A Quantitative Approach for Smart Parking

Informe

Información del proyecto

QPARK

Identificador del acuerdo de subvención: 801440

Sitio web del proyecto

DOI
10.3030/801440

Proyecto cerrado

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28 Marzo 2018

Fecha de inicio
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Fecha de finalización
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EXCELLENT SCIENCE - Future and Emerging Technologies (FET)

Coste total
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Aportación de la UE
€ 100 000,00

Coordinado por
UBIWHERE LDA
Portugal

Periodic Reporting for period 1 - QPARK (A Quantitative Approach for Smart Parking)

Período documentado: 2018-09-01 hasta 2020-02-29

Resumen del contexto y de los objetivos generales del proyecto

Ubiwhere has been commercialising a low-cost, seamless and straightforward-to-install system entitled Smart Parking, where parking operators can enhance their ongoing operations by knowing in

every instant what is happening and by analysing reports on the behavioural patterns detected by the platform, improving their operational and enforcement efficiency. This helps to improve the planning of parking facilities in urban environments, to reduce the time people spend driving around searching for vacant parking spaces, wasting fuel or battery, and emitting pollutants, ultimately to improve their quality of life.
QPARK aimed at upscaling Ubiwhere's Smart Parking solution, enriching it with a new service that enables the generation of reports via a thorough analysis of which areas of the city are more affected by certain events and how that sudden increase in people affects the city traffic and parking occupancy. The FET project QUANTICOL supported this what-if analysis by providing the necessary tools and mechanisms to advance in the problem space and provide useful knowledge quickly.
QPARK allows Ubiwhere to disrupt the global market by enriching its solutions with urban planning capabilities, powered by complex adaptive systems developed in QUANTICOL, by validating the available tools in a new pilot in Aveiro, Portugal. The goal is to provide the ability to simulate the usage of roads and parking spots/areas that compose the pilot. Users become able to request simulations, and, when completed, the user interface presents the results in a meaningful way. The following specific objectives have been identified for QPARK:
O1) Improve the TRL of CARMA Modelling Language from 5 to 7;
O2) Implement a Smart Parking pilot with 50 sensors in Aveiro (affecting around 500-700 inhabitants);
O3) Provide the CARMA plugin as a service allowing the generation of urban planning reports;
O4) Create a case study based on the innovation and results of the project.

Trabajo realizado desde el comienzo del proyecto hasta el final del período abarcado por el informe y los principales resultados hasta la fecha

The QPARK project was divided in 5 Work Packages, where WP1 focused on project management, where the main goal was to ensure all project objectives were met according to principles of maximum efficacy and efficiency.In order to achieve this, two main tasks were carried out during the course of the project: a first one committed to overall project coordination and quality management, and a second task more concerned with innovation, strategy and risk management.
Most of the effort of the project was on the technical side of the project, more specifically in WP2. Here, the QUANTICOL tools that could provide the simulation capabilities to its Smart Parking solution and achieve the O1) objective of increasing the TRL of CARMA Modelling Language from 5 to 7 were studied and tested. The Smart Parking platform was adapted to integrate the results of the simulations performed with QUANTICOL tools. This work aimed at tackling the objective O3).
WP3 aimed at assessing the performance and socio-economic impact of the Smart Parking application, together with an updated market analysis. Overall, this market assessment provided information needed to evaluate expected impact and sustainability of QPARK, with the purpose of a well structured exploitation under WP4. In order to evaluate the success of the work performed in the QPARK project, several KPIs were defined. With them, it was possible to compare the results of the project (obtained through the pilot reported in deliverable 5.1) against a set of predefined values which set the goals of the project. These KPIs helped assess if the objective O2) of running a pilot was

