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Xiyan He, Gilles Mourot, Didier Maquin, José Ragot, Pierre Beuseroy, André Smolarz, Edith Grall-Maës

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**Xiyan He<sup>1</sup>, Gilles Mourot<sup>1</sup>, Didier Maquin<sup>1</sup> & José Ragot<sup>1</sup>  
Pierre Beuseroy<sup>2</sup>, André Smolarz<sup>2</sup> & Edith Grall-Maës<sup>2</sup>**

<sup>1</sup>Centre de Recherche en Automatique de Nancy, CNRS UMR 7039, Nancy-Université  
2, avenue de la forêt de Haye, 54500 Vandœuvre-lès-Nancy, France  
{xiyan.he, gilles.mourot, didier.maquin, jose.ragot}@ensem.inpl-nancy.fr

<sup>2</sup>Institut Charles Delaunay, STMR CNRS UMR 6279, Université de Technologie de Troyes  
12, Rue Marie Curie, BP 2060, F-10010 Troyes, France  
{pierre.beuseroy, andre.smolarz, edith.grall}@utt.fr

**Titre : One-Class SVM in Multi-Task Learning**

**Référence du projet : PARDI (PARc Diagnostic)**

**Résumé :**

Classical machine learning technologies have achieved much success in the learning of a single task at a time. However, in many practical applications we may need to learn a number of related tasks or to rebuild the model from new data, for example, in the problem of fault detection and diagnosis of a system that contains a set of equipments *a priori* identical but working under different conditions. Indeed, it is common to encounter in industrial problems a number of *a priori* identical plants, such as in the building or maintenance of a fleet of nuclear power plants or of a fleet of their components. In such cases, the learning of the behavior of each equipment can be considered as a single task, and it would be nice to transfer or leverage the useful information between related tasks. Therefore, Multi-Task Learning (MTL) has become an active research topic in recent years. While most machine learning methods focus on the learning of tasks independently, multi-task learning aims to improve the generalization performance by training multiple related tasks simultaneously. We present a new approach to multi-task learning based on one-class Support Vector Machine (one-class SVM). In the proposed approach, we first make the assumption that the model parameter values of different tasks are close to a certain mean value. Then, a number of one-class SVMs, one for each task, are learned simultaneously. Our multi-task approach is easy to implement since it only requires a simple modification of the optimization problem in the single one-class SVM. Experimental results demonstrate the effectiveness of the proposed approach.

