Big Data Europe

BigDataEurope and the Societal Challenge on Transport

3rd Workshop Report

Background

BigDataEurope is an EU funded project, which started in 2015 and will culminate at the end of 2017. BigDataEurope has developed and provides an integrated stack of tools to manipulate, publish and use large-scale data resources. These tools are freely accessible to all, including those with minimal knowledge of the technologies involved, and have already been installed in customised data processing chains. The Big Data Integrator Platform is a key outcome of the Big Data Europe project. It is an ecosystem of specifications and reference implementations that are attractive to both current players and newcomers from all parts of the data value chain.

At the core of the BigDataEurope project are seven societal challenges or focus areas – health, food, energy, transport, climate, social sciences, and security. Transport is societal challenge 4 (SC4) and contributes to smarter, safer, and cleaner transport, using beyond-state-of-the-art data solutions and giving rise to a European leadership for new mobility services.

Objectives

This was the third, and final, workshop of the BigDataEurope societal challenge on transport. The first workshop focused on defining key user needs and requirements and the second workshop presented the BigDataEurope platform as applied to the transport pilot site in Thessaloniki. Since then, the platform has been refined and the third workshop aimed to show the added value that the BigDataEurope platform can bring to the transport sector. This workshop also sought to collect feedback from participants on how the BigDataEurope platform can be extended and improved to facilitate further applications. The workshop also featured a series of speeches discussing the transformation that big data is bringing to the transport industry and presenting some of the current EU funded projects working with transport and big data.

Participants

The workshop was attended by 40 participants, including representatives of industry, research institutes, as well as the European Commission and different public administrations. This diverse background of the participants helped facilitate lively debates in the afternoon session, where participants were able to voice their opinions and discuss and learn from each other. After the workshop, participants remarked that the workshop had provided an excellent opportunity for

networking by gathering people from different backgrounds, but all of which work with big data and transport.

Agenda

Moderator: Maxime Flament, ERTICO-ITS Europe

10:00	**Welcome and Introduction**	
10:00 – 10:10	Welcome	Maxime Flament, ERTICO-ITS Europe
10:10 – 10:30	Introduction to BigDataEurope and Current State of the Project	Simon Scerri, Fraunhofer IAIS
10:30 – 12:00	**Morning session**	
	Speeches on the topic: How is big data transforming the transport sector?	Maria Rautavirta, Finnish Ministry of Transport and Communications *(Senior Engineer and Deputy Head of Unit of the Data Business Unit at the Finnish Ministry of Transport and Communications)* Rodrigo Castineira, INDRA (*The Transforming Transport Project – Mobility meets big data*) Arnaud Burgess / Maria Rodrigues, Panteia *(LEMO project - Leveraging Big Data to Manage Transport Operations)* Victor Corral, ATOS *(AutoMat project - Automotive Big Data Marketplace for Innovative Cross-sectorial Vehicle Data Services)* Luigi Selmi / Simon Scerri, Fraunhofer IAIS *(BigDataEurope project insights into big data in transport)*
12:00 – 12:15	**Coffee Break**	
12:15 – 13:15	**Pilot Demonstration of the Big Data Integrator Platform**	
12:15 – 12:30	BigDataEurope mobility use case in Thessaloniki: Algorithms	Josep Maria Salanova, CERTH
12:30 – 13:15	Demonstration of the Big Data Integrator Platform	Josep Maria Salanova, CERTH Luigi Selmi, Fraunhofer IAIS
13:15 – 14:00	**Lunch**	
14:00 – 16:30	**Afternoon Interactive Session**	
14:00 – 15:10	Discussion: Big Data for Transport Users and Additional Societal Needs	Moderated by Maxime Flament, ERTICO – ITS Europe

15:10 – 16:20	Discussion: Technical Requirements and Additional Transport Use Cases	Moderated by Josep Maria Salanova, CERTH, and Luigi Selmi, Fraunhofer IAIS
16:20 – 16:30	**Summary and Closing Note**	**Maxime Flament, ERTICO – ITS Europe**

Morning Session: Presentations on MaaS and EU Funded Projects

Maxime Flament (ERTICO – ITS Europe) opened the workshop, welcoming the participants and providing an introduction to the agenda. He explained that data is quickly becoming a game changer in the world of transport and it is becoming increasingly important to have access to the right data at the right place and at the right time. When the BigDataEurope project was launched three years ago, integrating big data in transport in general was a novel idea. Some initiatives had been carried out in the logistics sector, but little was done in transport overall. This has quickly changed and now there are several projects running at the same time that work on different aspects of big data use in transport.

