Vikas Chandrakant Raykar

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Personal Data

Place and Date of Birth:	India | 02 February 1980
Address:	3003, Sobha Chrysanthemum,Thanisandra Main Road Bangalore, 560077, India
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Research Interests

Google Scholar profile | dblp profile | h-index 26 | i10-index 49

Work Experience

May 2019 – *Current*

Senior Technical Staff Member & Manager at IBM Research, Bangalore, India

IBM Research AI for Supply Chain

2019- Technical lead and manager for **IBM Research AI for Supply Chain** - The IBM Research AI for Supply Chain project intends to build state-of-the-art algorithms to enable intelligent self-correcting sustainable retail supply chains. The eventual goal is to ensure that the right product is at the right location at the right time and at the right price.

Nov 2012-2019

Senior Researcher at IBM Research, Bangalore, India

IBM Research AI

2016-2019 Technical lead for the **IBM Research AI for Fashion** - The IBM Research AI for Fashion project has built a portfolio of APIs, assets, and use cases for the fashion and retail industry primarily leveraging deep learning, computer vision and natural language processing. The use cases are targeted towards end consumers, online retailers, buyers, merchandisers and designers and spans sell (front end customer experience), buy (back end merchandising and procurement) and creative design (fashion designers).

2015-2016 Technical lead for the **LingVist: A picture is worth a thousand words** - The Far Reaching Research project LingVist: A picture is worth a thousand words aims to build a cognitive system that given an image can automatically and concisely summarize the salient content in the image in a few descriptive sentences.

2012-2015 Technical lead from India for **Project Debater** -Project Debater is the first AI system that can debate humans on complex topics. It digests massive texts, constructs a well-structured speech on a given topic, delivers it with clarity and purpose, and rebuts its opponent. Eventually, it will help people reason by providing compelling, evidence-based arguments and limiting the influence of emotion, bias, or ambiguity.

Oct 2013-2015

Adjunct Faculty at Indian Institute of Technology, Kanpur, India

Department of Computer Science and Engineering

July 2007-2012

Senior Staff Scientist at Siemens Healthcare, Malvern, PA, USA

2010-12 Healthcare Imaging Syngo R&D CAD Core Research Group

Designed robust machine learning algorithms for breast tomosynthesis intelligent windowing, stroke/glioma detection from brain MRI sequences, PET-MR attenuation correction, exploiting priors for digital mammography, and landmark based region prediction in medical images.

2007-10 Image and Knowledge Management, CAD and Knowledge Solutions Group

Designed machine learning algorithms for several commercially deployed computer aided diagnosis products that automatically identify early stage cancer of the lung, colon, and breast based on X-ray, CT, and MRI images. Involved in MRMC study design and analysis for the clinical trials.

Education

May 2007 — Doctor of Philosophy in Computer Science, **University of Maryland**, College Park
Thesis: Scalable machine learning for massive datasets: Fast summation algorithms
GPA: 4.0/4.0 | Advisor: Dr. Ramani Duraiswami

Dec 2003 — Master of Science in Electrical Engineering, **University of Maryland**, College Park
Major: Signal Processing | Minor: Computer Engineering
Thesis: Position calibration of acoustic sensors and actuators on distributed general purpose computing platforms
GPA: 3.828/4.0 | Advisors: Dr. Ramani Duraiswami and Dr. Rama Chellappa

May 2001 — Bachelor of Engineering in Electronics and Communication Engineering
National Institute of Technology, Trichy, India
Aggregate: 87.97% | Equivalent GPA: 4.0/4.0 | Department Rank: 1/51

Internships

Jun-July 2006 — Summer Intern at Siemens Medical Solutions, Malvern, PA, USA
Computer Aided Diagnosis and Therapy Group
Mentors: Dr. Harald Steck and Dr. Balaji Krishnapuram
Worked on personalized medicine and machine learning approaches to survival analysis.

Aug 2001-2006 — Research Assistant at University of Maryland, CollegePark, USA
Perceptual Interfaces and Realities Labaratory
Mentors: Dr. Ramani Duraiswami and Dr. B. Yegnanarayana
Scalable machine learning algorithms. Audio signal processing. Spatial audio.

Feb-Aug 2003 — Intern at Intel corporation, Santa Clara, CA, USA
Future Platforms Lab, Intel Labs
Mentors: Dr.Igor Kozintsev and Dr.Rainer Lienhart
Position calibration of a network of microphones/speakers on distributed computing platforms.

Apr-May 2000
Nov-Dec 1999 — Undergraduate Intern at Indian Institute of Science,Bangalore, India
Speech and Audio laboratory | Mentor: Dr.T. V. Sreenivas
Implemented a real-time 3D spatial audio system using Head Related Transfer Functions (HRTFs). Worked on modeling and interpolation of HRTFs.

May-Jun 1999 — Summer Intern at Centre for Artificial Intelligence and Robotics
Bangalore, India | Mentor: Dr. Ambalal V. Patel
Implemented PI and PD controller using Fuzzy Logic.

Honors and Awards

2021 | Aegis Graham Bell Award

The Bestseller Fabric.ai project won the 11th edition of the Aegis Graham Bell Award for the category A.I. powered innovation for retail.

2020 | AI and Innovation Retail award

The Bestseller Fabric.ai project won the AI and Innovation Retail award at the 3rd edition of the Future of Retail Summit and Awards 2020 held at Delhi on 6th March 2020.

2020 | IBM Invention Plateau Number 5

2019 | Senior Technical Staff Member

Selected as one of the 14 Senior Technical Staff Member (STSM) in 2019. The STSM position recognizes individuals with a superior record of technical achievement, innovation, and business impact who are driving IBM's growth. | announcement

2019 | Outstanding Technical Achievement Award for the AI for Fashion project

2019 | IBM Invention Plateau Number 4

2018 | Best of IBM honoree

Selected as a 2018 Best of IBM honoree, one of IBM's highest honors, given to only 1,000 top-performing employees worldwide and recognizes extraordinary contributions to our clients and our company. | announcement

2018 | IBM Research A-level innovation accomplishment for AI for Fashion project

IBM Research AI for Fashion has been rated as an A-level accomplishment in the Innovation category for 2018.

