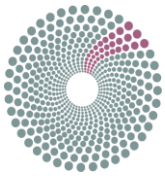

BIG DATA EUROPE

Big Data in Secure Societies

1st Workshop Final Report

The EU SatCen in the framework of the BigDataEurope (BDE) project organised a workshop on "Big Data in Secure Societies" for the "Secure Societies" Horizon 2020 Societal Challenge on 30 September 2015 in Brussels; the workshop was the first of a scheduled series in the BDE project for the Secure Societies domain.

Background

The "Secure Societies" Horizon 2020 Societal Challenge is related to the protection of freedom and security of Europe and its citizens. An example of major activity in supporting the primary aims of this Societal Challenge is the provision of geospatial products and services, mainly resulting from satellite data; the datasets used in the Space and Security domain comply with the definition of Big Data in terms of volume, variety, velocity, veracity and value.

Workshop aims

With dedicated sessions on specific topics led by specialists from the BDE project and the Security domain, the workshop aimed to:

- Identify current and future challenges for Big data and data management in the "Secure Societies" societal challenge;

- Build a Security community involving relevant entities through the collection of user requirements and Big Data implementation strategies;
- Show real world examples and use cases;
- Highlight the current state of the BDE project and the pilot case for the Security domain;
- Support the design and realization of the necessary ICT infrastructure on which the deployment and use of the BigDataEurope platform will be based.

The aim was to provide stakeholders in the Security domain with the opportunity to influence the BDE project and the development of the Big Data platform for security as well as to address a wide audience comprising data users from a variety of fields in the Security domain.

Workshop general information

The workshop was organised by the EU Satellite Centre and hosted by the Spanish Office for Science and Technology (Rue de Trone, 62) in Brussels on 30 September 2015 between 10.30 - 16.30. The workshop was divided in two main sessions: the morning session consisted of an introductory part followed by invited talks while the afternoon session consisted of two interactive discussions.

The workshop had a 66% turnout, with 68 registered participants and an actual number of 45 attendees from EC (DG CNECT, DG GROW, DG HOME, DG RTD), JRC, EDA, EUROPOL, EDA, FRONTEX, ESA, CDTI, DLR, ASD-EUROSPACE, EARSC and a number of other entities and private companies covering the domains of Space and Security, Cybersecurity, Fight against Crime and Data/Infrastructures. Working sectors were represented as follows: 33 % Space and Security; 29 % Data/Infrastructure; 21 % Cybersecurity; 17 % Fight against Crime.

Workshop Agenda

Welcome and Workshop presentation (10.30 – 10.40)
Gisele Roesems-Kerremans (EC CNECT.G3)

Introduction Talks (10.40 – 11.40)

- **10.40 – 11.00 Big Data and Societal Challenges**
  Gisele Roesems-Kerremans (EC CNECT.G3)
- **11.00 – 11.20 The BigDataEurope project**
  Sören Auer (Fraunhofer IAIS)
- **11.20 – 11.40 Big Data and Secure Societies**
  Sergio Albani (EU SatCen)

Invited Talks (11.40 – 12.40)

- **11.40 – 12.00: Space Data for Secure Societies**
  Sakellaris Hourdas (EC GROW.I3)
- **12.00 – 12.20: Social and Open Source Data for Secure Societies**
  Jean-Dominique Nollet (EUROPOL EC3)
- **12.20 – 12.40: Big Data challenges in Cybersecurity and Trust**
  Pierre Chastanet (EC CNECT.H4)

Lunch (12.40 – 14.10)

Interactive Session 1: Big Data Technologies in Secure Societies (14.10 – 15.10)
Chair Vangelis Karkaletsis (NCSR Demokritos)

- **Topic 1: Technical challenges and issues**
- **Topic 2: Data science and advanced analytics**
- **Topic 3: Architectures and infrastructural layers**

Interactive Session 2: Big Data Users in Secure Societies (15.10 – 16.10)
Chair Manolis Koubarakis (University of Athens)

- **Topic 1: User requirements and needs**
- **Topic 2: Pilots, use cases and scenarios**
- **Topic 3: On-going projects and initiatives**

Summary, Outreach and Feedback (16.10 – 16.20)
Sergio Albani (EU SatCen)

Closing Note and Farewell (16.20)
Gisele Roesems-Kerremans (EC CNECT.G3)

End of workshop (16.30)

Introduction talks

The Introduction Talks session aimed to offer an overview of Big Data challenges and opportunities in Europe, focusing on the societal challenge “Secure Societies”.

The workshop welcome and first introductory talk was given by Gisele Roesems-Kerremans (EC CNECT.G3); her presentation highlighted the importance of the BDE project for the EC, in line with the Big Data communication action defined in 2014 to boost jobs in data economy.

The second presentation was given by Soren Auer (Fraunhofer IAIS), BDE Project Coordinator. He showed how BDE aims to leverage the societal value of the Big Data for the seven Horizon 2020 Societal Challenges through three main activities: gathering the user requirements, developing a technical platform and proposing possible applications/pilots. The most suitable technical solutions to build the platform have to be adopted considering the large variety of tools available on-line. The main challenges of Big Data are the so-called 3Vs: Volume, Velocity and Variety. The state-of-the-art approach, called lambda architecture, is structured to address the volume (historical data that are processed by the batch layer) and the velocity (real time data that are processed by the speed layer); however, variety is missing. BDE will cover this gap by introducing a semantic layer for variety, which will make the data integration more flexible. BDE will also develop a platform that will require less technical skills for dealing with Big Data.

