

## Internship proposition: Machine learning for maintenance prediction and sound source identification

### Company presentation

AllianTech is company with strong presence in the field of acoustic and vibration. Our company is rooted in the business of sensors distribution. With more than 20 years of experience, the company has created a strong connection with the industry ranging from key player in manufacturing to aerospace industry. The continuous success of our company is based on reliable solution and highly reactive on-site support.

As an intern, you will be a part of the new journey of AllianTech in the young and dynamic development team. In the recent years we have successfully created an USB to IEPE adapter which introduce the general public to class 1 metrological measurement device. Which supports the connection on both PC and smartphone. We have recently realized a 16 inputs acquisition platform which can be captured through USB using a UAC2 protocol. This 16 inputs platform would allow us and the industry to capture data for monitoring the equipment like never before. The goal of this internship is to lay a foundation of in house machine learning projects.

The internship is separated into 3 phrases:

- Research the tools such as Matlab (statistics and machine learning toolbox), Deepdetect, scikit-learn, Caffe, Tensorflow
- Research Basic of neural network, Sound classification, sounds localisation, Machine Learning for Predictive Maintenance
- Implementation different models and compare the results

### Candidate Profile

3rd year student in "école d'ingénieur" or master student in the field of digital signal processing or information technology with a focus in Artificial Intelligence or related field. The candidate has a special interest in the treatment of signal such as sounds and vibration. He is going to analyze the signal and propose different indicators to distinguish and study. The candidate enjoys programming and facing difficult challenges with confidence. Familiarity with physical measurement is a plus (sensors, vibration).

### Missions

- If the vibration data is available, analyze and propose indicator on the data base to characterize the signal. For this use tools as Matlab (digital signal processing toolbox) or Python libraries
- Research machine learning tools to classify the signals
- Research available neural network or other algorithms (like SVM) for vibration/sounds classification
- Teach the machine to analyze the signal based on proposed indicators with augmented data
- Evaluate the solution

### Location

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