2017 | IBM Research Image Award winner for the AI for Fashion project

The IBM Research AI for Fashion one of the five projects, chosen from a field of more than 20 very worthy submissions, represent outstanding examples of work that has enhanced our image and differentiation, measured in part by: (1) Above average and sustained business and technical press and social media coverage, (2) Extensive industry, academic, analyst and other third-party endorsements and (3) Invitations to present or demonstrate at high-profile, third-party conferences and events. | announcement

2018 | Client Value OTAA for the IBM Practice: Put the client first.
2018 | Eminence and Excellence Cash Award for the IBM Practice: Dare to create original ideas.
2018 | Manager's Choice Award for the IBM Practice: Dare to create original ideas.
2018 | IBM Invention Plateau Number 2

2017 | Cannes Innovation Lions Shortlist

The Cognitive Collection designed by Jason Grech in collaboration with IBM Research team was shortlisted for 2017 Innovation Lions at Cannes. The Cannes Lions Awards celebrate the best creative work in the world and is one of the most difficult categories to be shortlisted in Cannes. The Cognitive Collection, made up of 12 couture dresses, debuted at the Melbourne Spring Fashion Week 2016 was based on analysis of more than 500,000 images of runway fashion imagery from historic fashion archives, as well as real time social-chatter round fashion trends.

2017 | IBM Cognitive Couture Wins Silver at APAC Effies

IBM and O&M picked up a coveted silver medal at the 2017 APAC Effie Awards for the marketing campaign around Cognitive Couture with Designer Jason Grech as part of Melbourne Spring Fashion Week. Recognized as the most prestigious awards in the region, the Effies are notoriously difficult to win as entrants must demonstrate strategic insight, creativity, flawless execution and returns - against entrants from 13 other countries.

2017 | IBM Research A-level Science accomplishment for Project Debater

IBM Research Project Debater was rated as an A-level accomplishment in the Science category for 2018 primarily because of the citations of the papers published as part of Debater project.

2016 | IBM RGM Excellence Award
Advancing cognitive technologies for fashion domain and opening up significant new opportunity for IBM

2015 | IBM Research Division Award for The Debater Grand Challenge project.
Project Debater is the first AI system that can debate humans on complex topics. Project Debater digests massive texts, constructs a well-structured speech on a given topic, delivers it with clarity and purpose, and rebuts its opponent.

2014 | Winner of the 2014 IBM Research India Distinguished Paper Award
Sequential crowdsourced labeling as an epsilon-greedy exploration in a Markov Decision Process, AISTATS 2014.

2014 | IBM Research India Invention Development Team award
2010 | Best Scientific Paper Award in Bioinformatics and Biomedical Applications Track at 20th International Conference on Pattern Recognition (ICPR 2010)
2009 | Winner of the third Data Mining Practice Prize for the best deployed data mining system in the industry at KDD 2009
2007 | Received the Dean's Fellowship award for 2006-2007 for excellence in research
2007 | Member of the Honor Society of Phi Kappa Phi 2007
2001 | Best outgoing student in the department for the year 2000-2001
1999 | Recipient of the National Science Fellowship Award (Engineering Stream) for the year 1999 funded by the Department of Science and Technology, Government of India
1995 | Recipient of the National Talent Search Examination (NTSE) scholarship

Journal Publications

14. CT colonography: effect of computer-aided detection of colonic polyps as a second and concurrent reader for general radiologists with moderate experience in CT colonography
Thomas Mang, Luca Bogoni, Vikram X Anand, Dass Chandra, Andrew J Curtin, Anna S Lev-Toaff, Gerardo Hermosillo, Ralph Noah, Vikas Raykar, Marcos Salganicoff, Robert Shaw, Susan Summerton, Rafel F Tappouni, Helmut Ringel, Michael Weber, Matthias Wolf, Nancy A Obuchowski
European Radiology, Vol. 24(7), pp. 1466–1476, July 2014.

13. Evaluation of computer-aided detection and diagnosis systems[†]
[†] An opinion paper from the American Association of Physicists in Medicine (AAPM) Computer Aided Detection in Diagnostic Imaging subcommittee (CADSC).
N. Petrick, B. Sahiner, S. G. Armato, III, A. Bert, L. Correale, S. Delsanto, M. T. Freedman, D. Fryd, D. Gur, L. Hadjiiski, Z. Huo, Y.Jiang, L. Morra, S. Paquerault, V. Raykar, F. Samuelson, R. M. Summers, G. Tourassi, H. Yoshida, B. Zheng, C. Zhou, and H-P. Chan
Medical Physics, Vol. 40, Issue 8, August 2013.

12. Mining anatomical, physiological and pathological information from medical images
Xiang Zhou, Yiqiang Zhan, Vikas C. Raykar, Gerardo Hermosillo Valadez, and Luca Bogoni
SIGKDD Explorations, Vol. 14, Issue 1, pp. 25–34, July 2012.

11. Eliminating Spammers and Ranking Annotators for Crowdsourced Labeling Tasks
Vikas C. Raykar and Shipeng Yu
Journal of Machine Learning Research, Vol. 13, pp. 491–518, February 2012.

10. Time-efficient CT colonography interpretation using an advanced image-gallery-based, computer-aided "first-reader" workflow for the detection of colorectal adenomas
T. Mang, G. Hermosillo, M. Wolf, L. Bogoni, M. Salganicoff, V. Raykar, H. Ringl, M. Weber, C. Mueller-Mang, A. Graser
European Radiology, Vol. 22, pp. 2768–2779, December 2012.

9. Computer-Aided Detection of Colorectal Polyps in CT Colonography With and Without Fecal Tagging: A Stand-alone Evaluation
T. Mang, L. Bogoni, M. Salganicoff, M. Wolf, V. Raykar, M. Macari, J. P. Pickhardt, F. Iafrate, A. Laghi, M. Weber, M. E. Baker, H. Ringl, C. J. Herold, A. Graser
Investigative Radiology, Vol. 47, Issue 2, pp. 99–108, February 2012.

8. Computerized Classification of Intraductal Breast Lesions using Histopathological Images
M. Murat Dundar, Sunil Badve, Gokhan Bilgin, Vikas Raykar, Rohit Jain, Olcay Sertel, and Metin N. Gurcan
IEEE Transactions on Biomedical Engineering, Vol. 58, Issue 7, pp. 1977–1984, July 2011.

7. Empirical Bayesian thresholding for sparse signals using mixture loss functions
Vikas C. Raykar and Linda H. Zhao
Statistica Sinica, Vol. 21, No. 1, pp. 449–474, Jan. 2011

6. Learning From Crowds
Vikas C. Raykar, Shipeng Yu, Linda H. Zhao, Gerardo H. Valadez, Charles Florin, Luca Bogoni, and Linda Moy
Journal of Machine Learning Research, Vol. 11, pp. 1297–1322, April 2010.

5. Fast Computation of Kernel Estimators
Vikas C. Raykar, Ramani Duraiswami, and Linda H. Zhao
Journal of Computational and Graphical Statistics, Vol. 19, No. 1, pp. 205–220, March 2010.

4. A fast algorithm for learning a ranking function from large scale data sets
Vikas C. Raykar, Ramani Duraiswami, and Balaji Krishnapuram
IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 30, No. 7, pp. 1158–1170, July 2008.

3. Extracting the frequencies of the pinna spectral notches in measured head related impulse responses
Vikas C. Raykar, Ramani Duraiswami, and B. Yegnanarayana
The Journal of the Acoustical Society of America, Vol. 118, No. 1, pp. 364–374, July 2005.

2. Position Calibration of Microphones and Loudspeakers in Distributed Computing Platforms
Vikas C. Raykar, Igor Kozintsev, and Rainer Lienhart
IEEE Transactions on Speech and Audio Processing, Vol. 13, No. 1, pp. 70–83, Jan. 2005.

1. Speaker Localization using excitation source information in speech
Vikas C. Raykar, B.Yegnanarayana, S. R. Mahadeva Prasanna, and Ramani Duraiswami
IEEE Transactions on Speech and Audio Processing, Vol. 13, No. 5, Part 2, pp. 751–761, Sep. 2005.

Book Chapters

5. Cost-Sensitive Cascades
Vikas C. Raykar
Book chapter in Cost-Sensitive Machine Learning, B. Krishnapuram, S. Yu, and R. B. Rao (Eds.), pp. 87–100, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2012.

4. Lung Nodule Detection
Luca Bogoni, Jinbo Bi, Charles Florin, Anna K. Jerebko, Arun Krishnan, Sangmin Park, Vikas C. Raykar, and Marcos Salganicoff
In ImageCLEF: Experimental Evaluation in Visual Information Retrieval, 2010, Volume 32, Part 3, pp 415-434, Springer Berlin Heidelberg.

3. The Improved Fast Gauss Transform with applications to machine learning
Vikas C. Raykar and Ramani Duraiswami
Book chapter in Large-Scale Kernel Machines, L. Bottou, O. Chapelle, D. DeCoste and J. Weston (Eds.), pp. 175–201, MIT Press 2007.

2. Multimodal tracking for smart videoconferencing and video surveillance
Dmitry Zotkin, Vikas C. Raykar, Ramani Duraiswami and Larry S. Davis
In Multimodal Surveillance: Sensors, Algorithms, and Systems, ed. by Z. Zhu and T. S. Huang, Artech House Publishers, Norwood, MA, 2007, pp. 141-175.

1. Providing Common Time and Space in Distributed AV-Sensor Networks by Self-Calibration
R. Lienhart, I. Kozintsev, D. Budnikov, I. Chikalov, and Vikas C. Raykar
In Intelligent Multimedia Processing with Soft Computing Series: Studies in Fuzziness and Soft Computing, Vol. 168 Y. Tan, K. H. Yap, and L. Wang (Eds.) 2005.

Peer Reviewed Conference Publications

Highly selective machine learning conference papers (NIPS, AISTATS, ICML, KDD) are marked as †.

36. Explainable AI based interventions for pre-season decision making in fashion retail
Surya Shravan Kumar Sajja, Nupur Aggarwal, Sumanta Mukherjee, Kushagra Manglik, Satyam Dwivedi, and Vikas Raykar
CODSCOMAD'21 In Proceedings of the 8th ACM IKDD CoDS and 26th COMAD (CoDS COMAD 2021). Association for Computing Machinery, New York, NY, USA.

35. Attention based multi-modal new product sales time-series forecasting †
Vijay Ekambaram, Kushagra Manglik, Sumanta Mukherjee, Surya Shravan Kumar Sajja, Satyam Dwivedi, and Vikas Raykar
KDD'20 In Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2020), pp. 3110–3118, Virtual Event, CA, USA, August 2020.

34. Multi-modal dialog for browsing large visual catalogs using exploration-exploitation paradigm in a joint embedding space
Indrani Bhattacharya, Arkabandhu Chowdhury, Vikas Raykar
ICMR'19 Proceedings of 2019 ACM International Conference on Multimedia Retrieval (ICMR 2019), Ottawa, Canada, June 2019.

33. Learning Disentangled Multimodal Representations for the Fashion Domain
Amrita Saha, Megha Nawhal, Mitesh M. Khapra, Vikas C. Raykar
WACV'18 Proceedings of 2018 IEEE Winter Conference on Applications of Computer Vision (WACV), Lake Tahoe, NV/CA, March 2018.

32. DeepSolarEye: Power Loss Prediction and Weakly Supervised Soiling Localization via Fully Convolutional Networks for Solar Panels
Sachin Mehta, Amar Azad, Saneem Chemmengath, Vikas C. Raykar, Shivkumar Kalyanaraman
WACV'18 Proceedings of 2018 IEEE Winter Conference on Applications of Computer Vision (WACV), pp. 333-342, Lake Tahoe, NV/CA, March 2018.

