Competitive-Blockchain-Based Parking System with Fairness Constraints

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Abstract

Parking slot detection is one of the most popular applications of Vehicular ad Hoc Network re-search field. Proposing smart algorithms for fast parking is crucial not only to facilitate drivers, but also to reduce traffic congestion, pollution, and vehicle energy consumption. Typically, an urban area has several competitive car parks and, in order to make the parking process automatic, a mechanism to ensure a fair competition among them is needed. Among all the methods able to guarantee transparency and equity in a system, blockchain is a robust technology. It has been success- fully applied in many different research fields, from financial to health. In this work, we provide an automaticparking system in which vehicles are allocated among several competitive parking areas (called competitors), through a blockchain-based approach, by applying a consensus mechanism to manage the system modifications. To this aim, two classes of fairness constraints are defined, according to which any new operation on the parking consortium must be approved by the members. Such an approach brings benefits for different reasons, starting from traffic condition improvement, up to driver stress and pollution decrease.

Full Text

This preprint is available for download as a PDF.

Figures

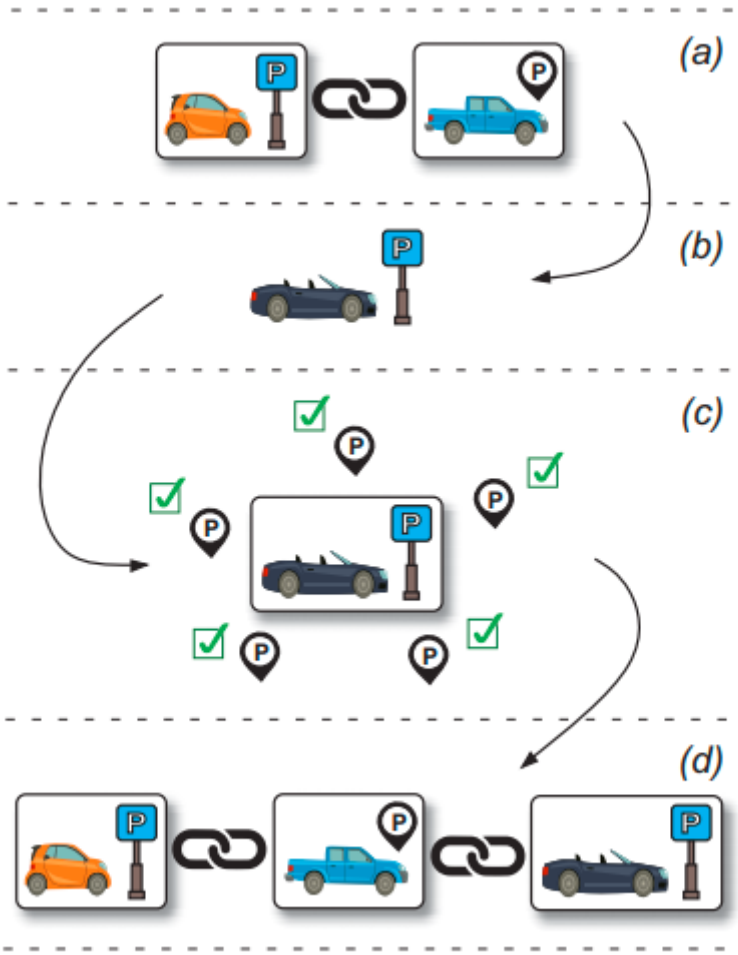

Figure 1

Example of parking areas which are consortium members

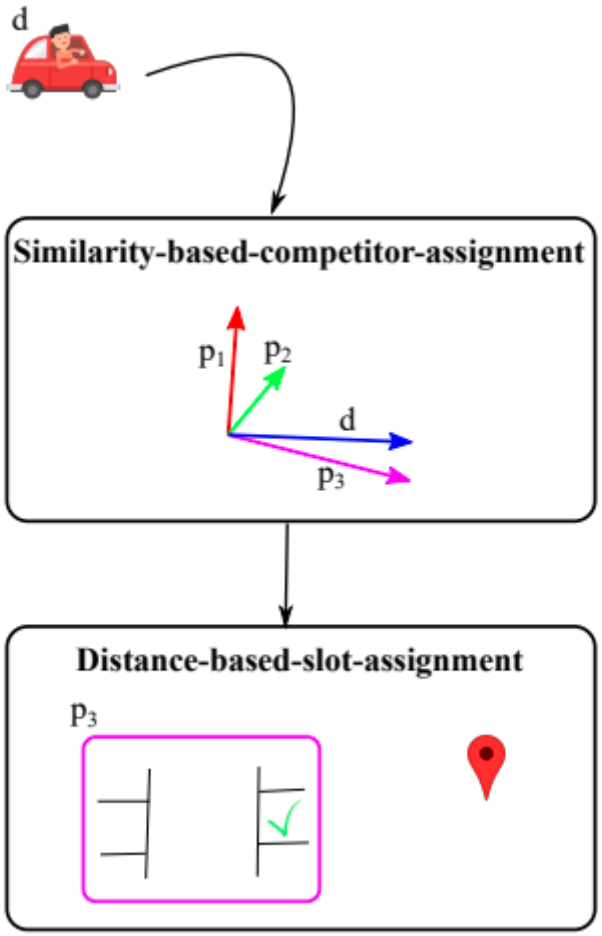

Figure 2

Schema of how the parking process works, by using the blockchain mechanism

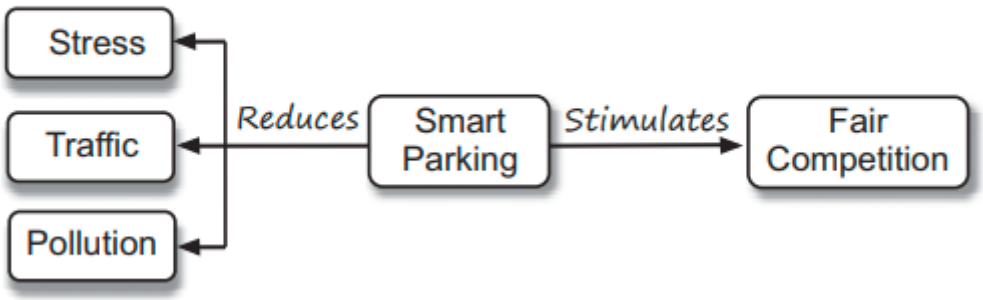

Figure 3

Steps of the parking process

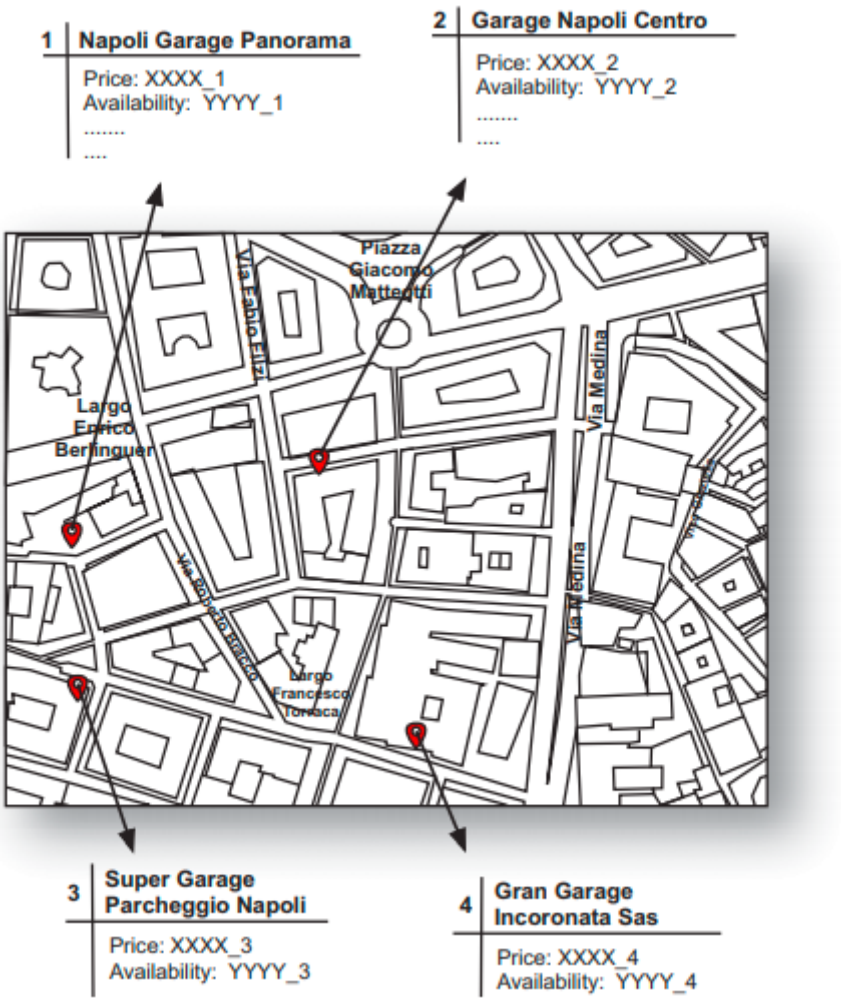

Figure 4

Advantages of the proposed system