#### Draft of the presentation in front of admission committee

##### Title

Traffic optimizations between autonomous driving cars using cooperative networks

##### Description

In the wake of the autonomous driving era, where cars are supposed to drive themselves between points of interests while meeting various criteria along their path, a new set of challenging issues and difficulties arise. Big companies, ambitious startups, universities, roaming investors, all of them swarm to what seems like a new version of the golden rush. In this very decade, almost simultaneously, another technology marked its stamp on a paramount domain of our civilization: blockchains and their applicability on the currency and trading. The basic rules of those new blockchain networks address issues like decentralized consensus between a great number of parties, trust without a central entity to vet transactions, non mutable ledger, etc.

This PhD thesis is aiming to investigate the applicability of blockchain networks in autonomous driving. A series of aspects of independent actors which drives themselves through a city can be modeled using concepts and infrastructure of mature blockchain solutions. Another set of aspects of existing blockchain solutions are unsuitable and not design for such applications. The purpose is to investigate both areas, to emphasize what is useful and to propose alternatives to what is inapplicable.

##### Themes

1. Traffic optimization opportunities in a city. Define the scope of what issues this thesis is attempting to solve.
2. Smart contracts for handling traffic information and generating decisions. Model the schema of data to be exchanged.
3. Consensus between independent traffic actors using Byzantine-fault tolerant protocols. Paxos partial proposal and implementation for autonomous traffic actors.
4. Proof of Work and Proof of Stake for establishing trust between independent actors. Avoid malicious actors and force the actors to play fair for maximizing their outcomes.