31. Joint Learning of Correlated Sequence Labelling Tasks Using Bidirectional Recurrent Neural Networks
Vardaan Pahuja, Anirban Laha, Shachar Mirkin, Vikas C. Raykar, Lili Kotlerman and Guy Lev
INTERSPEECH'17 Proceedings of Interspeech 2017, pp 548-552, Stockholm, Sweden.

30. An Empirical Evaluation of various Deep Learning Architectures for Bi-Sequence Classification Tasks
Anirban Laha and Vikas C. Raykar
COLING'16 Proceedings of COLING 2016, the 26th International Conference on Computational Linguistics, pp 2762–2773, Osaka, December, 2016.

29. Data Split Strategies for Evolving Predictive Models
Vikas C. Raykar and Amrita Saha
ECMLPKDD'15 Proceedings of ECML PKDD - European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, pp. 3–19, Porto, Portugal, 2015.

28. Claims on demand – an initial demonstration of a system for automatic detection and polarity identification of context dependent claims in massive corpora
Ehud Aharoni, Carlos Alzate, Roy Bar-Haim, Yonatan Bilu, Lena Dankin, Iris Eiron, Daniel Hershcovich, Shay Hummel, Mitesh Khapra, Tamar Lavee, Ran Levy, Paul Matchen, Anatoly Polnarov, Vikas Raykar, Ruty Rinott, Amrita Saha, Naama Zwerdling, David Konopnicki, Dan Gutfreund and Noam Slonim
COLING'14 Proceedings of COLING 2014, the 25th International Conference on Computational Linguistics: System Demonstrations, pp. 6–9, Dublin, Ireland, August 2014.

27. Decisions Under Drift: Adapting Binary Decision Thresholds to Drifts in Test Distribution
Sachin Kumar, Vikas C. Raykar, and Priyanka Agrawal
ICARE'14 Proceedings of the 6th IBM Collaborative Academia Research Exchange Conference (I-CARE), pp. 17:1–17:4, Bangalore, India, 2014.

26. An Autoencoder Approach to Learning Bilingual Word Representations †
Sarath Chandar A P, Stanislas Lauly, Hugo Larochelle, Mitesh M Khapra, Balaraman Ravindran, Vikas C. Raykar, and Amrita Saha
NIPS'14 Advances in Neural Information Processing Systems 27 (NIPS 2014), pp. 1853–1861, 2014.

25. Sequential crowdsourced labeling as an epsilon-greedy exploration in a Markov Decision Process †
Vikas C. Raykar and Priyanka Agrawal
AISTATS'14 Proceedings of the Seventeenth International Conference on Artificial Intelligence and Statistics (AISTATS), pp. 832–840, Reykjavik, Iceland, 2014.

24. AUC dominant unsupervised ensemble of binary classifiers
Priyanka Agrawal, Vikas C. Raykar, and Amrita Saha
SDM'14 Proceedings of the 2014 SIAM International Conference on Data Mining, pp. 271–279, Philadelphia, 2014.

23. Ranking annotators for crowdsourced labeling tasks †
Vikas Raykar and Shipeng Yu
NIPS'11 Advances in Neural Information Processing Systems 24 (NIPS 2011), pp. 1809–1817, 2011.

22. An entropic score to rank annotators for crowdsourced labeling tasks
Vikas Raykar and Shipeng Yu
NCVPRIPG'11 Proceedings of the Third National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), Hubli, India, 2011

21. Robust Large Scale Prone-Supine Polyp Matching Using Local Features: A Metric Learning Approach
Meizhu Liu, Le Lu, Jinbo Bi, Vikas Raykar, Matthias Wolf, and Marcos Salganicoff
MICCAI'11 Proceedings of the 14th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), pp. 73–80, Toronto, Canada, September 2011.

20. Designing efficient cascaded classifiers: Tradeoff between accuracy and cost †
Vikas C. Raykar, Balaji Krishnapuram, and Shipeng Yu
KDD'10 Proceedings of the 16th ACM SIGKDD international conference on Knowledge discovery and data mining (KDD), pp. 853–860, Washington DC, July 2010. [acceptance rate 17%] [oral presentation]

19. A Multiple Instance Learning Approach toward Optimal Classification of Pathology Slides
Murat Dundar, Sunil Badve, Vikas C. Raykar, Rohit Jain, Olcay Sertel, and Metin Gurcan
ICPR'10 Proceedings of 20th International Conference on Pattern Recognition, Turkey, August 2010. [acceptance rate 18%]
[Best Scientific Paper Award in Bioinformatics and Biomedical Applications Track]

18. **Nonparametric prior for adaptive sparsity** †
Vikas C. Raykar and Linda H. Zhao
AISTATS'10 In Proceedings of the Thirteenth International Conference on Artificial Intelligence and Statistics (AISTATS) 2010, JMLR: W&CP 9, pp. 629–636, Italy, May 2010.

17. **Mining Medical Images**
R. Bharat Rao, Glenn Fung, Balaji Krishnapuram, Jinbo Bi, Murat Dundar, Vikas C. Raykar, Shipeng Yu, Sriram Krishnan, Xiang Zhou, Arun Krishnan, Marcos Salganicoff, Luca Bogoni, Matthias Wolf, Anna Jerebko, and Jonathan Stoeckel.
KDD'09 Proceedings of the Third Workshop on Data Mining Case Studies and Practice Prize, Fifteenth Annual SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), Paris, June 2009.
[First place prize winner]

16. **Supervised Learning from Multiple Experts: Whom to trust when everyone lies a bit** †
Vikas C. Raykar, Shipeng Yu, Linda Zhao, Anna Jerebko, Charles Florin, Gerardo Valadez, Luca Bogoni, and Linda Moy
ICML'09 Proceedings of the 26th International Conference on Machine Learning (ICML), pp. 889–896, Montreal, June 2009.

