Aditya KRISHNA

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 Heidelberg, Germany

Acoustic Physicist and Data Scientist working on NDT and SHM using ultrasonics and machine learning.

Background and Experience

Acoustics, NDT Specialist and Data Scientist at Senseven GmbH

Oct '22 - Present, Vienna, Austria (Remote)

- Led the development of interpretable ML models to estimate valve leak rates from Acoustic Emission data, including signal processing, feature engineering, training and deployment; models are actively used for leak rate estimation.
- Optimized models for production with custom processing pipelines to ensure seamless integration on a smart mobile inspection device.
- Developed custom signal processing techniques to denoise transient AE signals, enabling reliable model predictions.
- Planned and conducted 15+ lab and on-site measurements at customer and partner locations to collect ground-truth data as well as validate and refine ML models.
- Evaluated and implemented production-ready algorithms for steam trap inspection, enabling automated failure detection and monetary loss estimation; currently in active use.
- Investigated the feasibility of detecting cavitation under high-noise conditions using acoustic emission techniques, contributing to future diagnostic capabilities.

Data Scientist, NDT Engineer at Baker Hughes

May '19 - Sep '22, Stutensee, Germany

- Developed algorithms and models to detect, classify, and size damages using active ultrasound, achieving a sizing accuracy of 85%.
- Led the acquisition, processing, and analysis of structured and unstructured ultrasonic data from inline inspection tools.
- Engineered automated algorithms for rapid extraction and classification of acoustic data, reducing manual effort and speeding up analysis workflows by several weeks.
- Planned and executed experimental measurements to develop a Phased Array inspection tool with enhanced reliability and performance.
- Designed a simulation tool to mitigate acoustic crosstalk in phased array measurements, improving the tool speed by 20%.
- Contributed as an Acoustics specialist in the development of machine learning models, improving predictive capabilities in ultrasonic inspections.

Doctoral Researcher Acoustic Physics, University of Bordeaux and CEA
Mar '16 - Mar '19, Bordeaux, France

- Developed a numerical simulation tool on Python for acoustic ultrasonic guided wave propagation in tubular structures, reducing computation times by 10-20$\times$ compared to FEM.
- Implemented parallel processing across multiple threads for enhanced computational efficiency.
- Designed and constructed an experimental setup with calibrated transducer arrays to validate simulation results through high-quality measurements.
- Formulated an Imaging algorithm to accurately detect and localize defects as small as 1/40th of the wavelength.
- Created experimental baseline subtraction techniques for Structural Health Monitoring applications, enabling detection of minute defects and those concealed behind structural obstacles.

Acoustic resonance based de-icing : Master's thesis, TU Braunschweig and DLR
Apr - Oct '15, Braunschweig, Germany

- Conducted comprehensive FEM simulations with ANSYS to predict resonance frequencies, mode shapes, and critical shear stresses at ice-structure interfaces.
- Designed and optimized positioning of piezoelectric actuators to maximize delamination effectiveness across multiple vibration modes.
- Successfully demonstrated ice delamination from aluminum and carbon fiber plates at resonance frequencies, validating simulation predictions in a specialized wind tunnel.
- Developed a methodology for implementing piezoelectric elements in ANSYS Harmonic Analysis using APDL command snippets.

Education

PhD Acoustic Physics	2016-2019
University of Bordeaux and CEA Tech	Bordeaux, France
MSc Aerospace Mechanics and Avionics (Specialization Structures)	2013-2015
ISAE-SUPAERO	Toulouse, France
BEng Aeronautical Engineering	2009-2013
Manipal Institute of Technology	Manipal, India

Software and Tools

Python, Git (SourceTree), Docker, Neptune.ai, ANSYS Workbench and APDL, Nastran, Patran, CATIA, ANSYS, SQL, MATLAB, LS-Dyna, Fusion 360, SketchUp

Languages

English (Fluent), German(B1), French (B1), Tamil (Native), Kannada, Hindi