Nash balanced assignment problem

Minh Hieu Nguyen*[1], Mourad Baiou[2], and Viet Hung Nguyen†[3]

[1]Laboratory of Informatics, Modelling and Optimization of the Systems (LIMOS) – Institut national polytechnique Clermont Auvergne, Université Clermont Auvergne, Ecole Nationale Supérieure des Mines de St Etienne, CNRS : UMR6158 – France

[2]Laboratory of Informatics, Modelling and Optimization of the Systems (LIMOS) – Institut national polytechnique Clermont Auvergne, Université Clermont Auvergne, Ecole Nationale Supérieure des Mines de St Etienne, CNRS : UMR6158 – France

[3]Laboratory of Informatics, Modelling and Optimization of the Systems (LIMOS) – Institut national polytechnique Clermont Auvergne, Université Clermont Auvergne, Ecole Nationale Supérieure des Mines de St Etienne, CNRS : UMR6158 – France

Abstract

We consider the Balanced Assignment Problem (BAP) that seeks to find an assignment solution which has the smallest value of max-min distance: the difference between the maximum assignment cost and the minimum one. However, by minimizing only the max-min distance, it may lead to a very inefficient solution in terms of total cost. Hence, we propose a fair way based on Nash equilibrium for finding assignment solutions having a better trade-off between the two objectives. For that, we introduce the concept of Nash Fairness (NF) solutions based on the definition of proportional-fair scheduling. The main result of this paper is to show that finding all NF solutions can be done in polynomial time.

*Speaker

†Corresponding author: viet_hung.nguyen@uca.fr