15. **Bayesian Multiple Instance Learning: Automatic Feature Selection and Inductive Transfer** †
Vikas C. Raykar, Balaji Krishnapuram, Jinbo Bi, Murat Dundar, and R. Bharat Rao
ICML'08 Proceedings of the 25th International Conference on Machine Learning (ICML), pp. 808–815, Helsinki, July 2008.

14. **Polyhedral Classifier for Target Detection A Case Study: Colorectal Cancer** †
Murat Dundar, Matthias Wolf, Sarang Lakare, Marcos Salganicoff, and Vikas C. Raykar
ICML'08 Proceedings of the 25th International Conference on Machine Learning (ICML), pp. 288–295, Helsinki, July 2008.

13. **Automatic online tuning for fast Gaussian summation** †
Vlad I. Morariu, Balaji V. Srinivasan, Vikas C. Raykar, Ramani Duraiswami, and Larry Davis
NIPS'08 Advances in Neural Information Processing Systems (NIPS), vol. 21, pp. 1113–1120, 2009.

12. **Multiple instance learning improves CAD detection of masses in digital mammography**
Balaji Krishnapuram, Jonathan Stoeckel, Vikas C. Raykar, R. Bharat Rao, Philippe Bamberger, Eli Ratner, Nicolas Merlet, Inna stainvas, Menahem Abramov, and Alexandra Manevitch
IWDM'08 Proceedings of the 9th international workshop on Digital Mammography (IWDM), pp. 350–357, Tucson, AZ, July 2008. [oral presentation]

11. **On Ranking in Survival Analysis: Bounds on the Concordance Index** †
Vikas C. Raykar, Harald Steck, Balaji Krishnapuram, Cary Dehing-Oberije, Philippe Lambin
NIPS'07 Advances in Neural Information Processing Systems (NIPS), vol. 20, pp. 1209--1216 , 2008.

10. **A fast algorithm for learning large scale preference relations** †
Vikas C. Raykar, Ramani Duraiswami, and Balaji Krishnapuram
AISTATS'07 Proceedings of the 11th International Conference on Artificial Intelligence and Statistics (AISTATS), pp. 385-392, Peurto Rico, March 2007. [oral presentation]

9. **Efficient Kriging via Fast Matrix-Vector Products**
Nargess Memarsadeghi, Vikas C. Raykar, Ramani Duraiswami, and David M. Mount
AERO'08 IEEE Aerospace Conference, Big Sky, Montana, March 2008.

8. **Fast optimal bandwidth selection for kernel density estimation**
Vikas C. Raykar and Ramani Duraiswami
SDM'06 Proceedings of the sixth SIAM International Conference on Data Mining, pp. 524–528, Bethesda, April 2006.

7. **The manifolds of spatial hearing**
Ramani Duraiswami and Vikas C. Raykar
ICASSP'05 Proceedings of International Conference on Acoustics, Speech and Signal Processing (ICASSP), vol. III, pp. 285–288, Philadelphia, March 2005.

6. **Approximate expressions for the mean and the covariance of the maximum likelihood estimator for acoustic source localization**
Vikas C. Raykar and Ramani Duraiswami
ICASSP'05 Proceedings of International Conference on Acoustics, Speech and Signal Processing (ICASSP), vol. III, pp. 73–76, Philadelphia, March 2005.

5. **Automatic Position Calibration of Multiple Microphones**
Vikas C. Raykar and Ramani Duraiswami
ICASSP'04 Proceedings of International Conference on Acoustics, Speech and Signal Processing (ICASSP), vol. IV, pp. 69–72, Montreal, Canada, May 2004.

4. **Position Calibration of Audio sensors and actuators in a distributed computing platform**
Vikas C. Raykar, Igor Kozintsev and Rainer Lienhart
ACMMM'03 ACM Multimedia 2003, pp. 572-581, Berkeley, November 2003.

3. **Tracking a moving speaker using excitation source information**
Vikas C. Raykar, Ramani Duraiswami, B.Yegnanarayana, and S. R. Mahadeva Prasanna
ES'03 Proceedings of the 8th Eur. Conf. Speech Communication Technology, pp. 69–72, Geneva, September 2003.

2. **Extracting significant features from the HRTF**
Vikas C. Raykar, B.Yegnanarayana, R. Duraiswami, and L. Davis
ICAD'03 Proceedings of the 9th International Conference on Auditory Display (ICAD 2003), pp. 115–118, Boston, July 2003.

1. **Virtual audio system customization using visual matching of ear parameters**
D. Zotkin, R. Duraiswami, L. Davis, A. Mohan, and Vikas C. Raykar,
ICPR'02 Proceedings of the 16th Int. Conference on Pattern Recognition, Vol. 3, pp. 1003–1006, Quebec City, August 2002.

Workshop Papers/Peer Reviewed Abstracts

27. Sustainable assortment planning.
Nupur Aggarwal, Abhishek Bansal, Kushagra Manglik, Kedar Kulkarni, Sumanta Mukherjee, and Vikas Raykar.
INFORMS 2020 Annual Meeting, Virtual Event, USA, November 7-13, 2020.

26. Explainable hyper-local demand sensing for fashion retail.
Vijay E, Surya Shravan Kumar Sajja, Akshay Gugnani, Vikas Raykar, and Amith Singhee
INFORMS 2020 Annual Meeting, Virtual Event, USA, November 7-13, 2020.

25. Explainable AI based interventions for pre-season decision making in fashion retail.
Surya Shravan Kumar Sajja, Nupur Aggarwal, Sumanta Mukherjee, Kushagra Manglik, Satyam Dwivedi, and Vikas Raykar.
INFORMS 2020 Annual Meeting, Virtual Event, USA, November 7-13, 2020.

24. Data-driven stochastic markdown optimization in fashion retail.
Kedar Kulkarni, Abhishek Bansal, and Vikas Raykar.
INFORMS 2020 Annual Meeting, Virtual Event, USA, November 7-13, 2020.

