

Anju Jose Tom, Post Doctoral Researcher

Major Areas: *Signal Processing, Computer Vision, Machine Learning*

INRIA RENNES, France

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PROFILE SUMMARY

I am an Active researcher holding a recent Ph.D and currently doing Post Doctoral research in an internationally recognised research institute in France called INRIA, with my research focus in signal processing, computer vision, machine learning. I have six years of research experience (2016-2022) with publications in top-tier (Q1 standard) journals and top international conferences. in the research area.

KEYWORDS RELATED TO THE RESEARCH AREA

Signal Processing, Computer Vision, Image and Video Processing, Deep Learning, Image Compression, GANs, Data Repurposing, Multi-item Compression, Data Science and Artificial Intelligence, Machine Learning.

EDUCATION & POSTDOCTORAL EXPERIENCE WITH FURTHER RESEARCH PLANS

- **Queensland University of Technology, Brisbane Australia** QUT, Revaero
Post Doctoral Researcher (Future) Sept. 2022 – Aug 2024
- **National Institute for Research in Digital Science and Technology, Rennes** INRIA, SIROCCO
Post Doctoral Fellowship (Present) Sept. 2020 – Aug 2022
- **National Institute of Technology, Calicut (NIT)** CGPA: 8.75
Ph.D in Electronics & Communication Engineering. Dec. 2016 – May 2020
- **College of Engineering (CEC), Cherthala** CGPA: 9.4
Master of Technology in Signal Processing. Aug. 2014 – May 2016
- **Saintgits College of Engineering, Kottayam** CGPA: 8.6
Bachelor of Technology in Applied Electronics and Instrumentation. Aug. 2010 – May 2014
- **St. George Higher Secondary School, Kattappana** 95 %
Higher Secondary Education. July 2008 – July 2010

ONGOING RESEARCH PROJECT WITH INRIA FRANCE

- **DATA REPURPOSING (DARE):** This project aims to develop a new compression paradigm for large-scale image and video databases. It is nothing but changing the initial data format for another type of visualization in a more compact representation, thus leading to drastic compression ratios.
- **Collaborator:** Dr. Thomas Maugey, Research Scientist, Team SIROCCO, Inria, France
- **Recent manuscripts under preparation::**
 1. **Anju Jose Tom**, Thomas Maugey, “Image embedding and user preference modeling for data collection sampling”
- **Recent Papers Submitted::**
 1. Tom Bachard, **Anju Jose Tom**, Thomas Maugey, “Semantic alignment for multi-item compression”, *IEEE International Conference on Image Processing (ICIP), 2022.*

FUTURE RESEARCH PROJECT WITH QUT AUSTRALIA

- **Low-cost Cognitive Electronic Warfare (C-EW) system:** This system is to be hosted on an Uncrewed Aerial Vehicle (UAV). It employs leading edge Digital Signal Processing (DSP) and Artificial Intelligence (AI) combined with a small Software Defined Radio (SDR) placed on UAVs.
- **My role:** A critical element for the Project is skills in Signal and Image Processing, detection and tracking. I will perform independent research along with a mix of tracking the project research objectives, coordination and liaison with chief investigators and Project Management and mentoring and R& D support to the 2 PhD Candidates.
- **Project Team members:** Project Lead: Dr Terrence Martin (RevAero) Chief Investigators: Prof Clinton Fokes (QUT), Dr Dhammika Jayalath (QUT), Dr Simon Denman (QUT), PhD Candidates : Mr Zi Huang (Software and NN Research), Fraser Williams (Hardware and UAV Integration)

INVITED TALKS

- **Title of the talk: Robust Principal Components Analysis based Video Inpainting:** Online training programme conducted by CapsNetwork (International Network for Capsule Imaging in Endoscopy) on Video Processing and Wireless Capsule Endoscopy, Norway, Date of the talk: 27 April 2022.

