The First International Workshop on Intelligent Public Transports – Toward the Next Generation of Urban Mobility

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Abstract— Today, public transport plays a key role on maintaining sustainable mobility levels on the major urban areas worldwide. In the next decades, the expected growing of such areas will push these massive means of transportation to be even more reliable. The sensor's networks installed on modern cities enabled novel possibilities and research lines to be explored by data driven Intelligent Transportation Systems applied to these problematics. This workshop intends to be a first step to bring together both data and transportation scientists into the same venue to let them build up together that next generation of Urban Mobility.

I. INTRODUCTION

This document presents an workshop proposal for the next edition of IEEE ITSC, to take place next September 2015 in Las Palmas, Gran Canarias, Spain. It is structured as follows: firstly, the workshop program and scope are introduced in Section II-A. Then, the workshop format, a list of tentative presenters and a draft scheduled are outlined in Section III, followed by some final remarks.

II. WORKSHOP OUTLINE

A. Program

Nowadays, everything is being built up taking advantage in sensor's data (e.g.: bridges, computers, houses, vehicles). The Public Transport is not an exception. By being highly dependent on the dynamics of the human behavior (both drivers and passengers), it is intrinsically connected to the data derived from them as well. In the past, this was completely unrealistic. The Data Miners worked *closed* on their labs with their *impractical* Machine Learning algorithms - as there was no large-scale data to apply them. On the other hand, the Civil Engineers aimed to model such dynamics assuming theoretical levels of stochasticity and/or optimistic scenarios. Such models comprise a fair but still inaccurate approach to such dynamic behavior. Today's reality increased dramatically the availability of the mobility-based data by the multiple social infrastructures that already use intelligent sensors and real-time communicational frameworks (e.g. 3G).

The availability of these type of data (e.g. smartphones, traffic light sensors, APC/AVL, fare-based, etc.) on a large-scale changed the way that both Civil and Computer Scientists faced the problematics around Public Transportation [1]–[17]. It enables a whole new bunch of possibilities which are still far by being fully explored. On the other hand, it also brings novel issues regarding each individual's and/or company's privacy that are worthy to be discussed and analyzed. Where are we going? Where do we want to go? Which are the current trends? How can we explore these data to improve the Public Transportation? Which can be done to improve the bus transfers coordination? How about the taxi dispatching? Preventive Maintenance? The Planning and The Control of Public Transportation in general?

These problematics are addressed by this workshop's scope (introduced below). The researchers/engineers are encouraged to participate and take advantage of this opportunity to exchange ideas and to share their R&D findings/experiences.

B. Scope

The technical areas include but are not limited to the following:

- intelligent and real-time public transport control and operational management (bus bunching, transfer coordination, corrective actions);
- public transportation planning and management (route definition, schedule planning, duties definition and/or assignment) using Big Data;
- mobility-based data analytics and machine learning applications;
- different modes of public transport and their interactions (road, rail, air and water-based);
- artificial public transportation systems and simulation;
- trajectory mining and related applications;
- data-driven preventive maintenance policies;
- distributed and ubiquitous public transport technologies and policies;
- travel demand analysis and prediction;
- advanced traveler information systems using homogeneous/heterogeneous data sources;
- intelligent mobility models and policies for urban environments;
- smart architectures for vehicle-to-vehicle/vehicle-to-infrastructure communications;
- agent-based models of public transport systems;
- complex network theory applications in public transport;

- automatic assessment and/or evaluation on the public transport reliability (planning, control and other related policies);

III. TENTATIVE SCHEDULE

This section introduces a draft of the workshop's schedule. The authors included in this list authorized the dissemination of their names and affiliations as presenters of this workshop on a tentative fashion. This preliminary list and a possible scheduling of their presentations is introduced in the following two sections.

A. List of Presenters

There were a total of seven authors which demonstrated interest on participate on this workshop. They are enumerated using an alphabetic order:

- Agostino Nuzzolo - *University of Rome Tor Vergata, Italy*
- Francisco Pereira - *SMART - MIT alliance, Singapore*
- Jorge Freire de Sousa - *U. Porto, Portugal*
- Marc Barthelemy - *CEA Institut de Physique Theorique, France*
- Niels van Oort - *TU Delft, Netherlands*
- Nitin Maslekar - *NEC Laboratories Europe, Germany*
- Rosaldo Rossetti - *U. Porto, Portugal*

B. Schedule

We want to propose an **half-day workshop**. The author's presentations are tentatively scheduled in the enumeration below. Note that the presentation title's and content may still be subject to changes. The times are indicated in minutes using relative terms, where ST stands for the workshop's starting time.

- ST+00 LMM/OC/MB - Workshop Kick-off
- ST+05 AN - *"Individual predictive information for travelers of Advanced Public Transport"*
- ST+30 FP - *"Application of web mining to capture (planned) non regular demand in public transport"*
- ST+55 JFS - *"Urban Logistics integrated in a Multimodal Mobility System"*
- ST+80 NM - *"Bus Bunching Reduction using AVL-data and Genetic Algorithms"*
- ST+105 Coffee Break
- ST+125 NvO - *"Improving public transport planning and decision making applying Big Data"*
- ST+150 MB - *"Uncovering the spatial structure of mobility networks from mobile phone data"*
- ST+175 RR - *"Electric public collective mobility"*
- ST+200 Round Table Discussion

IV. FINAL REMARKS

We aim great expectations for this venue by opening a novel discussion space on intelligent public transport systems within the IEEE ITSC organization. By doing so, we expect to enlarge the social grounds of IEEE ITSC to high quality researchers on these areas who did not attended its previous editions.

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