23. Can social media trends improve demand forecast ?.
Akshay Gugnani, Surya Shravan Kumar Sajja, and Vikas Raykar.
INFORMS 2020 Annual Meeting, Virtual Event, USA, November 7-13, 2020.

22. Hyper-local sustainable assortment planning
Nupur Aggarwal, Abhishek Bansal, Kushagra Manglik, Kedar Kulkarni, and Vikas Raykar.
AI for fashion supply chain: The fifth international workshop on fashion and KDD, Virtual Event, CA, USA, 24 August 2020.

21. Explainable AI based interventions for pre-season decision making in fashion retail
Surya Shravan Kumar Sajja, Nupur Aggarwal, Sumanta Mukherjee, Kushagra Manglik, Satyam Dwivedi, Vikas Raykar.
AI for fashion supply chain: The fifth international workshop on fashion and KDD, Virtual Event, CA, USA, 24 August 2020.

20. Styling with Attention to Details
Ayushi Dalmia, Sachindra Joshi, Raghavendra Singh and Vikas C. Raykar
AI for fashion: The third international workshop on fashion and KDD, London, United Kingdom, 20 August 2018.

19. Joint multi-modal representations for e-commerce catalog search driven by visual attributes
Amrita Saha, Vikas C. Raykar and Mitesh Khapra
KDD 2016 workshop on Machine learning meets fashion: Data, algorithms and analytics for the fashion industry.

18. Multilingual Deep Learning
Sarath Chandar A P, Mitesh M. Khapra, Balaraman Ravindran, Vikas Raykar, and Amrita Saha
NIPS 2013 Deep Learning Workshop.

17. Can a Machine Learning-based Windowing Algorithm Pass Turing Test?
A. K. Jerebko, G Hermosillo-Valadez, V. C. Raykar, T. Mertelmeier, S. Abdurahman, and A. Fieselmann
In Radiological Society of North America scientific assembly and annual meeting program (RSNA 2012), November 2012.

16. Learning to Locate Cortical Bone in MRI
Gerardo Hermosillo Valadez, Vikas C. Raykar, and Xiang Zhou
Third International Workshop on Machine Learning in Medical Imaging(MLMI 2012), Nice, France, October 2012.

15. Annotation models for crowdsourced ordinal data
Vikas C. Raykar and Shipeng Yu
Presented at the Second Workshop on Computational Social Science and the Wisdom of Crowds (NIPS 2011), Sierra Nevada, Spain, December 2011.

14. Ranking annotators for crowdsourced labeling tasks
Vikas C. Raykar and Shipeng Yu
Proceedings of the 6th Annual Machine Learning Symposium, New York, pp. 79--80, October 2011.

13. Active Learning for Model Selection
Vikas C. Raykar and Subhadeep Mukhopadhyay
Proceedings of the 5th Annual Machine Learning Symposium, New York, pp. 91–92, October 2010.

12. CT colonography: Retrospective evaluation of the performance of computer-aided detection of colonic polyps in tagged and untagged preparation
T. Mang, L. Bogoni, M. Salganicoff, M. Wolf, V. Raykar, M. Macari, and A. Graser
In the annual meeting of the European Congress of Radiology (ECR), March 2010.

11. Effect of a concurrent virtual dissection with CAD for CTC interpretation: A multi-reader study evaluating accuracy and interpretation times
A.A. Ahmad, M. Macari, K.C. Cho, J.A. Bonavita, E. Robinson, L. Bogoni, M. Salganicoff, M. Wolf, and V. Raykar
In the annual meeting of the European Congress of Radiology (ECR), March 2010.

10. CT Kolonographie: Multizentrische Evaluation der Leistungsfähigkeit Computer-assistierter Detektion (CAD) kolorektaler Polypen bei Patientenvorbereitung mit und ohne Fecal Tagging
T. Mang, L. Bogoni, M. Salganicoff, M. Wolf, V. Raykar, M. Macari, P. Pickhardt, H. Ringl, and A. Graser
Österreichisch-Bayerischer Röntgenkongress 2010

9. Assessment of Computer-aided Nodule Detection Algorithm on Pathology Proved CT Data Sets
Sangmin Park, Tae Jung Kim, Vikas C. Raykar, Vikram Anand, Maneesh Dewan, and Anna Jerebko
In Radiological Society of North America scientific assembly and annual meeting program (RSNA 2008), November 2008. [oral presentation]

8. Non-parametric prior for adaptive sparsity
Vikas C. Raykar and Linda H. Zhao
Poster at the 4th Annual Machine Learning Symposium, New York, November 6 2009.

7. Fast large scale Gaussian process regression using approximate matrix-vector products
Vikas C. Raykar and Ramani Duraiswami
Presented at the Learning workshop 2007, San Juan, Peurto Rico, March 2007

6. On the manifolds of spatial hearing
Vikas C. Raykar and Ramani Duraiswami
Presented at the NIPS 2006 workshop on Novel Applications of Dimensionality Reduction.

5. The improved fast Gauss Transform with applications to machine learning
Vikas C. Raykar and Ramani Duraiswami
Presented at the NIPS 2005 workshop on Large scale kernel machines.

4. Extracting the frequencies of the pinna spectral notches in measured head related impulse responses
Vikas C. Raykar, Ramani Duraiswami, and B. Yegnanarayana
Presented at the 148th meeting of Acoustical Society of America, San Diego, California, November 2004.

3. A study of pinna anthropometry and the spectral notch frequencies
Vikas C. Raykar, Ramani Duraiswami, and B. Yegnanarayana
Presented at the 148th meeting of Acoustical Society of America, San Diego, California, November 2004.

2. Self Localization of acoustic sensors and actuators on distributed platforms
Vikas C. Raykar, Igor Kozintsev and Rainer Lienhart
ICCV 2003 International Workshop on Multimedia Technologies in E-Learning and Collaboration, Nice, France, October 2003.

1. Head Related Impulse Response Interpolation for Dynamic Spatialization
T.V.Sreenivas, Vikas C. Raykar and Ramesh Raman
Presented at the Texas Instruments DSPS fest-2k, November 2000, Banglore, India.