The Introduction Talks session was concluded by the presentation of Sergio Albani (EU SatCen), Secure Societies domain leader; his presentation illustrated the EU SatCen role in the BDE project. SatCen is addressing the “Secure Societies” Challenge focusing on the building of a Secure Societies Community (eliciting needs and requirements of relevant stakeholders related to Big Data management and exploitation) as well as on planning, developing and evaluating the instantiations of the BDE stack through appropriate pilot trials in real-world scenarios for Secure Societies. Preliminary user requirements were collected from interviews with SatCen staff, EU entities, international organizations and industry representatives. The requirements were categorized in accordance with the data

value chain (management and exploitation) and the platform characteristics. These requirements will lead to the development of the first pilot in collaboration with the BDE Secure Societies technical partners (University of Athens and NCSR-Demokritos). The pilot will consider two different workflows of data: the first one is related to the detection of changes in areas of interest using satellite images and successive verification using (social) media information; the second workflow is related to the event detection using (social) media and the verification using satellite images.

Invited talks

The Invited Talks session intended to cover the main areas of the Secure Societies challenge: Space and Security, Fight against Crime and Cybersecurity.

The presentation on Space and Security was delivered by Sakellaris Hourdas (EC GROW.I3), who presented the Copernicus programme with a focus on Secure Societies and Big Data challenges.

A presentation on Fight against Crime was delivered by Jean-Dominique Nollet (EUROPOL-EC3). EUROPOL is the EU's law enforcement agency with the main goal to help achieve a safer Europe by fighting against terrorism, cybercrime and organized crime; EC3 is responsible for addressing cybercrime in the European Union and for protecting European citizens.

The talk on Cybersecurity issues was held by Pierre Chastanet (EC CNECT.H4), who described how cybersecurity is a fundamental sector in security scenarios, ranging from IT infrastructures development to data security.

First Interactive session and Secure Societies pilot description

The first interactive session was chaired by Vangelis Karkaletsis (NCSR Demokritos), technical partner in the development of the Secure Societies pilot. The aim of the session

was to show an overview of the technical challenges and issues for the platform development and pilot implementation, in order to discuss with the audience the architecture to adopt and the advance analytics tools to use.

The lambda architecture was described along with the available existing technologies (not only the well-known Hadoop technologies, but also tools already implemented in other EU projects). A first selection amongst the Big Data technologies in the frame of the BDE project has already been done, considering the requirements of the pilot.

In particular, the Security pilot will cover all the challenges of Big Data: volume (wide satellite images), variety (heterogeneous sources of data, as images and text from news and social media), velocity (fast-paced social data - news stream), veracity (cross-verification of the sources) and value (adding useful information). Apart from the established Big Data tools in the frame of the lambda architecture, specific tools for image processing (e.g. change detection), text mining (e.g. clustering, crawling), geo-data storage & access (Semagrow) as well as a GUI (Sextant) will be considered.

The first workflow of the pilot is defined as **change detection** workflow and it is based on **remote sensing** data: tools for satellite images selection, download and processing (such as co-registration and change detection) are already available on the Sentinel Scientific Data Hub and Sentinel 1 Toolbox/SNAP. The first phase of the pilot will integrate these tools into the BDE platform, scaling their operations to large volumes of data by transforming them into a parallel procedure. If a change is detected using satellite images, the social sensing part of the workflow will be activated in order to add information to the satellite information and to verify the event. The second workflow of the pilot is called **event detection** workflow and it is based on **social sensing** data: it extracts information from news and social media, whose outcomes activate the change detection tool, focusing its processing on a specific area. The weight that will be assigned to the two sources of information (remote sensing and social sensing) in the final decision making is still under discussion. During the session a presentation was given by Mark Last (Ben-Gurion University of the Negev), expert on text mining for security and cybersecurity applications.

Second interactive session and audience feedbacks

The second interactive session was chaired by Manolis Koubarakis (University of Athens), Technical Leader of the Secure Societies domain. This session aimed at presenting some on-going projects and initiatives in order to collect more ideas for the development of the Security pilot.

The session was also dedicated to collect requirements from the audience in addition to those highlighted during the day (e.g. integration of ethical issues through ethical guidelines in the project, use of data encryption tools, use of additional data sources to increase the variety of the data such as tracking systems and communications logs).

During the session a presentation was given by Mihai Datcu (DLR), who described a tool for data mining / information extraction from satellite images (mainly high resolution SAR images).

Conclusions

The conclusions were presented by Sergio Albani (EU SatCen). The event was successful with several participants covering different sectors of the Secure Societies domain and speeches given by key representatives from EC, EUROPOL-EC3 and the BDE project. The interactive sessions, led by the BDE Secure Societies technical partners, gave the audience the possibility to provide useful recommendations and comments which will be considered in the platform setting, in the pilot development and for future initiatives. It was also announced that most of the material will be available online and the participants were encouraged to check the BDE website in order to follow up the project and to be actively involved in it.

The workshop was then officially closed by Gisele Roesems-Kerremans.

Links to other Material

- presentations
- photos