

DEMANDE D'OFFRE DE POSTE POST-DOCTORANT

site Careers Total

Intitulé du poste :

Post doctorant in *Learning welding prediction and classification models from various, heterogeneous sources*

Lieu de travail :

Pays : FRANCE

Région/Etat :

Ville : Grenoble

Date d'entrée en service : 1st October 2016.....

Durée du contrat : 2 years.....

Niveau d'expérience attendu :

Débutant ☐

Première expérience ☐

Expérimenté xx ☐

Diplôme demandé :

Diplôme	Cochez la case	Diplôme	Cochez la case
CAP/BEP		BAC	
BTS/DUT/BAC +2		Licence/BAC +3	
Maîtrise/BAC +4		DESS/DEA/MAGISTERE/MASTER	
Ingénieur		Ecole de Commerce	
Doctorat	X	High/Secondary School Degree	
HNC/HND or Equivalent		Bachelor's Degree	
Master's Degree		Research Degree	
PhD/Doctorate	X	Autre/Other	

Domaine de recherche :

Domaine	Cochez la case	Domaine	Cochez la case
Assistance/Secretariat		Business Stratégie Economie	
Commercial/Achats/Trading Marketing		Communication	
Droit des entreprises		Finance	
Forage puits		Géologie Géophysique Réservoir	
Information Documentation		Inspection Maintenance	X
Logistique		Médecine du travail	
Moyens Généraux		Opérations Exploitation	
Projets Industriels		Qualité Hygiène Sécurité Environnement	
Recherche et Développement	X	Ressources Humaines	
Systèmes Informations/Télécoms		Vente	

Description du poste :

Machine learning methods are meeting an increasing success in various domains, such as marketing with customer behavior prediction, health with patient diagnosis and industry with the optimization of industrial processes.

The present project fits within a general problem addressed by Total on trying to predict, from various characteristics (or parameters/variables), different properties (as mechanical properties under stress) of welding in pipelines. The parameters can take various forms (quantitative or qualitative, ordinal or non-ordinal, real or Boolean) and are highly heterogeneous. They however need to be combined in order to obtain good prediction and one of the main challenges of this project is precisely to find the best way to combine different parameters for enhanced prediction and classification. In parallel, it is of course important to determine whether the different parameters are correlated or not, and to make use of possible correlations in the prediction/classification tasks. The developed method will have to be well adapted to large scale, heterogeneous datasets that are common to many different domains; it will furthermore be applied to the prediction of weld properties from parameters of the welding process.

During the project, the successful candidate will have to address the following points:

1. Study correlations between variables of many different types and extend existing models/methods to integrate all data types as well as their dependencies. The dataset collected by Total for studying welding in pipelines is unique by the diversity of the variables it relies on (product names, physical measures, manual annotations, ...). This diversity constitutes a major challenge for all existing data

analysis and machine learning methods. We will also try, whenever possible, to quantify the uncertainty associated with the representation of each data type;

2. In addition to the above-mentioned datasets, physical phenomena (as welding) are often described via equations that display relations between variables; they are also subject to simulations aimed at assessing their future evolution. One of the goals of the project will be to study how one can couple machine learning and physical equations and simulations to improve the accuracy of the prediction. This is a promising line of research that can bring together communities that do not usually work together;
3. Provide tools to help experts understand the results obtained by the models developed.

This will include:

- Working with a team of computer scientists and mathematicians
- Developing new machine learning/data analysis models
- Implementing and testing the models developed

Compétences requises :

→ **Formation et connaissances** :

Ph.D. or equivalent experience in computing, modeling, machine learning, statistics and applied mathematics

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→ **Niveau d'expérience attendu** :

Significant experience in modeling and developments of machine learning models

→ **Aptitudes** :

- Proven ability to solve research problems, with demonstrable research experience in one or more of the following areas: machine learning, modeling, statistics
- Ability to work effectively with a multidisciplinary team
- Excellent scientific publishing record
- Excellent oral and written communication skills
- Knowledge of one or more of the following science areas: computer science, modeling, optimization, learning
- Software engineering tools: knowledge of Python and/or R