- [42] Arnab Sarkar. Low-Overhead Real-Time Proportional Fair Scheduling, May 2006. [with Prof. P.P. Chakrabarti]

- [43] T. Kalyani. Video transcoding: H.264 to MPEG-II bit-streams, May 2006. [with Prof. J. Mukherjee]
- [44] Atul Bhartia. Video transcoding: Arbitrary resizing of H.264 bit-streams, May 2006. [with Prof. J. Mukherjee]
- [45] Anshuman Mishra. Software watermarking scheme for Java class files, May 2006. [with Prof. P.P. Chakrabarti]
- [46] Vikram Agarwal. Multiple polymorphic arguments in object-oriented languages, May 2005.
- [47] M. Sreenivasulu. Code compression for performance enhancement of variable length embedded processors, May 2005.
- [48] Amit Gupta. Optimizing binaries using pattern matching, May 2005.
- [49] Mrinmoy Ghosh. Compiler backend generation and optimization for extensible architectures, June 2004. [with Prof. P.P. Chakrabarti]
- [50] Sant Saran Gupta. Code compression in variable length RISC processors, May 2004.
- [51] Arnab Roy. Simulation based verification of microprocessor pipeline simulators, May 2004. [with Prof. P.P. Chakrabarti]
- [52] Vasant Patil. Video transcoding algorithms, May 2004.
- [53] Anil Mangolia. Preprocessor for multimethods in object-oriented languages, Jan 2003.
- [54] GK Rao. QoS support for multimedia traffic with transcoding, Jan 2003.
- [55] K. Krishnakumar. RWA in WDM networks, May 2002.
- [56] Arun Kumar. Modelling of multimedia traffic, May 2002.
- [57] JS Rao. QoS support for multimedia traffic, Jan 2002.
- [58] B. Srikanth Reddy. Modelling of multimedia traffic, May 2001.

Graduated @ BITS Pilani

- [59] S. Prasanth. Network topology design using multiobjective EA, Dec 2000.
- [60] MS Sudarshan. Network topology design using multiobjective EA, Dec 2000.
- [61] Ishan Banerjee. Polymorphism in cipher design, Dec 2000.
- [62] V. Devtha. Video temporal segmentation, Dec 2000.
- [63] KL Arvind. Visual modelling, May 2000. [with Prof. I.J. Nagraath]
- [64] Mayank Gupta. Hybrid learning algorithm for vector quantization, May 2000.
- [65] Bhanu Prakash. Hybrid learning algorithm for vector quantization, May 2000.
- [66] Vinay Seth. Finger print identification, May 2000.
- [67] Vishnu Makkapati. Encoding of multi-/hyper-spectral image data, Dec 1999.
- [68] Mahesh Agarwal. Face recognition, Dec 1999.
- [69] SK Santhanakrishnan. Communication network topology design using multiobjective EA, Dec 1999.
- [70] N. Vinay Kumar. Object oriented toolkit for multiobjective EA, May 1999.
- [71] Dilip Jain. Multiobjective optimization with evolutionary algorithm, May 1998. [with Prof. N. Chakraborty]
- [72] ... and several others.

