**Postdoc or research engineer (12 months)**
**Host organization** :Unité d'Informatique et d'Ingénierie des Systèmes (U2IS), ENSTA Paris
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# Non-destructive Testing and Uncertainty

The U2iS laboratory of ENSTA Paris at Institut Polytechnique de Paris is looking for a motivated and enthusiastic young researcher to work on 3D pose estimation and uncertainty. Founded in 1741 ENSTA Paris is the oldest "Grande Ecole" in France and is located in Palaiseau in the south of Paris.

We seek a research **engineer / post-doc** interested in **Non-destructive Testing and Deep learning**. Non-destructive Testing has become a topic of attention in the computer vision community. Our project goes further by mixing it with representation learning and uncertainty quantification to clearly understand the in and out of distribution.

The candidate should have basic knowledge of Deep Learning. Computer science/ or mathematician profiles are also welcome to apply. The future applicant will be given the opportunity to apply to excellent international publications (CVPR, ICCV, ECCV, TPAMI, IJCV, NIPS, ICLR).

**Goal :** Non-Destructive Testing (NDT) involves identifying and characterizing damages or defects on the surface and interior of materials without cutting apart or otherwise altering the material. Hence, it is a crucial field for most manufacturers. NDT refers to the assessment and the inspection process of materials or components for characterization or finding defects and flaws in comparison with some standards. Our goal in this postdoc is to study how we can use deep learning to perform NDT similarly to [2, 3, 5, 4]. The postdoc will first evaluate current algorithms on [1] and then in our dataset. Afterward, he will study a way to adapt this algorithm to adapt them to the specificity of our dataset.

Hence the goal will be to evaluate if they are interesting and reliable and if they can be used in real-world scenarios. Note that an important part of the work will consist in improving the NDT dataset since we expect results on this database.

Depending on the candidate's profile, the future worker might focus more on the mathematical or computer science aspects.

**Your task :**

- You will be in charge of projects and activities related to the research in NDT.
- You will help in improving an NDT database.
- You will lead the research work.
- You might supervise internship students.
- You will publish the results of your research in scientific international conferences and journals.

**Desired profile :**

- PhD or Master degree in Computer Vision, Machine Learning, Statistics, Computer science or related fields
- Relevant scientific track record on major computer vision conferences/journals (CVPR, ICCV, ECCV, TPAMI, IJCV, NIPS, ICLR, etc.)
- Experience on DNN models and, in particular in Pytorch framework
- Good communication skills and ability to cooperate
- Proficient in English language (written and oral)
- Experience in Multi GPUs cluster
- Experience in High-Performance Computing

**To formally apply, please send us an email with your resume and your reference letter.**

[1] Bergmann, Paul, et al. "MVTec AD–A comprehensive real-world dataset for unsupervised anomaly detection." Proceedings of the IEEE/CVF conference on computer vision and pattern recognition. 2019.

[2] Pang, Guansong, et al. "Deep learning for anomaly detection : A review." ACM Computing Surveys (CSUR) 54.2 (2021) : 1-38.

[3] Defard, Thomas, et al. "Padim : a patch distribution modeling framework for anomaly detection and localization." International Conference on Pattern Recognition. Springer, Cham, 2021.

[4] Liznerski, Philipp, et al. "Explainable deep one-class classification." arXiv preprint arXiv :2007.01760 (2020).

[5] Roth, Karsten, et al. "Towards total recall in industrial anomaly detection." arXiv preprint arXiv :2106.08265 (2021).