Technical reports/Arxiv papers

5. Taxonomy grounded aggregation of classifiers with different label sets
Amrita Saha, Sathish Indurthi, Shantanu Godbole, Subendhu Rongali, Vikas C. Raykar

4. Fast weighted summation of erfc functions
Vikas C. Raykar, R. Duraiswami, and B. Krishnapuram
CS-TR-4848, Department of computer science, University of Maryland, CollegePark.

3. Very fast optimal bandwidth selection for univariate kernel density estimation
Vikas C. Raykar and R. Duraiswami
CS-TR-4774, Department of computer science, University of Maryland, CollegePark.

2. Fast computation of sums of Gaussians in high dimensions
Vikas C. Raykar, C. Yang, R. Duraiswami, and N. Gumerov
CS-TR-4767, Department of computer science, University of Maryland, Collegepark.

1. Extracting frequencies of the pinna spectral notches in measured head related impulse responses
Vikas C. Raykar, C. Yang, R. Duraiswami, and N. Gumerov
CS-TR-4609, Department of Computer Science. University of Maryland CollegePark.

Bylines/Blogs/Media articles

4. Using AI, IoT to deliver fresh food, cut wastage
Kedar Kulkarni and Vikas Raykar, Forbes India blog, Oct 31, 2019.

3. Cognitive is the new black at New York Fashion Week
IBM THINK blog, March 14, 2017.

2. Make your fashion tech intelligent - Cognitive Fashion
Byline in Economic Times(Retail) online, 28th December 2015.

1. Fashion Forward With Cognitive Computing
Byline article titled published in the Retailer Magazine, 2015.

Invited talks

18. Explainable AI based interventions for pre-season decision making in fashion retail
Invited talk at at the XAI and NLP workshop at the University of Bologna on December 15, 2020.

17. Unlocking the power of AI for transforming fashion supply chain
Case study at the 16th Marketing Conclave 2020 organised by IAMAI on 27-28 August 2020.

16. Omni-Channel Retail: Cross-Channel Strategies that Work for Customer Delight
Invited talk at the Retail Technology Conclave, Renaissance Hotel, Mumbai, September 18-19, 2019.

15. AI in Fashion Supply Chain
Invited talk at the Internet Commerce Summit 2019, Bangalore, India, August 20-21, 2019.

14. AI for Fashion Supply/Value Chain
Invited talk at the IKDD special session on Data Science in India in KDD 2019, Alaska, August 7, 2019.

13. AI for Fashion: Data is the new black
Invited talk at the Apparel Sourcing Week 2019, Bangalore, India, March 15-16 2019.

12. AI for Fashion: Data is the new black
Invited talk at the The ACM India Joint International Conference on Data Science and Management of Data (CoDS-COMAD 2019), Kolkata, India, Jan 3-5 2019.

11. AI for Fashion: Data is the new black
Invited talk at The ACM India Joint International Conference on Data Science and Management of Data (CoDS-COMAD) 2019, Kolkata, India, January, 2019.

10. AI for Fashion: Data is the new black
Invited talk at the 2018 Design Research Symposium, Drexel University, Westphal College of Media Arts and Design, Philadelphia.

9. Evolving Predictive Models: How not be a overzealous data scientist
Invited talk at the Indian Institute of Technology, Hyderabad to kickoff the IBM Shared University Research award, 14 July 2018.

8. Learning from crowds
Invited talk at the 3rd Summer School on Machine Learning - Advances in Modern AI held at the International Institute of Information Technology, Hyderabad from 9 - 14 July 2018.

7. AI for fashion: Data is the new black
Invited talk at the first Bangladesh Fashionology Summit in Dhaka on February 12, 2018 organized by the Bangladesh apparel exchange.

6. Evolving predictive models
Invited talk at the IKDD special session on Data Science in India in KDD 2016, held in San Francisco, held on August 15, 2016.

5. Evolving predictive models
Invited Speaker at the 2nd Indian Workshop on Machine Learning, July 1-3, 2016, IIT Kanpur

4. Sequential crowdsourcing
Invited Speaker at the Conformal Prediction for Reliable Machine Learning workshop, Indian Institute of Technology, Hyderabad, 18th December 2015.

3. Applications of Deep Learning-Visual Analytics
Invited talk at the Deep Learning - Winter School organized as a part of the 7th IBM Collaborative Academia Research Exchange (I-CARE) workshop on October, 2015.

2. **Learning from crowds**
   Invited Talk at the 1st Indian Workshop on Machine Learning (IWML 2013), IIT Kanpur, India, July 2013.

1. **Sparse non-parametric Bayesian shrinkage for high dimensional problems**
   Invited talk at IMS-China International Conference on Statistics and Probability 2009, July 3-6, 2009, Weihai, China.

Patents

Google patents

8. **Touch and pressure-based apparel image searching**
   US10586263B2
   Vikas Raykar, Amrita Saha, and Raghavendra Singh

7. **Semantic merge of arguments**
   US10614100B2
   Mitesh Khapra, Vikas Raykar, Amrita Saha, Noam Slonim, and Ashish Verma

6. **Automatic generation of a speech by processing raw claims to a set of arguments**
   US9753916B2
   Ehud Aharoni, Indrajit Bhattacharya, Yonatan Bilu, Dan Gutfreund, Daniel Hershcovich, Vikas Raykar, Ruty Rinott, Godbole Shantanu, Noam Slonim

5. **Matching of regions of interest across multiple views**
   US8885898B2
   Meizhu Liu, Le Lu, Vikas C. Raykar, Marcos Salganicoff, Matthias Wolf

4. **Adaptive anatomical region prediction**
   US9336457B2
   Vikas C. Raykar, Yiqiang Zhan, Maneesh Dewan, Gerardo Hermosillo Valadez, Zhigang Peng, Xiang Sean Zhou

3. **System and Method for Multiple-Instance Learning for Computer Aided Diagnosis**
   US8131039B2
   Balaji Krishnapuram, Vikas C. Raykar, Murat Dundar, R. Bharat Rao

2. **Three-dimensional position calibration of audio sensors and actuators on a distributed computing platform**
   USRE44737E1
   Vikas C. Raykar, Igor V. Kozintsev, Rainer W. Lienhart

1. **Method for three-dimensional position calibration of audio sensors and actuators on a distributed computing platform**
   US6941246B2
   Vikas C. Raykar, Rainer W. Lienhart, Igor V. Kozintsev

Open Source Software

The various fast algorithms that I developed during my doctoral dissertation are released under the GNU Lesser General Public License (LGPL) and have been widely downloaded.

