

Smart cities and fog computing

Laboratory: IRIT (Computer science Laboratory) in Toulouse in the SEPIA TEAM

Localisation: University Toulouse III

Salary: legal gratification 600,60€ per month

Keywords: Edge and Fog computing, Gama, Multi-agent systems, scheduling

Expected abilities, one or more of the following

- Optimization techniques (A.I, Multi-Agent System)
- Graph theory
- Knowledge on Gama platform is a plus

Context

The project is in the context of the Vilagil (funded by Toulouse Metropole) project at IRIT (<http://www.irit.fr> (<http://www.irit.fr>)) in Toulouse. The host team is SEPIA. The main research topic of the SEPIA team is optimisation of datacenter (multi-objective scheduling).

This project aims at improving mobility using a smart-city approach. A large amount of local information will be harnessed to help proposing to citizens the best paths in the city using multiple mobility means (bikes, buses, metro, cars, ...).

The computing infrastructure backing this service is currently centralized, which leads to several type of problems: from a high resource consumption to a single point of failure.

In the context of smart cities, computing infrastructures are geographically distributed.

In our project we will use fog and edge computing to manage distributed applications providing the same service as the centralized one, and running on fixed and mobile entities. The scientific aim of our project consists in mapping the graph of the physical infrastructure with the one of the services to be deployed.

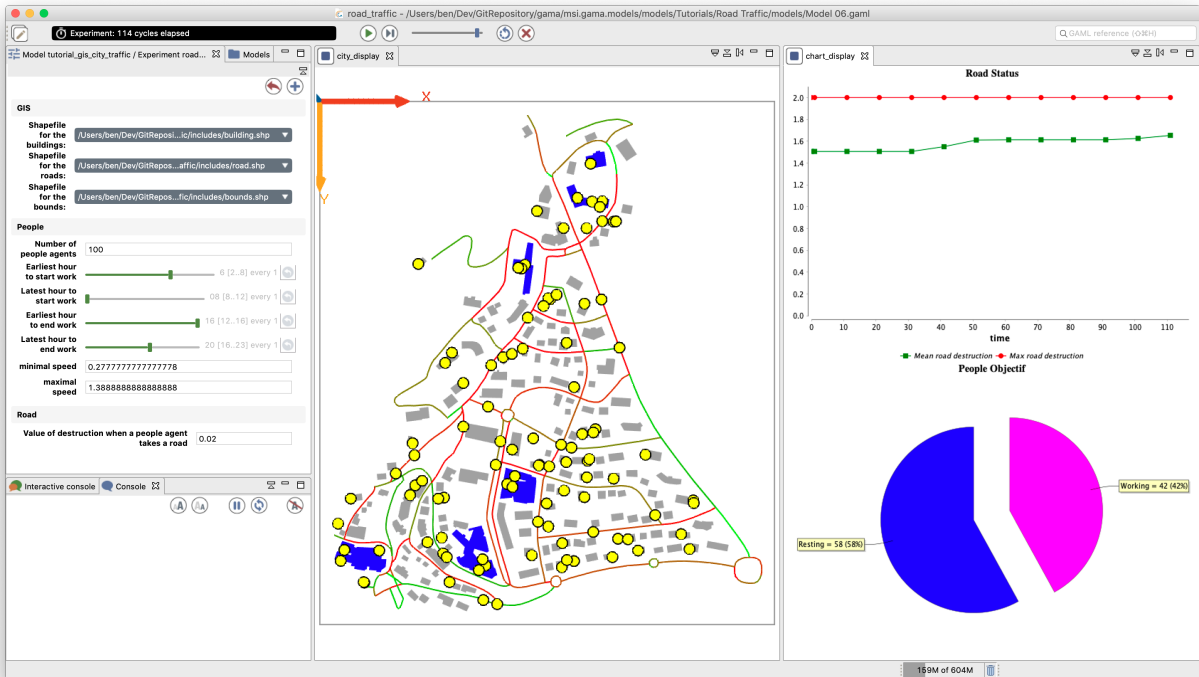
Assignment

The goal of this project will be to develop algorithms to place multi-modality mobility services on the Fog infrastructure of Toulouse Metropole. We consider having a graph of a complex application with sources of information (sensors in the city) and treatments (such as requests of path from end-users). We also have a graph of physical computing infrastructure available. We will use both of them to optimize the services deployment under different constraints and objectives (such as Quality of Service, Energy Consumption, ...) and to provide a simulation and visualisation platform of the results. We will take into account the dynamism of the system (such as people and bus mobility,

different densities of requests, ...).

This position aims at:

- Formalizing the problem;
- Explore different possible heuristics;
- Develop a simulator for evaluation and visualisation based on Gama simulator (<https://gama-platform.org/>).



Depending on the applicant profile the content of the position can be amended.

Application

You can submit your application (CV/Cover Letter) to Georges Da Costa (georges.da-costa@irit.fr) and Patricia Stolf (patricia.stolf@irit.fr)