



BIG DIVE

DATA SCIENCE & ANALYTICS

aizoOn: overview

Perotti

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In collaboration with



ABOUT US

aizoOn is an independent consultancy company focused on technology and innovation, operating at a global level.

OUR VISION

To apply a quantitative and scientific approach for a more sustainable and responsible society

OUR MISSION

To sustain our customers' future in the digital era, providing the required know-how in technology and innovation

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AIZOON GROUP

We cover the entire process of value creation for customers, together with our affiliated companies:

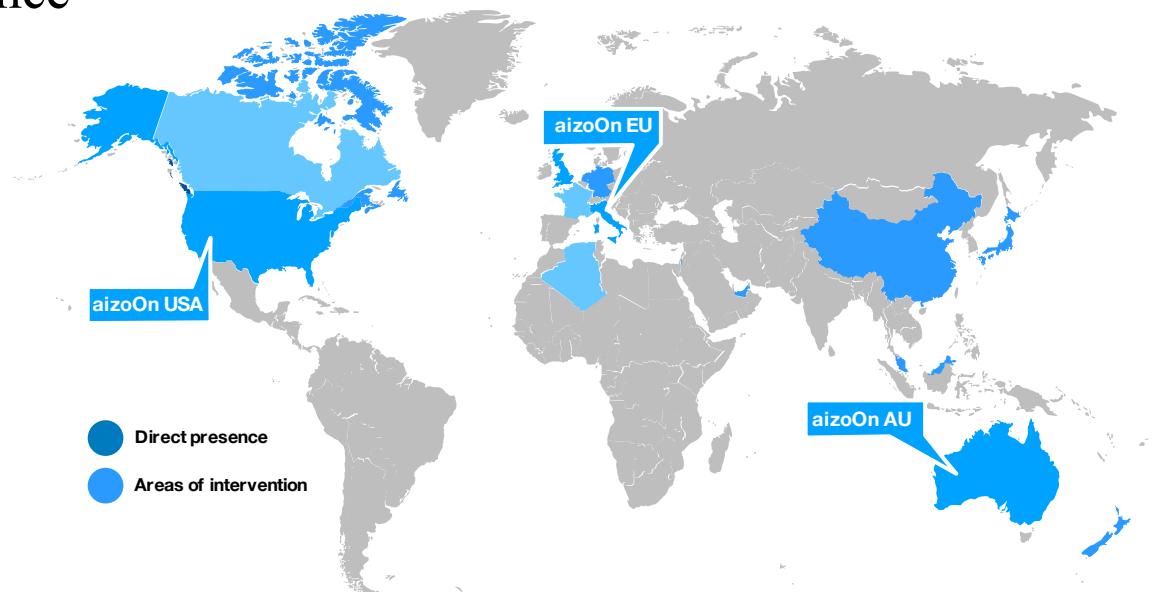
CSP: Research center for the IoT and IoD

Trustech: micro-bio and nanotech

Lyt: IoT for the person and her environment

K-Now: social data intelligence

We are now operative
in all continents



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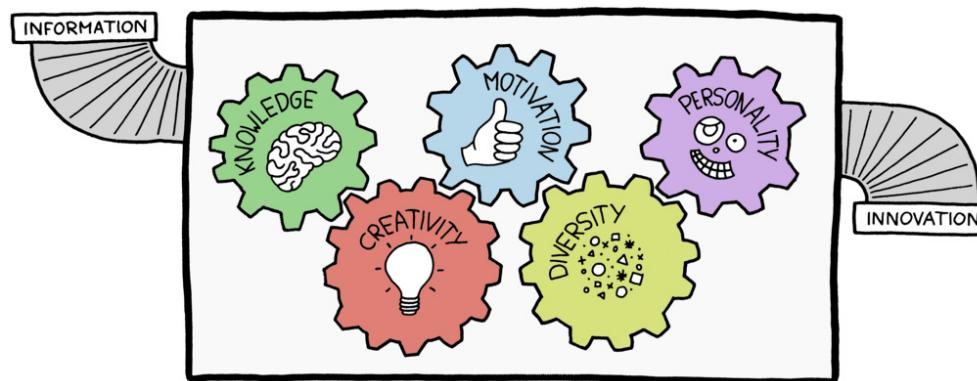


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DATA DRIVEN INNOVATION UNIT

The mission of aizoOn's **data driven innovation unit** is to discover new valuable knowledge from **big data**.



We have taken the **eco-system approach**: innovation happens through a **co-creation process** involving government agencies, individuals, public and private entities .