1. The improved fast Gauss Transform
2. FIGTree: Fast Improved Gauss Transform with Tree Data Structure
3. Fast optimal bandwidth selection for kernel density estimation
4. Fast summation of erfc functions and ranking

Interns supervised

2017 Arkabandhu Chowdhury
Rice University
Multi-modal dialog system

2017 Indrani Bhattacharya
Rensselaer Polytechnic Institute
Multi-modal dialogs for visual browsing

2016 Anshumaan Bajpai
University of Notre Dame
Cognitive Couture – Data is the new black

2016 Yash Bhalgat (co-supervised with Amrita Saha)
Indian Institute of Technology, Mumbai, India
Anlysing prints in fashion with deep autoencoders

2015 Deepak Mittal
Indian Institute of Technology, Madras, India
Image Question Answering: An attention based model

2014 Sachin Kumar (co-supervised with Priyanka Agrawal)
Indian Institute of Technology, Kharagpur, India
Decisions under drift: Adapting binary decision thresholds to drifts in test distribution

2014 Divya Padmanabhan
Indian Institute of Science, Bangalore, India
ROC based annotator models for collaborative filtering

2013 P. Balamurugan
Indian Institute of Science, Bangalore, India
Supervised multiple metric nearness problem

2010 Subhadeep Mukhopadhyay
Department Statistics, Texas A&M University
Learning loop for cloud based computer-aided diagnosis

2010 Meizhu Liu (co-supervised with Le Lu)
Department of Computer and Information Science and Engineering, University of Florida
Colon polyp prone-supine matching using metric learning methods

2008 Oksana Yakhnenko (co-supervised with Balaji Krishnapuram)
Computer Science Department, Iowa State University
Predictive models for breast cancer diagnosis

Workshops organized

5. AI for fashion supply chain.: The fifth international workshop on fashion and KDD
Vikas C. Raykar, Pavithra Harsha, Nupur Aggarwal, and Surya Shravan Kumar Sajja
KDD'19 Co-organised the fifth international workshop on fashion and KDD, hosted at KDD 2020 in Virtual event, CA, USA on 24th August, 2020.

4. AI for fashion: The fourth international workshop on fashion and KDD
Vikas C. Raykar, Raghavendra Singh, Ranjitha Kumar, Aruna Rajan, Soo-Min Pantel, Ayushi Dalmia, Abhishek Bansal
KDD'19 Co-organised the fourth international workshop on fashion and KDD, hosted at KDD 2019 in Anchorage, Alaska, USA on 5th August, 2019.

3. AI for fashion: The third international workshop on fashion and KDD
Vikas C. Raykar, Raghavendra Singh, Ayushi Dalmia, Urs Bergmann, Nikolay Jetchev, Sumit Borar, Soo-Min Pantel, Julian McAuley
KDD'18 Co-organised the third international workshop on fashion and KDD, hosted at KDD 2018 in London, UK on 20th August, 2018.

2. Machine learning meets fashion: Data, algorithms and analytics for the fashion industry
Vikas C. Raykar, Soo-Min Pantel, Heng Xu, Raghavendra Singh, Julian McAuley
KDD'17 Co-organised the second international workshop on fashion and KDD, hosted at KDD 2017 in Halifax, Nova Scotia - Canada on 14th August, 2017.

1. Machine learning meets fashion: Data, algorithms and analytics for the fashion industry
Vikas C. Raykar, Brad Klingenberg, Heng Xu, Raghavendra Singh, Amrita Saha
KDD'16 Co-organised the first international workshop on fashion and KDD, hosted at KDD 2016 in San Francisco, California on 14th August, 2016

Service and Professional Activities

Member American Statistical Association, ACM Special Interest Group on Knowledge Discovery and Data Mining (SIGKDD), American Association of Physicists in Medicine (AAPM) Computer Aided Detection in Diagnostic Imaging (CAD) Subcommittee, The American Association for the Advancement of Science (AAAS).

Journal Reviewer Journal of Machine Learning Research, IEEE Transactions on Pattern and Machine Intelligence, Neurocomputing, Data Mining and Knowledge Discovery, IEEE Transactions on Speech and Audio Processing, IEEE Transactions on Signal Processing, Cytometry Part A, Springer, Pattern Recognition Letters, Statistical Analysis and Data Mining, Machine Learning

Conference Reviewer AAAI 2021, KDD 2016, NIPS 2015, IKDD 2015, ICARE 2014, NIPS 2014, NIPS 2013, CIKM 2013, IJCAI 2013, CIKM 2011, AISTATS 2011, National Conference on Communications (NCC) 2011 Bangalore India, Ad-hoc reviewer for ICML, AISTATS, KDD (20011,2012), and NIPS conferences, ICASSP 2005.

Program Committee 2nd Indian Workshop on Machine Learning 2016, 3rd IKDD Conference on Data Sciences, Pune, India 2016, 2nd IKDD Conference on Data Sciences, Bangalore, India, 2015, 6th IBM Collaborative Academia Research Exchange Conference (I-CARE), Bangalore, India 2014, NIPS 2010 workshop on Predictive Models in Personalized Medicine, 20th ACM Conference on Information and Knowledge Management (CIKM) October 2011 Glasgow, UK.

Computing Skills

Expertise in python, docker, kubernetes, kubeflow, caffe, pytorch and tensorflow. Working knowledge of R, MATLAB, C, C++, and Java, Active interest in data mining competitions, Experience with various MRMC analysis software.