BigDataEurope project coordinator Simon Scerri (Fraunhofer IAIS) then provided an insight into the current state of BigDataEurope. The project has entered its last stretch and will end in December 2017. However, the intention is to keep the platform that BigDataEurope has developed running after the official end of the project. The project has been recognised by the Big Data Value Association and there are currently talks going on to present the BigDataEurope architecture and reference model to them. According to Simon, the objective of this workshop was to show what BigDataEurope has achieved, but also, and more importantly, to keep the discussions within the community alive and to learn from each other's experience.

Then, delving into the session of speeches on how big data in changing transport, Maria Rautavirta (Finnish Ministry of Transport and Communications) presented the Finnish perspective on using big data to advance the transport sector. She explained that in Finland all aspects of communications and transport, including privacy, security, and infrastructure have been gathered under the responsibility of one ministry. This is perhaps why Finland has been so successful in finding solutions to the integration of big data in transport. Finland has also opened up all the administrative data sets. That is to say that all openly available data is now openly available in Finland, including transport and weather related data. The Finnish government has obliged service providers to share information through the Act on Transport Services, which will fully come into effect as of 1st January 2018. The Finnish government now intends to work on reviewing the transport system as a whole, making market access easier and promoting interoperability. Speaking more generally, Maria Rautavirta emphasized the need for data to be high quality and accessible in a timely manner. Moreover, data must be in a usable format, since, if it is not, then any efforts in achieving multi-modality are hugely hampered.

Next, Rodrigo Castineira (INDRA) introduced the Transforming Transport project, which was launched in January 2017 and is focused on the logistics domain. The project covers seven domains – highways, airports, ports, rail, vehicles, urban mobility, and supply networks – and aims to show that

big data has potential to bring added value to each of these sectors. Similarly to BigDataEurope, Transforming Transport also aims to develop a solution that would be usable beyond the end of the project. So far the project has been working on problem understanding and validation of key solution ideas. It will then move on to large-scale experiments and trials in the field, which will involve end users. The Transforming Transport consortium has identified 160 data sources, of which, interestingly, only 2% have an amount of personal data. This goes to show that data can still be effectively utilised without raising concerns about data privacy and security.

The AutoMat project was introduced next. Victor Corral (ATOS) explained that the objective of AutoMat is to create an open ecosystem for providing manufacturer-independent data to cross-sectorial service providers. The AutoMat "Vehicle Big Data Marketplace" will thus provide a single point of data access for different service providers. The vision of the AutoMat project is that accessing data in this way will enable new and innovative business ideas for many stakeholders. The project has already worked on creating standardised and open interfaces that would allow for unconstrained data access and has gathered over 120,000 data packages in the Marketplace, thanks to the broad range of OEMs participating in the project. AutoMat has also addressed issues related to user acceptance by providing incentives to vehicle owners who share their data and by ensuring that the vehicle owner has full control over which data is provided to which service provider.

Last but not least, Arnaud Burgess (Panteia) provided an insight into the new LEMO project, which has been funded under the last Horizon 2020 call and will start in November 2017. The objective of the LEMO project is to produce a research and policy roadmap towards data openness, collection, exploitation and data sharing that would support EU transport stakeholders in addressing technical issues, as well as concerns related to legitimacy, data privacy, and security. The roadmap will outline a series of incremental steps needed to support decision makers in addressing current barriers and challenges in evidence-based decision-making. The LEMO consortium will, in particular, address five transport dimensions - mode, sector, technology, policy, and evaluation – and also conduct a series of case studies, which will involve organisations that actively use big data for specific purposes. The case studies will help LEMO understand the strategies and actions taken by these organisations to leverage big data and identify the merits and demerits.

