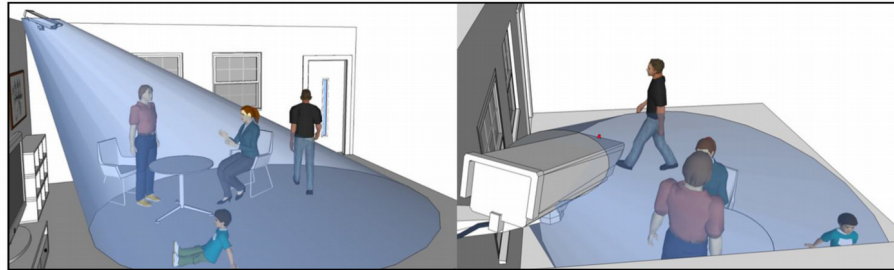


Optimization of surveillance camera placement

Host: Group « Métaheuristics and combinatorial optimization »
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Keywords: optimization, metaheuristics, C/C++.

Context: This internship is offered as part of a project funded by the University of Haute-Alsace (UHA), entitled "optimal camera placement for automatic detection of hazardous situations". The results of this project can be highlighted through various applications: video surveillance of public places, detection of dangerous situations for the elderly with loss of autonomy (fall, dizzy spell, run away, etc).

Problem, objectives, and requested work:

The problem is how to optimize the placement of heterogenous camera sensors such that it totally covers the 3D space to monitor. The aim is to minimize the total cost of the cameras. In the literature [1,2], the problem is often handled as the coverage of a 2D surface (the ground), and the coverage of a 3D space has not been deeply investigated until now. However this constraint is important in any application where no blind spot can be allowed to ensure a good quality of service.

The objective of this internship would be to develop approximate approaches for the deployment of cameras in 3-dimensional areas. Such a deployment should minimize the total deployment cost of the network by properly determining necessary camera sensors and their positions in the monitoring area.

The intern will begin with a bibliographical study to have a good understanding of the problem and the related work. Then, a good model of the problem should be proposed in order to implement optimization methods that can solve the problem on large instances. The experimental study will be built on metaheuristics developed in our team, by adapting and/or hybridizing existing algorithms to get good results.

Required skills: Good knowledge of optimization methods, metaheuristics, and C/C++.

Internship gratification: Approximately 565 € / month (official amount fixed by public institutions).

Duration: 4 to 6 months.

Contact: For more information or to apply (send a CV, a cover letter and the report cards containing all your marks obtained during your university studies), please send an email to mathieu.brevilliers@uha.fr.

Références :

1. Yi-Ge Fu, Jie Zhou and Lei Deng. **Surveillance of a 2D Plane Area with 3D Deployed Cameras.** *Sensors, Volume 14, Issue 2*, 2014.
2. Eduardo Penha Castro Fantini, Luiz Chaimowicz. **Coverage in Arbitrary 3D Environments: The Art Gallery Problem in Shooter Games.** *Simpósio Brasileiro de Jogos e Entretenimento Digital*, 2013.