* * *

Supervision of Research Associates: IIT Kharagpur

- [1] Pritam Khanda. MHRD's Virtual Lab, 2010-11.
- [2] Soham Chakraborty. Microsoft's Object-Oriented Technology, 2004-06.
- [3] P. Sankar Muthu. MHRD's Multiobjective E.A.s for Combinatorial Optimization Problems, 2004-05.
- [4] Panchali Sen. Microsoft's Object-Oriented Technology, 2003-04.
- [5] Dipankar Das. NSC's Software Tools for Embedded Systems, 2003-04. (with Prof. P.P. Chakrabarti)
- [6] Sandip Aine. NSC's Software Tools for Embedded Systems, 2003-04. (with Prof. P.P. Chakrabarti)
- [7] Arnab Sarkar. NSC's Software Tools for Embedded Systems, 2003-04. (with Prof. P.P. Chakrabarti)
- [8] Vibha Rathi. NSC's Software Tools for Embedded Systems, 2003-04. (with Prof. P.P. Chakrabarti)
- [9] Sanjay Chatterjee. NSC's Software Tools for Embedded Systems, 2003-04. (with Prof. P.P. Chakrabarti)
- [10] Samik Das. NSC's Software Tools for Embedded Systems, 2003-04. (with Prof. P. P. Chakrabarti)
- [11] Subrat Panda. NSC's Software Tools for Extensible CompactRISC Processors, 2002-04. (with Prof. P.P. Chakrabarti)
- [12] Rakesh Gupta. NSC's Software Tools for Extensible CompactRISC Processors, 2002-03. (with Prof. P.P. Chakrabarti)
- [13] Mrinmoy Ghosh. NSC's Software Tools for Extensible CompactRISC Processors, 2001-04. (with Prof. P.P. Chakrabarti)
- [14] Banit Agarwal. NSC's Software Tools for Extensible CompactRISC Processors, 2001-03. (with Prof. P.P. Chakrabarti)
- [15] Debjit Sinha. NSC's Software Tools for Extensible CompactRISC Processors, 2001-02. (with Prof. P.P. Chakrabarti)
- [16] Supratik Mazumdar. NSC's Software Tools for Extensible CompactRISC Processors, 2001-02. (with Prof. P.P. Chakrabarti)
- [17] Rahul Chaudhary. NSC's Software Tools for Extensible CompactRISC Processors, 2001-02. (with Prof. P.P. Chakrabarti)

. * * *

.

Consultancy & Sponsored Projects

- [1] *Sponsored Project* : Educational Data Mining
Funded by : UGC, Govt. of India
Period : 2018 – 19 *Amount* : INR 500 K
Principal Investigator : Rajeev Kumar *Co-Investigator* : ---

This sponsored project aimed to develop a framework for educational data mining for HEIs. In this work, Deep/Machine Learning (DL/ML) techniques were employed for knowledge extraction from voluminous data about HEIs. This project developed tools and techniques for Data-to-Knowledge (D2K) extraction.

- [2] *Sponsored Project* : Programming and Data Structures Virtual Lab
Funded by : MHRD, Govt. of India
Period : 2010 – 12 *Amount* : INR 1500 K
Principal Investigator : Rajeev Kumar *Co-Investigator* : ---

The course is the introductory core course, usually done by every engineering student from all engineering branches in their first year of study. Students are introduced to the basic programming concepts and an algorithmic problem-solving approach. Since this is the first course in programming, the lab plays a critical role in understanding programming concepts and problem-solving using computers. In the absence of a lab, this course remains an abstract course. A student understands the intricacies of programming and problem-solving through the lab.

The general and most versatile C-language is currently being used for programming. However, the next phase of Virtual Lab can use Java programming language as the problem-solving medium.

- [3] *Consultancy Project* : Object Oriented (C#/.NET centric) Courseware Development
Funded by : Microsoft Corp., USA (under Global CFP)
Period : 2004 – 07 *Amount* : USD 22 K
Principal Consultant : Rajeev Kumar *Co-Consultant* : ---

The course is designed primarily to bring synergy and interplay among the following components – Object Oriented Technology (OOT) for better programming methodologies and code reuse, Programming Language Design and Implementation (PLDI) for a better understanding of language semantics, Virtual Execution Environment (VEE) for an insight of the runtime system providing extensible and safer computing towards code certification, and Software Engineering (S.E.) for trusted and reusable system.

The course was introduced as a graduate-level course at IIT Kanpur and is offered since then at IIT Kharagpur. Many research articles are the outcome of this activity.