Pilot Demonstration of the Big Data Integrator Platform

In the second part of the morning session, Luigi Selmi (Fraunhofer IAIS) and Josep Maria Salanova (CERTH) presented the Big Data Integrator Platform. Luigi first explained the architecture of the platform, which uses Apache Kafka for messaging, Apache Flink for data processing, and PostGis and Elasticsearch for storage and licensing. This technological set-up has enabled the transport societal challenge of BigDataEurope to achieve its objective of creating a scalable, fault-tolerant and flexible platform based on open source frameworks that can process unbounded data sets. Luigi also mentioned that the transport pilot is able to process real-time FCD data for map-matching and classify a road segment according to the traffic level.

Josep Maria then provided a practical insight into the BigDataEurope transport pilot in Thessaloniki. The pilot uses multi-source data sets (including speed, traffic flow, and travel time) in order to provide a short-term prediction of traffic status, which is based on mobility and traffic pattern

recognition. A fleet of 1,200 taxis is used in Thessaloniki for estimating traffic status on the road network. On average 400 vehicles circulate continuously and send speed and location every 6-10 seconds, which are used for estimating traffic status in real time. The model used for predicting the traffic status is refined through machine learning techniques, which help achieve an efficient and robust prediction with an average error of 5-6 km/h. A 10-fold cross-validation is used to select the appropriate model to predict the traffic speed for a given time. A series of models are tested and the one that provides the lowest average error is used in the BigDataEurope platform.

Afternoon Session: Lively Discussions on the Take-Up of Project Results

The afternoon session, moderated by Maxime Flament (ERTICO – ITS Europe), started with the question of how to achieve better take-up of project results. From the morning session and the projects presented, it was clear that there is a lack of cooperation amongst the projects and that, although BigDataEurope did a lot of work to attract interest to the Big Data Integrator Platform, it has not been implemented as widely as could have been hoped.

Participants remarked that a first starting point could be to promote the project in countries which are not part of the consortium and are not directly involved in the project. It is also important to organise different events and educate the audiences. Hackathons with educational sessions were mentioned as one example of what could be done. It is also important to focus on the audience that is invited to an event. Currently, there is most often a vertical focus with events for specific stakeholder groups, but it would be important to bring together people with similar concerns, regardless of background. In addition, project consortiums should look for existing solutions and other projects or entities that could be interested in cooperating. These could include universities and research institutes which are often interested in trying new solutions and technologies that projects are developing. Moreover, it is important to identify the problem owner, that is, who has the problem, and what kind of tools are there to provide a solution and how this solution can be improved. Improving the existing solution can then become the foundation for a new EU funded project.

It is important to involve decision makers in the projects as well, for example, by organising special educational sessions and other events. Moreover, decision makers should be made aware of the existing solutions that exist in other countries and that could be implemented in their countries. As discussed in the morning session of the workshop, there are many lessons that can be learned from Finland regarding how data can be made open and how people can be incentivised to share data. It was also mentioned that Austria, which is looking to integrate different transport modes in one platform, can be taken as an example of a good practice.

Workshop participants then raised some questions regarding the future of the BigDataEurope project. First and foremost, participants were interested in what will happen after the end of the project – will there be a report on the lessons learned and best practices identified throughout the course of the project, and what will happen with the Big Data Integrator Platform. According to project coordinator Simon Scerri (Fraunhofer IAIS), even after the end of the project, the project website will continue to host the project's public deliverables, which will shed some more light on the work that has been done. The plan is also to have similar workshops at least annually for the

next two years after the end of the project. These workshops would also discuss questions participants have about the use of the BigDataEurope platform. In the meantime, for any issues regarding the implementation of the platform, anyone interested can turn to GitHub, where a self-sustaining community has already been established and can try to resolve questions regarding the BigDataEurope platform.

Conclusions

The workshop showed that there is a clear need to create a larger community and keep the discussions within the community alive. The workshop was a success since it enabled participants to showcase their projects and initiatives, explain the vision and objectives of their work, and liaise with like-minded individuals and organisations. Although the afternoon sessions deviated from the agenda and, instead of looking at user needs and requirements, focused on brainstorming good ways to promote projects and their results, it delivered much useful feedback, which will be taken up in the BigDataEurope consortium.

