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**Current
Position**

- **Associate Professor**
Electronics and Electrical Engineering,
Indian Institute of Technology Guwahati (IITG), Guwahati, Assam

**Current
Research
Areas**

- **Applications of Signal Processing** such as
 - a) Privacy preserving signal/information processing such as face-matching in the encrypted domain, anonymous counting and verification and privacy preserving image retrieval.
 - b) Biometrics and Biometric counter-spoofing
 - c) Non-perfect secret sharing schemes applied to fine-grained access control and key distribution in wireless nodes.
 - d) Anomaly detection in heterogeneous data using Graphical Methods
 - e) GAN fake detection based on Natural Space Characterization

**Educational
Profile**

- **Doctor of Philosophy**, University of Toronto, Ontario, Canada, July 2006
Dissertation title: Methodologies for Access Control and Fingerprinting of Multimedia
Overall CGPA for courses: **3.94/4.0**
- **Master of Engineering**, Memorial University of Newfoundland, Canada, April 2001
Major Area: Power Electronics and Controls
Dissertation title: An Improved Control Strategy for a Hybrid Series Compensator
Overall CGPA for courses: **4.0/4.0 (Scaled to a 4-pt. quantum, Average 91%)**
- **Bachelor of Engineering (Electronics)**, K.J.Somaiya College of Engineering, University of Mumbai, India, Aug 1998,
Marks: **Distinction (71%)** in degree examinations (**ranked 2nd in a class of 66, 32nd out of 1066 students in Mumbai University**)
Dissertation title: Development, Simulation and Modelling of IGBT based Power Conditioner (*Team project under Mr. Sridhar and Dr. Ganesh Bhokare*)
B.E final year Project done in Industry with M/S Crompton Greaves Ltd., Mumbai, (August 1997 to March 1998)

**Awards and
Scholarships**

- **Bell University Labs** research assistantship (2001-2004).
- **CITO research scholarship** at University of Toronto (2004-05).
- **Edward. St. Rogers Scholarship** for Doctoral study, University of Toronto (2003- 05)
- **University of Toronto Open Fellowship** for Doctoral Study (2001-03).
- **Fellow of School of Graduate Studies** at Memorial University, St Johns, Canada (M.Eng program, 1999-2001)

**Patent
Granted**

- **PRIVACY PRESERVING FACE BIOMETRIC RETRIEVAL**
Patent number:499022 GRANTED on Jan 12th, 2024
Application/Reference No.: 201741011081
Authors: Kannan Karthik, Ramasetty Ramarao and Hemavathy Muthuswamy
- Work and DESIGN developed for: **Bharat Electronics Ltd. (BEL)** as a part of a CONSULTANCY project.

Publications

Book (Published)

K. Karthik, D. Hatzinakos, "*Multimedia Encoding for Access Control with Traitor Tracing: Balancing Secrecy, Privacy and Traceability*", **Book** published by VDM Verlag Dr. Muller, Germany, **2008**, ISBN: 978-3-8364-3638-0.

Journal-papers (Accepted/Published)

K. Balaji and **K. Karthik**, "*Image Life Trails Based On Contrast Reduction Models For Face Counter-Spoofing*", EURASIP J. on Info. Security **2023**, 1 (2023). <https://doi.org/10.1186/s13635-022-00135-8> [2023]

S. Chakraborty, **K. Karthik** and S. Banik, "*Graph Synthesis for Pig Breed Classification from Muzzle Images*", IEEE Access, vol.9., pp.127240-127258, DOI: 10.1109/ACCESS.2021.3111957. [**2021**].

K. Balaji, **K. Karthik**, "*Face anti-spoofing by identity masking using random walk patterns and outlier detection*". Pattern Analysis and Applications, 23, 1735-1754 (**2020**). <https://doi.org/10.1007/s10044-020-00875-8>.

P. Malik and **K. Karthik**, "*Correction of complex purple fringing by green-channel compensation and local luminance adaptation*," in IET Image Processing, vol. 14, no. 1, pp. 154-167, January, **2020**. DOI: 10.1049/iet-ipr.2019.0732.

P. Malik and **K. Karthik**, "*Iterative Content Adaptable Purple Fringe Detection*", in Springer Journal of Signal, Image and Video Processing (SIVP), pp 1-8, **2017**, DOI 10.1007/s11760-017-1144-1.

K. Karthik, S. Kashyap," *Transparent Hashing in the Encrypted Domain for Privacy Preserving Image Retrieval*", in Springer Journal of Signal, Image and Video Processing, Special issue on Image and Video Processing for Security, Vol. 7, No. 4, pp 647-664, July **2013**.

