

Sanjay SHARMA

Research Engineer | PhD in Computer Science

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Currently employed as a Research Engineer in the **R&D department at Capgemini Engineering**, where I specialize in developing and integrating perception modules for connected autonomous vehicles. Former **Doctoral Researcher in Image and Signal Processing at CEA-LIST**. With **6 years of experience** in both **C++ and Python**, and equally proficient in designing and developing projects using them. My professional interests are deeply rooted in exploring and seizing development and research opportunities within signal and image processing, especially in realm of machine learning including advance algorithm . I am skilled in Bayesian probabilistic modeling, deep learning, and signal and Image processing and indeed in Programming. Additionally, I possess hands-on experience in real-time testing and the implementation of advanced algorithms.

COMPETENCIES

Expertise Domains	Signal and Image Processing, Numerical Methods, Data Structures and Algorithms, Machine Learning (Shallow Learning, Deep Learning, Reinforcement Learning), Robotics, Camera/LiDAR/Radar Integration, Probability and Statistical Analysis, Bayesian Modeling, Uncertainty Analysis
Development Platforms	C/C++, Python, MATLAB
Development Tools	Robot Operating System (ROS1/2) , Python (PyMC3, SciPy, TensorFlow, PyTorch, OpenCV, NumPy, Scikit-learn, Pandas), C/C++ (Computer Vision and Image Processing, OpenCV, Point Cloud Processing for Lidar Data, CUDA Algorithms)
Platforms	Cluster Computing, Edge Computing, Embedded Systems
Modeling Techniques	Finite Element Method (FEM) : COMSOL Multiphysics (sensor modeling), Ansys, Abaqus, CIVA

PROFESSIONAL EXPERIENCE

Present	Research Engineer, CAPGEMINI ENGINEERING - ALTRAN PROTOTYPE AUTOMOBILES, Issy-les-Moulineaux, France
Feb 2023	5G Open Road Project : <i>Advanced infrastructure european project with Renault, Stellantis, Valeo, and more</i> <ul style="list-style-type: none">➢ Developed sensor fusion algorithms for camera and LiDAR in the vision module.➢ Trained, validated, and deployed deep learning models based on Transformer architecture.➢ Implemented unsupervised learning techniques for LiDAR point cloud detection and classification.➢ Created first-principle-based image segmentation algorithms for the driving road environment. <div>ROS1/2 Kalman Filter C++/Python GPUs Edge Computing Git</div>
Oct 2022	Doctoral Researcher in SHM (Predictive Maintenance), CEA-LIST, Paris-Saclay, France
April 2019	Thesis : <i>Performance Demonstration of Guided Waves Based Structural Health Monitoring System</i> <ul style="list-style-type: none">➢ Developed Probability of Detection (POD) curves for defect detection in SHM using Bayesian probabilistic modeling, bridging the gap between simulation and experimental results (Physics Informed Model).➢ Demonstrated the efficacy of various data-driven models, including Support Vector Machines and Deep Learning, in enhancing the probability of defect detection using image reconstruction algorithms via sensors.➢ Modeled sensors for higher frequency excitation of guided waves in a computational domain, improving the accuracy of structural health monitoring simulation. <div>AI in Material Science Wave Propagation Uncertainty Analysis Image Reconstruction Experiments COMSOL/CIVA</div>
April 2024	Visiting Associate Professor (Part-time), EMLV - LÉONARD DE VINCI BUSINESS SCHOOL, Paris, France
January 2024	Subject : <i>Data Analysis and Management</i> <ul style="list-style-type: none">➢ Developed and delivered the Data Analysis course, covering fundamental and advanced topics to equip 32 students with essential skills for analyzing and interpreting complex datasets.➢ Provided personalized mentorship and guidance on academic projects, supporting students in applying theoretical concepts to real-world scenarios. <div>Probability & Statistics Business Analytics Python (Pandas, NumPy) Student Mentorship</div>
June 2022	Project Coordinator, OPEN-SOURCE CONTRIBUTION, Paris, France
August 2022	Project : <i>Improving Waste Sorting and Segregation through Image-based Deep Learning</i> <ul style="list-style-type: none">➢ Led a team of 16 members in deploying deep learning models for object detection and classification.➢ Coordinated team efforts to enhance waste management efficiency using advanced image processing techniques. <div>YOLOv4 Git Database Collection & Management Team Leadership & Coordination</div>