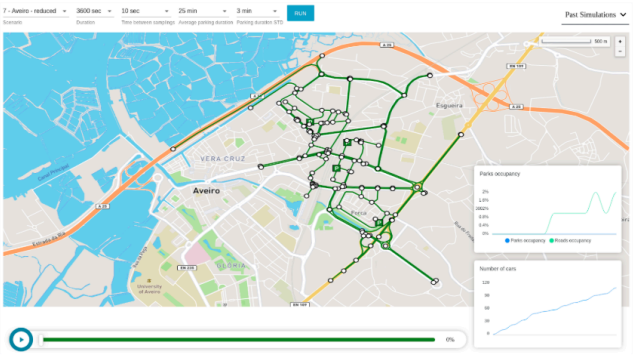
achieved, and were reported in D3.2. In deliverable 5.1 the needed next steps to improve this feature are presented.
The aim of WP4 was to support the dissemination and communication strategy, along with the exploitation plan, of QPARK. Ubiwhere has performed all the activities to ensure proper commercialisation and awareness of the project outcomes. A webpage about the project was put online in its website as defined in the Dissemination Plan, as well as in the company's brochure for smart cities, in the annual reports and showcasing it in several relevant events for smart cities, as well as FET Innovation Launchpad mid-term workshop and FET Briefing events. The case study will be published after the review to achieve O4.
WP5 is all about the performance of the pilot, making use of the development work of WP2, aided by the data obtained from 30 parking sensors, to provide city planners with the ability to plan actions within their cities based on the results of the simulations. Ubiwhere deployed the necessary sensors to obtain parking data throughout the city of Aveiro, integrated the data in its platform and observed the parking occupancy in order to replicate it within the simulation models. With this, Objective O2 was achieved.
Some preliminary tests were performed on the system, where users tried to create simulations using their preferred inputs and analysed the obtained results. Objective O3 was achieved.

Avances que van más allá del estado de la técnica e impacto potencial esperado (incluida la repercusión socioeconómica y las implicaciones sociales más amplias del proyecto hasta la fecha)

Throughout the project, it was possible to use CARMA and its tools in order to develop a simulation engine to simulate the parking usage of a city under certain conditions. Although the amount of capabilities to manipulate the simulation ended up being somewhat limited, it was possible to test the limits of these tools to provide simulation capabilities to help city officials make informed decisions regarding the parking systems of their cities.
The initially defined objectives O2 and O3 were fully achieved, while O1 was partially achieved (the source-code with improvements has not yet been made available to the open-source community but will soon) and O4 will be achieved after the project's review (when the team gets feedback from the European Commission and the project reviewers to complete the case study). The accomplishment of these objectives is detailed in the Technical Report attached.
The main expected impact of the project was for Ubiwhere's Smart Parking platform to take a step forward in becoming one of the market leaders in the Smart Cities domain. In order to differentiate itself from this saturated market, Ubiwhere has decided to exploit QUANTICOL's tools with the aim of improving the platform's data analysis capabilities. This is done through the ability to run simulations of the parking of a city under different circumstances. In this way, Smart Parking customers will be able to take informed decisions on the parking of their cities. The developed software takes a step in this direction, but as has been explained throughout this document, there are still steps to be taken in order to make this solution valuable to city officials.
Due to the nature of CARMA, it has been hard to make a product that can be easily used by a layman, and additionally, the difficulties of developing using this modelling language meant that it took a lot of effort to develop the simplest features, leaving no time for more advanced functionalities. Furthermore,

from the experience using and understanding CARMA, it is still unclear if it will be possible to develop the missing features that would make the feature valuable. As such, it cannot be said that the desired impacts have been achieved, but the next steps have been defined in order to achieve this.

Smart Parking System



Smart Parking System

Id	KPI	Goal	Achieved?
8	Does the system seem useful to the users?	>2.5/4	Yes
9	Is the system easy to use for the users?	>2.5/4	Yes
10	Is the system easy to learn for the users?	>2.5/4	Yes
11	Are the users satisfied with the system?	>2.5/4	Yes

Qualitative KPIs

Qualitative KPIs

Id	KPI	Goal	Achieved?	Notes
1	Be able to run a simulation for a subset of the city of Aveiro in a reasonable time	Less than 24 hours	Yes	
2	Be able to run a simulation for the whole city of Aveiro in a reasonable time	Less than 24 hours	No	With the full city, a 1-minute simulation took 4 hours to run
3	Allow users to create, edit and remove parking areas	Yes	No	Limitations with the CARMA language
4	Allow users to define how long the simulation runs	Yes	Yes	
5	Allow users to define how long drivers stay in parking areas	Yes	Yes	
6	Allow users to visualize the state of every parking area and road of the city throughout the simulation	Yes	Yes	
7	Allow the spawn rate of the drivers within the simulation to be automatically defined through the real data obtained through parking sensors	Yes	No	Limitations with the CARMA language

List of defined KPIs

List of KPIs

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Permalink: https://cordis.europa.eu/project/id/801440/reporting/es