K. Karthik, "*Constructing Intrinsic Image Signatures by Random Downsampling and Differential Mean-Median Information*", in International Journal of Tomography & Simulation (IJTS), Special Issue on "Information and Communication Technology", Vol.22, No.1, pp 112-144, **2013**.

P. Das, **K. Karthik**, B. C. Garai, "*A robust alignment-free fingerprint hashing algorithm based on minimum distance graphs*," Elsevier Journal on Pattern Recognition, Vol. 45, Issue 9, pp. 3373-3388, **2012**, DOI: 10.1016/j.patcog.2012.02.022.

A. Talwai, D. Sengupta, and **K. Karthik**, "A Transparent Encryption Scheme for Watermarked Biometric and Medical Images," International Journal of Computer and Electrical Engineering vol.4, no. 3, pp. 278-282, **2012**.

K. Karthik, D. Hatzinakos, "Decryption Key Design for Joint Fingerprinting and Decryption in the Sign Bit plane for Multicast Content Protection", International Journal of Network Security (IJNS), Vol. 4, no. 3, pp. 254-265, May **2007**. <http://ijns.nchu.edu.tw/contents/ijns-v4-n3/ijns-2007-v4-n3-p254-265.pdf>

D. Kundur, **K. Karthik**, "*Video fingerprinting and encryption principles for Digital Rights Management*", Proceedings of IEEE, vol. 92, no. 6. pp. 918-932, June **2004**.

Selective Conference-papers (Accepted/Published)

S. Chakraborty and **K. Karthik**, "*Test-point Induction Order Ranking based One Class Classification using Minimum Spanning Trees*", **ACCEPTED** in June 2025 in *International Conference on Computer Vision and Image Processing (CVIP)* to be held in December **2025**.

K. Karthik and K. Balaji, "*Identity Independent Face Anti-spoofing based on Random Scan Patterns*", In Proceedings of 8th International conference on Pattern Recognition and Machine Intelligence (PREMI 2019), Tezpur, Assam, India, December 17-20, **2019**.

K. Karthik and B. R. Katika, "*Image quality assessment based outlier detection for face anti-spoofing*," 2017 2nd International Conference on Communication Systems, Computing and IT Applications (CSCITA), Mumbai, India, **2017**, pp. 72-77, doi: 10.1109/CSCITA.2017.8066527.

K. Karthik, H. Balaraman, "*Key Independent Face Clustering in the Encrypted Domain*", in proceedings of in International Conference on Industrial and Information Systems (ICIIS 2017), Peradeniya, Sri Lanka, December 15-16, **2017**.

K. Karthik, "*Key Search and Adaptation based on Association Rules for Backward Secrecy*", in IEEE Workshop on Information Forensics and Security (WIFS 2015), Rome, Italy, November 13-16, **2015**.

K. Karthik, "*Virtually Reconfigurable Secure Wireless Networks using Broadcast Tokens*" in proceedings of International conference on Network Systems and Security (NSS 2013), Madrid, Spain, June 3-4, in Lecture Notes in Computer Science, Vol. 7873, pp 599-606, **2013**.

K. Karthik, "*A Ramp Code for Fine-grained Access Control*", proceedings of International Conference on Computer Science and Information Technology (CCSIT 2013), Bangalore, Karantaka, Feb 18-20, Vol. 3, No. 6, **2013**.

V. S. Manikanta and **K. Karthik**, "Image similarity based on eigen-correspondences," 2013 Annual IEEE India Conference (INDICON), Mumbai, India, **2013**, pp. 1-6, doi: 10.1109/INDICON.2013.6726067.

K. Karthik, "Robust Image Hashing by Downsampling: Between Mean and Median", in World Congress on Information and Communication Technologies (WICT 2011), Mumbai, Maharashtra, Dec 11-14 **2011**.

K. Karthik, D. Hatzinakos, "*MIX-SPLIT: Controlled Mixing of Secrets and Traceable Pseudonym Generation using Codebooks*", Workshop on Information Forensics and Security (WIFS), Washington, Seattle, Dec 12-15, **2010**.

K. Karthik, D. Hatzinakos, "*A Unified approach to construct Non-perfect Secret Sharing and Traitor Tracing schemes*," Proceedings of International Conference on Security and Management (SAM 07), Las Vegas, Nevada, June 25-28, **2007**.

K. Karthik, D. Kundur, D. Hatzinakos, "*Joint fingerprinting and decryption for multimedia content tracing in wireless networks*", Proceedings of the SPIE, Florida, USA, Vol 5403, pp.360-370, April 12-16, **2004**.