- [4] *Sponsored Project* : Multiobjective Evolutionary Algorithms for Combinatorial Optim.
Funded by : MHRD, Govt. of India
Period : 2002 – 07 *Amount* : INR 1000 K
Principal Investigator : Rajeev Kumar *Co-Investigator* : ---

Most combinatorial problems are computationally *hard*. In a multiobjective setting, the major challenge is obtaining many representative, diverse solutions across the desired/optimal Pareto-front. In simple treatments, multiple objectives are combined ad hoc to yield a scalar objective. Other conventionally used optimization heuristics models the multiobjective problem in a single objective domain, treating all but one of the objectives as constraints. In this project, the standard single objective problems (with or without constraints), e.g., spanning tree, 0/1 knapsack, traveling salesman, graph coloring, etc., are recast into their respective biobjective optimization problems. Empirically, it is shown that the solutions obtained with multiobjective evolutionary algorithms (MOEA) as black-box optimization tools cover a larger range and are superior to the deterministic heuristics in terms of diversity and convergence.

The outcome of this sponsored research project is reflected in many research publications. Another important spin-off of this research activity is the tutorial on "Evolutionary Multiobjective

Combinatorial Optimization (EMCO)," which became a regular feature at ACM's GECCO till 2009, the lead conference in this area.

- [5] *Consultancy Project* : Software Tools for Embedded Systems
 Funded by : National Semiconductors Corp., Germany/USA
 Period : 2003 – 06 *Amount: USD 100 K*
 Principal Consultant : Prof. P.P. Chakrabarti *Co-Consultant : Rajeev Kumar*

- [6] *Consultancy Project* : Software Tools for C.R. Family of Processors
 Funded by : National Semiconductors Corp., Germany/USA
 Period : 2001 – 03 *Amount: USD 225 K*
 Principal Consultant : Prof. P.P. Chakrabarti *Co-Consultant : Rajeev Kumar*

These two consultancy projects were due to the collaborative research between IIT Kharagpur and the Compact RISC (C.R.) National Semiconductor Corporation (NSC) processing groups located in Germany and Israel. University of Michigan (UoM) was another partner in this activity, looking into the hardware-related aspects, whereas IIT Kharagpur concentrated on software-related issues.

Twin projects focused on software tool development for rapid reduction in the time to market a custom solution based on the C.R. family of processors. It included software development tools, architecture exploration and evaluation tools, and Instruction Set Architecture (ISA) verification tools. The aim was to help NSC develop tools that would speed up the development of new architectures (like functional and performance simulators), produce systems software tools (like Debuggers, Assemblers, Linkers, and Compilers) for customers, and rapidly explore the design space by providing tools for extensible C.R. processors (ISA verification and software toolset for CR-X). This effort also aimed to develop the Software Quality Assurance (Q.A.) framework for the tools produced by this activity.

The project activity had three primary parts: tools for CR16C, an extension of the toolset to handle the CR16C family of processors, and a scalable toolset concept for the extensible C.R. (CR-X). The CR-X activity also aimed at developing a mechanism to generate the toolset for C.R.-based processors automatically. The critical goals were to generate tests and test the software in a proper Q.A. framework. The platform for development was Linux. The effort aimed at maximum use of available GNU following the GNU rules/coding standards.

While working on these twin projects, the project team encountered many interesting issues and challenges, and solutions to some of those culminated in several research publications.

- [7] *Sponsored Project* : Convergence of Multiobjective Evolutionary Algorithms
 Funded by : IIT Kharagpur
 Period : 2001 – 03 *Amount: INR 100 K*
 Principal Investigator : Rajeev Kumar *Co-Investigator : ---*

In multiobjective optimizations, solutions that are non-dominated at some stage in the computations become dominated by a superior solution at some later stage. Moreover, for most of the real-world problems, the desired/optimal Pareto front is *unknown*. This project aimed to extend the previous work (GALESIA, 1997) and incorporate the notion of convergence in multiobjective evolutionary algorithms (MOEA).

* * *