Final report of the STSM at University of Murcia
Under COST Action CA15140

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Purpose of the STSM

The collaboration with the researchers from the University of Murcia started during the preparation of my Ph.D. thesis, which was defended in June of 2013. Our collaboration is focused on the development of heuristic algorithms for complex competitive facility location.

The aim of the STSM is to keep in touch with the host research group, discuss results obtained in separate research work since our last meeting and to plan further joint research work. The work plan of the STSM was organized as follows:

- present and discuss the results obtained in separate research work on the development of random search algorithm for the discrete competitive facility location;

- plan the research work on the application of the previously proposed ranking-based random search algorithm to solve the competitive facility location problem with newly proposed customers behavior model;

- plan an extended experimental investigation of ranking strategies used in the previously proposed ranking-based algorithm in order to describe recommendations for choosing a ranking strategy by properties of the problem being solved;

- discuss ideas on how the existing ranking-based algorithm for symmetric competitive facility location models can be applied for asymmetric competitive facility location models;

- design a ranking-based algorithm (or a prototype) for asymmetric competitive facility location.

Description of the work carried out during the STSM

Several working sessions with the researchers from the host institution have been organized to exchange and discuss research results obtained in separate work and to plan further research tasks. The sessions have been focused on analysis of the existing data, planning extended experiments to check some hypotheses, formulated during work sessions, and designing new algorithm for asymmetric competitive facility location, thus making the list of tasks for further collaboration.

Description of the main results obtained

The plan for the research work on the application of the previously proposed random search discrete optimization algorithm to competitive facility location problem where customers buying power is distributed among several facilities which are all optimal in Pareto sense has been made. The new set of test problem instances with different quality values for candidate locations has been formulated to cover various real-world situations.

The experimental investigation of strategies for candidate locations ranking has been performed using different features to describe viability of a candidate location.

The strategy to evaluate viability of a candidate location when solving an asymmetric facility location problem has been proposed and design of the algorithm based on the proposed strategy has been created. The set of problem instances to investigate performance of the proposed algorithm has been formulated.

Future collaboration with the host institution

The collaboration with the host institution will be continued as a lot of work has been planned for the future; e.g. continue the investigation of strategies for ranking candidate locations, implementation and investigation of the algorithm, proposed during the STSM, etc. It is expected to organize further meetings and work sessions with the researchers from University of Murcia in order to discuss the results and stimulate collaboration.

Foreseen publications/articles resulting from the STSM

It is expected that further collaboration will issue relevant results which will be presented in scientific conferences and published in scientific publications.