RESEARCH

- **Ph.D** NIT, Calicut
Research Supervisor: Dr. Sudhish N. George, Assistant Professor, NIT **Thesis Defence: 26 May 2020**
 - **Thesis Title:** Design of Moving Object Detection Schemes for Challenging Surveillance Environments
 - **Problem Statement:** To design and implement algorithms for moving object detection from surveillance videos which are capable of addressing dynamic background, noisy video data, incomplete video data, subsampled video data and low resolution video data.
 - **Research Publications**
 1. **Anju Jose Tom**, Sudhish N. George, "A three way optimization technique for noise robust moving object detection using tensor low rank approximation, $l_{1/2}$ and TTV Regularizations", *IEEE Transactions on Cybernetics*, Print ISSN: 2168-2267, Online ISSN: 2168-2275, DOI: TCYB.2019.2921827, 2019.
 2. **Anju Jose Tom**, Sudhish N. George, "Simultaneous reconstruction and moving object detection for wireless multimedia sensor networks based surveillance systems", *IEEE Transactions on Image Processing*, DOI: 10.1109/TIP.2020.3004696, June, 2020.
 3. **Anju Jose Tom**, Sudhish N. George, "Video completion and simultaneous moving object detection for extreme surveillance environments", *IEEE Signal Processing Letters*, 2019, vol 26, pp:577-581.
 4. Shijila B, **Anju Jose Tom**, Sudhish N. George, "Simultaneous denoising and moving object detection using low rank approximation", *Future Generation Computer Systems*, Elsevier, 2019, vol 90, pp:198-210.
 5. Shijila B, **Anju Jose Tom**, Sudhish N. George, "Moving object detection by low rank approximation and l_1 -TV regularization on RPCA framework", *Journal of Visual Communication and Image Representation*, Elsevier, 2018, vol 56, pp:188-200.
 6. **Anju Jose Tom**, Sudhish N. George, "Video super resolution and joint moving object detection from low-res surveillance videos", *IEEE Transactions on Intelligent Transportation Systems* (under review).
 - **Conferences**
 1. **Anju Jose Tom**, Sudhish N. George, "Tensor Total Variation Regularized Moving Object Detection for Surveillance Videos", in *IEEE International Conference on Signal Processing and Communication (SPCOM 2018)*, pp: 327-331, IISc, Bangalore, India, 2018.

POST GRADUATION

- **Master of Technology - Signal Processing** CEC, Cherthala, India
Project Title: Ripplet Transform based Medical Image Compression Aug.2014 - Aug.2016
 - **Objective:** To design and implement algorithms for Medical Image Compression using Ripplet Transform.

UNDER GRADUATION

- **Bachelor of Technology** Saintgits, Kottayam, India
Project Title: SMART ROOM using LabVIEW Jul. 2010 - May 2014
- **Awards and Certifications**
 - Prize for Outstanding Student Performance, Department of AEI & PTA, Saintgits College of Engineering, Kottayam, India.
 - Prize for best mini project, Department of AEI, Saintgits College of Engineering, Kottayam, India.

WORKSHOPS/FACULTY DEVELOPMENT PROGRAMME (FDP)S ATTENDED

1. Computational Imaging with Novel Image Modalities (CLIM) workshop at INRIA-Rennes, France. (2021 September 29-30)
2. TEQUIP Sponsored Workshop on Optimization Techniques (2016 March 21-23) at College of Engineering Cherthala (CEC), India.
3. FDP on Linear Algebra for Engineers (2015 Nov 24-26) at CEC Cherthala.
4. Accelerobotix, a Workshop conducted by Technophilia systems in Association with Robotics and computer Applications Institute of USA held at Saintgits College of Engineering, Kottayam (2012 Oct 5-6).
5. TEQIP III sponsored Faculty Development Programme on Research Trends in Multimedia and Multi-rate Signal Processing (24th-29th June, 2019) at NIT Calicut, India

TECHNICAL TOOLS AND SKILLS

1. Efficient coding skills in softwares such as C, C++, Git, Python (numpy, scikit-learn, TensorFlow, keras), Pycharm, Pytorch, Matlab
2. Proficiency in software implementations at a product level using computer vision/machine learning tools such as OpenCV
3. Knowledge & know-how in computer vision (detection, segmentation, classification/recognition, detection, real-time image processing, etc.)
4. Knowledge & know-how in digital signal processing

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS AND EDITORIAL EXPERIENCE

1. Member of Institute of Electrical and Electronics Engineers (IEEE)
2. Reviewer for IEEE Transactions on Intelligent Transportation Systems (ITS) and IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)

TEACHING EXPERIENCE/MASTER PROJECT SUPERVISION

1. Assistant Professor of Bachelors in Electronics at CCST College of Science and Technology, Palakkad, Kerala, India. Single Semester: Jun. 2016 - Nov. 2016
Subjects Handled : Basic Electronics, Digital Electronics, Basic Electronics Lab, Digital Electronics Lab.
Duties: Lectures, Tutorials, Conducting Lab exams, Viva voce, Preparing questions, Marks Tabulation
2. Master Project Co-supervision and Teaching assistance during Ph.D at NIT Calicut, India. Two Semesters: Jun. 2017 - Jun. 2018
Duties: Weekly meeting with project student, Proofreading manuscripts, Lectures, Tutorials, Conducting Lab exams, Viva voce, Preparing questions, providing motivational talks to students.
3. Master Project Co-supervision at Inria-Rennes, France. One Semester: Feb. 2021 - July. 2021

PERSONAL PROFILE

- Date of birth: 03 June 1992
- **Home address (for communication):** 12 A Rue des Plantes, Apartment 242, 35700 Rennes, France.

REFERENCES

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