Home > ... > Orizzonte 2020 >

SETA: An open, sustainable, ubiquitous data and service ecosystem for efficient, effective, safe, resilient mobility in metropolitan areas

HORIZON 2020 SETA: An open, sustainable, ubiquitous data and service ecosystem for efficient, effective, safe, resilient mobility in metropolitan areas

Rendicontazione

Informazioni relative al progetto

SETA

ID dell'accordo di sovvenzione: 688082

Sito web del progetto 🛃

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Progetto chiuso

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Coordinato da THE UNIVERSITY OF SHEFFIELD

Questo progetto è apparso in...

Oceani minacciati: proteggere e preservare i nostri ambienti marittimi

Periodic Reporting for period 2 - SETA (SETA: An open, sustainable, ubiquitous data and service ecosystem for efficient, effective, safe, resilient mobility in metropolitan areas)

Periodo di rendicontazione: 2017-08-01 al 2019-01-31

Sintesi del contesto e degli obiettivi generali del progetto

Around 50% of the global population live in metropolitan areas, and this is likely to grow to 75% by 2050. These metropolitan areas need to grow in an efficient, sustainable, and resilient way. Efficient because an efficient economy of scale is required for such conglomerates in order to work, sustainable in their use of resources (in particular for food, water and energy) and resilient to disasters, both natural and man-made. In particular, intelligent and sustainable mobility encompasses the smarter, greener and more efficient movement of people and goods; it provides a radical change from transport as a series of separate modal journeys to an integrated, reactive, intelligent, mobility system.

The SETA solution will be based on the management of high-volume, high-velocity, multi-dimensional, heterogeneous, cross-media, cross-sectoral data and information which is sensed, crowdsourced, acquired, linked, fused, and used to model mobility with a precision, granularity and dynamicity that is impossible with today's technologies.

SETA will create methodologies and technologies for: (i) Effective and efficient gathering of largescale heterogeneous data and information sensed by physical sensors, mobile devices, collected over large scale via participatory sensing and crowdsourcing, as well as derived from institutional, public and private bases; (ii) Designing and developing real-time, personalised and ubiquitous transport and mobility services for citizens and businesses; (iii) Designing and developing a dashboard for decision makers which will allow effective daily and long-term planning of transport in the metropolitan areas, as well as support resilience and safety of mobility.

Lavoro eseguito dall'inizio del progetto fino alla fine del periodo coperto dalla relazione e principali risultati finora ottenuti

SETA has developed, implemented and deployed a number of novel tools and technologies for acquiring, fusing, modelling and using mobility data. These have been rigorously tested in laboratory evaluations on large-scale data and in real-world settings in the three case-study cities (and other cities where available).

Data acquisition work includes (i) passive sensing: low cost environmental sensors, video image analysis to determine road and public transport occupancy and WiFi/Bluetooth monitoring for both occupancy counting and public space and indoor location/activity monitoring; both the image analysis and Bluetooth monitoring technologies are being exploited in future projects; (ii) opportunistic (social media) monitoring technologies were developed for incident detection, this work was exploited in the sporting domain by a now successful start-up; and (iii) participatory sensing: to track both motorised and non-motorised activity (technology for the latter being the main developed focus within the project), also soliciting direct responses from citizens concerning mobility issues. The work on motorised monitoring has lead to further uses of the tracking data (e.g. investigation of road safety), which is currently being developed as a service. The non-motorised monitoring technology has been used within a health initiative which involving 100,000s of UK citizens. Methodologies have been implemented for extracting and fusing information from the various sensors in order to provide estimates of the traffic speeds for future use in the predictive modelling. The data acquired from the sensing and fusion was used to enhance local and network-wide traffic modelling, for example incorporating turn and origin-destination information. The novel work in both the fusion and modelling has resulted dozens of conference and journal publications.

SETA has developed a platform which supports real-time, high volume visualisation and analysis allowing decision makers' to observe in real-time mobility issues. The various stakeholders can interact with the SETA platform to gain personal or city-wide mobility understanding. This work involves the development of: (i) a variety of mobile apps for specific cities and services; (ii) a routing engine which considers environmental data as well as speed/distance; (iii) portals into the SETA Data Management Platform to provide understanding of the current state of the sensors and network; and (iv) a facet-based DSS which allows analysts to examine large-scale mobility data, and constraining and relaxing information facets to focus on the area specific interest.

The SETA technologies are integrated within the cloud-based Data Management Platform, providing specialised common API, architecture and infrastructure to support low-latency, scalable management, analysis and development of multimodal mobility with smooth and scalable collection, indexing, manipulation and sharing of heterogeneous, multimodal, dynamic mobility data. The platform has been released in multiple iterations, in line with a well-defined agile software development process and technical procedures, enabling rapid development, prototype evaluation and effective testing, maintenance and integration of new components

Progressi oltre lo stato dell'arte e potenziale impatto previsto (incluso l'impatto socioeconomico e le implicazioni sociali più ampie del progetto fino ad ora)

The project SETA has produced 15 journal papers covering the acquisition, fusion and modelling of mobility data. These papers describe the project's progress in the SotA, for example: (i) modelling of user satisfaction with transport services; (ii) the use of rule-based and machine learning techniques for traffic prediction; (iii) a review of the critical issues and potential solutions in the effective use of crowdsourced data; (iv) the use of activity monitoring data to generate both descriptive and predictive models of active travel behaviour; (v) the use of simulated annealing techniques for vehicle routing in smart cities using floating car; (vi) the use of spatial clustering techniques to improve the prediction of transit demand; (vii) the combination of a variety of image processing methods to identify and classify patterns of traffic congestion; (viii) methodologies for mapping the data to a coarse Geographic Information System (GIS) network, for reducing the network complexity at the city scale and estimating the speed from the travel time data.

The University of Sheffield's activity monitoring technology is being employed in a number of UK health initiatives to get the population more active and has been used by 100,000 of users.

The University of Sheffield's social media monitoring technology, in particular the real-time, largescale processing framework, name-entity linking and veracity assessment technologies have been adopted by a UK company (footballwhispers.com) and used to provide a rumour detection system to predict transfer likelihoods. This UK start-up was established around the begin of the SETA project and in the last two years has won a number of technology awards and has grown to over 20 employees.

The Floow's technology, originally for monitoring driver performance for insurance, is now being considered for supporting for traffic management, resolution approaches for hazardous junctions, input into pollution investigations, modelling and infrastructure evaluations. The developed of proof of value demonstrations have triggered a range of follow on scientific work which will continue beyond the project end.



SETA Logo

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