Sept 2018 Jan 2018	<p>Senior Engineer, GENERAL AERONAUTICS PVT. LTD. , Bangalore, India</p> <p>Project : <i>Drone Structural Analysis</i></p> <ul style="list-style-type: none"> > Responsible for calculation of load levels and material stress factor using analytical knowledge to identify design constraints for drones in python. <p>Composite material Python Ansys Drones Analytical calculation</p>
July 2018 Aug 2018	<p>Master's student, INDIAN INSTITUTE OF SCIENCE, Bangalore, India</p> <p>Thesis : <i>Optimized design of Active noise and Vibration control on marine platform using smart material</i></p> <ul style="list-style-type: none"> > Achieved a 53% reduction in structural noise on a laboratory prototype of a large marine structural platform through the implementation of active control (PID controller). > Conducted optimization of the design for the active noise and vibration control actuator system integrated with a feedback loop. <p>Matlab PID controller Actuator Experimentation Machine Learning Noise&vibration control</p>

EDUCATIONAL BACKGROUND

2022	PhD in Image and Signal Processing, Université Paris-Saclay, Paris, France
2018	Master of Technology in Aerospace Engineering (Specialization in Control and Systems), Indian Institute of Science, Bangalore, India - IISc
2015	Bachelor of Technology in Aeronautical Engineering, University College of Engineering, Rajasthan, India

LANGUAGES

English	
French	

STRENGTHS

- > Passionate and Motivated
- > Independent
- > Proactive

PUBLICATIONS (LAST UPDATED : JUNE 2024)

A MODEL ASSISTED PROBABILITY OF DETECTION FOR GUIDED WAVE SHM SYSTEMS : COMPARATIVE STUDY ON RECENT STATISTICAL DEVELOPMENTS (2024)

B. Yilmaz, S. Sharma, A. Recoquillay, B. Chapuis, and P. Calmon, Proceedings of the 10th European Workshop on Structural Health Monitoring (EWSHM 2024), June 10-13, 2024, Potsdam, Germany

A HYBRID ACTUATOR MODEL FOR EFFICIENT GUIDED WAVE BASED STRUCTURAL HEALTH MONITORING SIMULATIONS (2024)

Sanjay Sharma, Olivier Mesnil, Arnaud Recoquillay, and Bastien Chapuis, Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems

METHODOLOGY OF PROBABILITY OF DETECTION CURVE VIA DEEP LEARNING FOR GUIDED WAVE STRUCTURAL HEALTH MONITORING (2024)

Sanjay Sharma, Olivier Mesnil, and Bastien Chapuis, Journal of structural health monitoring : under-review

SELF-REFERENCED ROBUST GUIDED WAVE BASED DEFECT DETECTION : APPLICATION TO WOVEN COMPOSITE PARTS OF COMPLEX SHAPE (2023)

Olivier Mesnil, Arnaud Recoquillay, Clément Fisher, Valentin Serey, Sanjay Sharma, and Oscar d'Almeida, Mechanical Systems and Signal Processing

EXPERIMENTAL VALIDATION OF MAPOD METHODOLOGY FOR SHM APPLIED TO THE DETECTION OF GROWING CRACKS IN A METALLIC PART (CONFERENCE PRESENTATION) (2023)

Pierre Calmon, Sanjay Sharma, Olivier Mesnil, and Bastien Chapuis, 8th International Workshop on Reliability of NDT/NDE

AN IMPROVED SENSOR MODEL FOR EFFICIENT GUIDED WAVE BASED STRUCTURAL HEALTH MONITORING SIMULATION (2021)

Sanjay Sharma, Olivier Mesnil, Bastien Chapuis, and Pierre Calmon, NDT 2021 - 13th International Symposium on NDT in Aerospace 2021

TRANSDUCER MODEL FOR GUIDED WAVE BASED STRUCTURAL HEALTH MONITORING SIMULATION (2022)

S. Sharma, Doctoriales de la COFREND, Vol. 27(8)

MODEL ASSISTED POD FOR GUIDED WAVE BASED STRUCTURAL HEALTH MONITORING OF GROWING CRACKS (2019)

Sanjay Sharma, Olivier Mesnil, Bastien Chapuis, and Pierre Calmon, NDE 2019