2018-00496 - Optimization of the mining of transactions within the Ethereum blockchain. M/F

Contract type : Public service fixed-term contract
Level of qualifications required : PhD or equivalent
Fonction : Post-Doctoral Research Visit

Context

Scientific environment

The postdoctoral research will be carried out within the partnership of the INOCS team and the startup company Utocat.

The researcher will be supervised by Luce Brotcorne (INOCS) and Bernard Fortz (INOCS).

Frequent meetings will be organized with Utocat.

INOCS:
The primal goal of INOCS is the study (modeling and methodological concerns) of optimization problems involving complex structures (CS). The INOCS team focuses on integrated models for problems with (CS) taking into account the whole structure of the problem and the development of solution methods taking explicitly into account the nature and the structure of the decisions as well as the properties of the problem. More information at https://team.inria.fr/inoxs/

Utocat:
Utocat was created in October 2014 by Clément Francomme to help merchants accepting bitcoin payments and converting it directly in euros. In 2015, Utocat joined the Euratechnologies acceleration program and pivoted to propose Blockchainiz : the dedicated access platform for Banks and Insurance companies.

As a Platform As A Service (PAAS), Blockchainiz is a blockchain solution for financial services that accompanies projects up to the production stage. Blockchainiz connects the functional processes to the blockchain. Data is not replicated on different IT systems anymore. Blockchainiz is used as a common repository for every part of the process. Hence, it enables to limit the typing errors, to optimize the costs and delays while the customer experience is improved. More information at: https://www.blockchainiz.io

Now, they develop a new product : Catalizr, a connector between bank, investor and company that enables the automation of the management of unlisted securities between these three actors and facilitates investment in very small businesses (TPEs) and SMEs via a completely digital and secure process in the blockchain.

More information at: https://www.utocat.com/fr

Assignment

The objective of this project is to optimize the mining of transactions within the Ethereum blockchain, both in terms of processing time and costs.

Based on historical data extracted from the blockchain, the research aims at answering the two following questions:

For a fixed fee, what is the maximum time limit for a transaction to be undermined?

For a fixed maximum time limit, what is the amount of costs to be allocated (gasPrice)?

The researcher will combine machine learning techniques and robust and two-level optimization techniques to model the problem and develop efficient algorithms to solve it.

Main activities

Skills

Candidates should hold a PhD degree in Operations research, mathematics, computer science, or similar fields and should ideally have a solid background in discrete optimization, integer programming, decomposition techniques. Computer science skills in algorithmic and C/C++ development as well as basic knowledge of machine learning techniques and blockchain technology are also welcome.

Knowledge of French is not required, but good communication skills and a solid knowledge of English are essential.
Benefits package

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities