SOUTENANCE DE THESE

THESIS DEFENSE

Shameem PUTHIYA PARAMBATH

Unité de Recherche **: Laboratoire Heudiasyc, Labex MS2T**

soutiendra sa thèse de **Doctorat** sur le sujet **:**

New methods for multi-objective learning

A l'Université de Technologie de Compiègne

Le vendredi 16 décembre 2016 à 14h00

Amphi N104 – Centre Pierre Guillaumat

Devant le jury composé de :

- M. AMINI Massih-Reza, Professeur des Universités, Université Grenoble Alpes, LIG, Saint Martin d'Hères
- M. DENOEUX Thierry, Professeur des Universités, Université de technologie de Compiègne, Laboratoire Heudiasyc
- M. GALLINARI Patrick, Professeur des Universités, Université Pierre et Marie Curie, LIP6
- M. GRANDVALET Yves, Professeur des Universités, Université de technologie de Compiègne, Laboratoire Heudiasyc
- Mme SZAFRANSKI Marie, Assistant Professor, ENSIIE, IBGBI, Evry
- M. USUNIER Nicolas, Research Scientist, Facebook, Paris

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www.labexms2t.fr

Abstract :

Multi-objective problems arise in many real world scenarios where one has to find an optimal solution considering the trade-off between different competing objectives.
Typical examples of multi-objective problems arise in classification, information retrieval, dictionary learning, online learning etc.
In this thesis, we study and propose algorithms for multi-objective machine learning problems.

We give many interesting examples of multi-objective learning problems which are actively persuaded by the research community to motivate our work.
Majority of the state of the art algorithms proposed for multi-objective learning comes under what is called "scalarization method", an efficient algorithm for solving multi-objective optimization problems.

Having motivated our work, we study two multi-objective learning tasks in detail.
In the first task, we study the problem of finding the optimal classifier for multivariate performance measures.
The problem is studied very actively and recent papers have proposed many algorithms in different classification settings.
We study the problem as finding an optimal trade-off between different classification errors, and propose an algorithm based on cost-sensitive classification.
In the second task, we study the problem of diverse ranking in information retrieval tasks, in particular recommender systems.
We propose an algorithm for diverse ranking making use of the domain specific information, and formulating the problem as a submodular maximization problem for coverage maximization in a weighted similarity graph.

Finally, we conclude that scalarization based algorithms works well for multi-objective learning problems.
But when considering algorithms for multi-objective learning problems, scalarization need not be the "to go" approach.
It is very important to consider the domain specific information and objective functions.
We end this thesis by proposing some of the immediate future work, which are currently being experimented, and some of the short term future work which we plan to carry out.