

Poste d'ingénieur de recherche CDD

Basic AI and Data Science : high-dimensional statistical learning

Specialized ML and AI : signal, image, vision

Application domain : non-destructive control, ultrasound sensors

Mots-clés deep learning, multi-modal imaging, weakly supervised learning

Laboratoire impliqué : IBISC (UEVE)

durée totale du stage 18mois, 2600€/mois net

date de début et de fin du stage Oct. 1st, 2022, to Feb. 26Th, 2024

A research engineer position is opened at IBISC-lab (www.ibisc.univ-evry.fr) starting from October 2022.

IBISC /SIAM is a team dedicated to artificial intelligence and cybersystems. IBISC is particularly involved in precision medicine, evaluation and patient care, and personalized medicine.

As part of the SONDES project, we are looking for a research engineer (Candidate Master Science, BAC+5), beginner or confirmed, for a CDD of at least 18 months with a very good background in mathematics and computer science; a strong personal interest in machine learning is also mandatory.

Research topics related to the SONDES project include:

- machine learning to predict the quality of measurements and detect defects
- data visualization
- image and signal analysis
- domain shift
- data augmentation

Scientific Description

Non-destructive testing (NDT) is one of the components of "advanced manufacturing". Control during maintenance, to detect material defects, check the conformity of welds, etc.

This work concerns the identification by deep neural networks of possible fat defects in a critical system. The identification of these defects will be based on several ultrasonic measurements, carried out in situ by the maintenance teams of the various partner industrial sites.

The objectives of this study are

1. (main): Be able to recognize in (at least) 95% of cases, bolts with a "corrosive stress crack" or "fatigue crack" type defect
2. Develop explanatory algorithms to visualize the elements that had a preponderant weight in the decision taken by the model to classify a bolt as defective.
3. expand the training set to reduce modeling uncertainty (epistemic uncertainties) by training our model on many more measurements, but whose labeling might be less reliable or absent (semi-supervised learning).

Requirement

Master's degree in one of the following fields, or a closely related domain:

- computer science
- mathematics and statistics
- engineering

How to apply ?

send a cover letter, Transcripts (L3, M1, M2) and CV by e-mail to vincent.vigneron@univ-evry.fr and jean-philippe.conge@universite-paris-saclay.fr

Selection will be based on width, depth, and relevance of the candidate's expertise; high curiosity and potential will be the most important asset in applying.

Location

This position is located at IBISC lab, in Evry (91)

If you know any candidates appropriate for this position, please share this information with them and ask them to get in touch with me at their earliest convenience.

Please feel free to forward this email to other colleagues.

Références

[1] Oktay Karakuş, Nantheera Anantrasirichai, Amazigh Aguersif, Stein Silva, Adrian Basarab, and Alin Achim. Detection of line artifacts in lung ultrasound images of covid-19 patients via nonconvex regularization. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67(11) :2218–2229, 2020.

[2] Ana Lopez, Ricardo Bacelar, Inês Pires, Telmo G. Santos, José Pedro Sousa, and Luísa Quintino. Non-destructive testing application of radiography and ultrasound for wire and arc additive manufacturing. *Additive Manufacturing*, 21 :298–306, 2018.

[3] Maryam Najafabadi, Flavio Villanustre, Taghi Khoshgoftaar, Naeem Seliya, Randall Wald and Edin Muharemagic. Deep learning applications and challenges in big data analytics. *Journal of Big Data*, 2, 12 2015.

[4] Shangqin Yuan and Xudong Yu. Ultrasonic non-destructive evaluation of selectively laser-sintered polymeric nanocomposites. *Polymer Testing*, 90 :106705, 2020.