Links

- The presentations are made available on slideshare.
- Photos from the event are available on Flickr.
- Additional information can be found on the BigDataEurope website.

Report by Zane Mezdreija (ERTICO-ITS Europe).

Annex I

Participant List

#	Last Name	First Name	Company
1	Anckaert	Ivan	Freelance
2	Bajnóczi	Mihály	Permanent Representation of Hungary to the EU
3	Bourdy	Emilien	University of Reims Champagne-Ardenne
4	Burgess	Arnaud	Panteia
5	Carlsson	Anders	Volvo Technology
6	Castineira Gonzalez	Rodrigo	INDRA
7	Corral Franco	Victor Javier	ATOS
8	Dananchy	Luc	AKKA BELGIUM
9	Deltour	Anne	European Commission
10	Drees	Holger	BASt
11	Faria	Pedro	AKKA
12	Flament	Maxime	ERTICO - ITS Europe
13	Frigne	Dirk	Geosparc
14	Furno	Angelo	IFSTTAR/ENTPE LICIT
15	Grillo	Patrizio	EC - DG MOVE - B4
16	Hayden	Niall	Transport Infrastructure Ireland
17	Herrera Lotero	Javier	
18	Hintenaus	Dieter	ASFINAG
19	Hochguertel	Holger	INRIX Europe GmbH
20	Johansson	Claes	Volvo Group Trucks Technology
21	Karjalainen	Piia	ERTICO / MaaS Alliance
22	Kerschot	Hugo	IS-practice
23	Kindler	Holger	DIHK e.V.
24	Kulikova	Yulia	inmarsat
25	Liu	Danjing	IBM
26	Madsen	Signe	Central Denmark EU office
27	Mezdreija	Zane	ERTICO - ITS Europe
28	Panozzo	Niccolò	European Cyclists' Federation
29	Papapanagiotou	Eftychios	Technical University of Munich

30	Raes	Lieven	Informatie Vlaanderen
31	Rautavirta	Maria	Finnish Ministry of Transport and Communications
32	Rodrigues	Maria	Panteia
33	Salanova	Josep Maria	CERTH
34	Scerri	Simon	Fraunhofer IAIS
35	Selmi	Luigi	Fraunhofer IAIS
36	Simon	Emile	Luxembourg Institute of Science & Technology (LIST)
37	Springer	Benedikt	KoWi - EU Liasion Office of the German Research Organisations
38	Szenci	Ildiko	Antall József Knowledge Centre
39	Tiago	Ricardo	IMT - Instituto da Mobilidade e dos Transportes
40	van den Hoek	Jaap	INRIX gmbH

Annex II

Transcript of Notes from Afternoon Discussion Session

Sheet 1

- What are big challenges that BDE can solve?
- Technology roadmap
    - Illustrate with examples + what does it do
    - Show benefits
    - Dare to show what is not working
    - Showcase portal
- New projects
- Who is the problem owner?
    - Who will take it up and do something further
- EU BDV Conference December 2017
- BDVA – ERTICO Activity Group on Mobility
- Other standards / organisations
    - Datex II
    - MaaS Alliance
- Migration issues
    - Not always feasible

Sheet 2

- Vertical focus? – Bring people with the same concerns together
- Promote to:
    - Member States
    - ITS
    - Promotion activities after project results
- Lack of skills – training
- Educate – build up skills
    - Decision makers
- How to make it easy to understand
    - Why open data?
    - Why interoperable data?
- Hackathon
    - Data pitch – open call to SME research
    - Global transport hackathon
    - SLUSH Helsinki – 23 November – 1 December
- Bring together
    - Similar concerns
    - Traffic management
    - Logistics

    - MaaS
- Encourage – pilots to bring awareness to transport operations
    - Simulations

Sheet 3

- NAP (national access points)
- Finland
    - Data is coming from service providers
    - Move away from central data -> distributed
- Austria
    - Traffic info Austria (VAD)
- GIT
    - Community
    - Support
    - Map core contributors
    - Pay active moderators?
- Data sources