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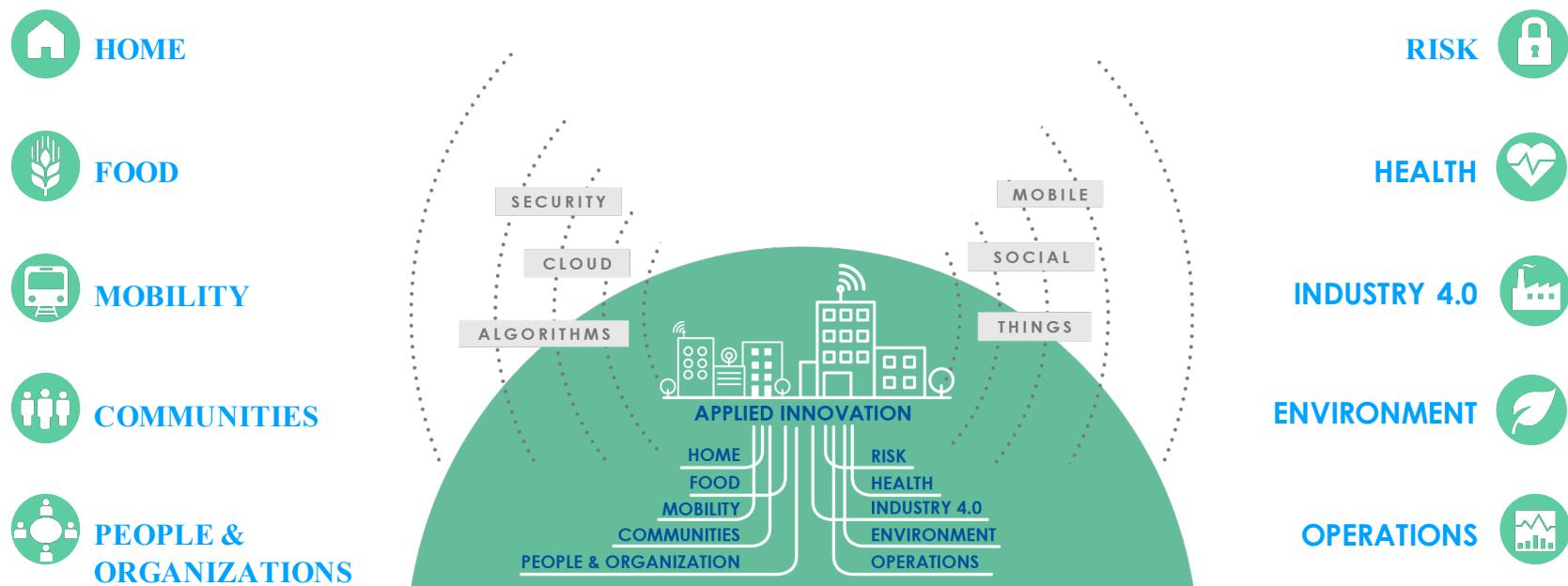


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INNOVATION STREAMS

We operate on several areas of innovation and technology:



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(SOME) PROJECTS



SETA is an ongoing European applied research project on urban mobility. It will deliver methods and technologies for the organization, monitoring, and planning of the mobility on metropolitan areas.



MOON is a tool for the navigation and analysis of a company's network of people, customers, and skills. Exploiting various data sources and data mining techniques it allows to explore patterns, communities, top performers and more inside the organization for a more informed management of the human capital.

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(SOME) PROJECTS



ARAMIS® is an advanced artificial and human intelligence system for monitoring the risks of cyber attacks in enterprise networks. Fast, reliable and scalable, it helps in the risk management for companies through machine learning engines for behavioral anomalies and advanced analytics, for a real-time identification of the threats.



ALYT links software and hardware into an IoT platform handling different tipologies of connected devices at home or in the office, independently of the protocol. ALYT can embed third-party solutions and apps enabling the development of revenue sharing trade policies.

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(SOME) PROJECTS



FOOD DIGITAL MONITORING aims at realising the concept of “intelligent factory” in the agri-food business. A near-real-time monitoring -through physical sensors and advanced analytics- of the important indicators in all critical phases of the production chain assures the quality and safety of the raw materials, the transformation process and the distribution of the final products.



ELISE is a platform for monitoring and forecasting air quality parameters in metropolitan areas. The platform integrates the experimental measurements of pollution levels (obtained through a network of portable and fixed sensors) with the values calculated by means of a mathematical diffusion model. The web platform dashboards displays real-time data, forecasts, historical values and statistical comparisons

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An ubiquitous data and service ecosystem for better metropolitan mobility



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688082.



SETA - Highlights

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

- ✓ Duration: 36 months
- ✓ Action: Research and Innovation Action
- ✓ Funded by H2020: ICT-16-2015 – Big Data



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688082.



SETA - Challenge

The **impact of congestion** is worse in urban centres where 70% of transportation CO2 and particulate pollution is generated and is predicted to increase due to urban growth



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SETA - Goal and Ambition

To create a technology and methodology for **intelligent and sustainable mobility** in the metropolitan areas, based on *high-volume, ubiquitous, heterogeneous and multi-source, real-time* data



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SETA - Partnership



- ▶ **3 Research Institutions:**
Universities of Sheffield (UK), Delft (NL), Cantabria (ES)
- ▶ **1 Industry:** Aizoon (IT)
- ▶ **5 SMEs:** The Floow (UK), K-Now (UK), Scyfer (NL), TSS-Transport Simulation Systems (ES), SoftwareMind (PL)
- ▶ **3 pilot cities:** Torino, Birmingham, Santander



shef.ac.uk



aimsun.com



tudelft.nl



scyfer.nl



aizoon.it



softwaremind.com



birmingham.gov.uk



thefloow.com



CITTÀ DI TORINO
comune.torino.it



shu.ac.uk



k-now.co.uk



ayto-santander.es

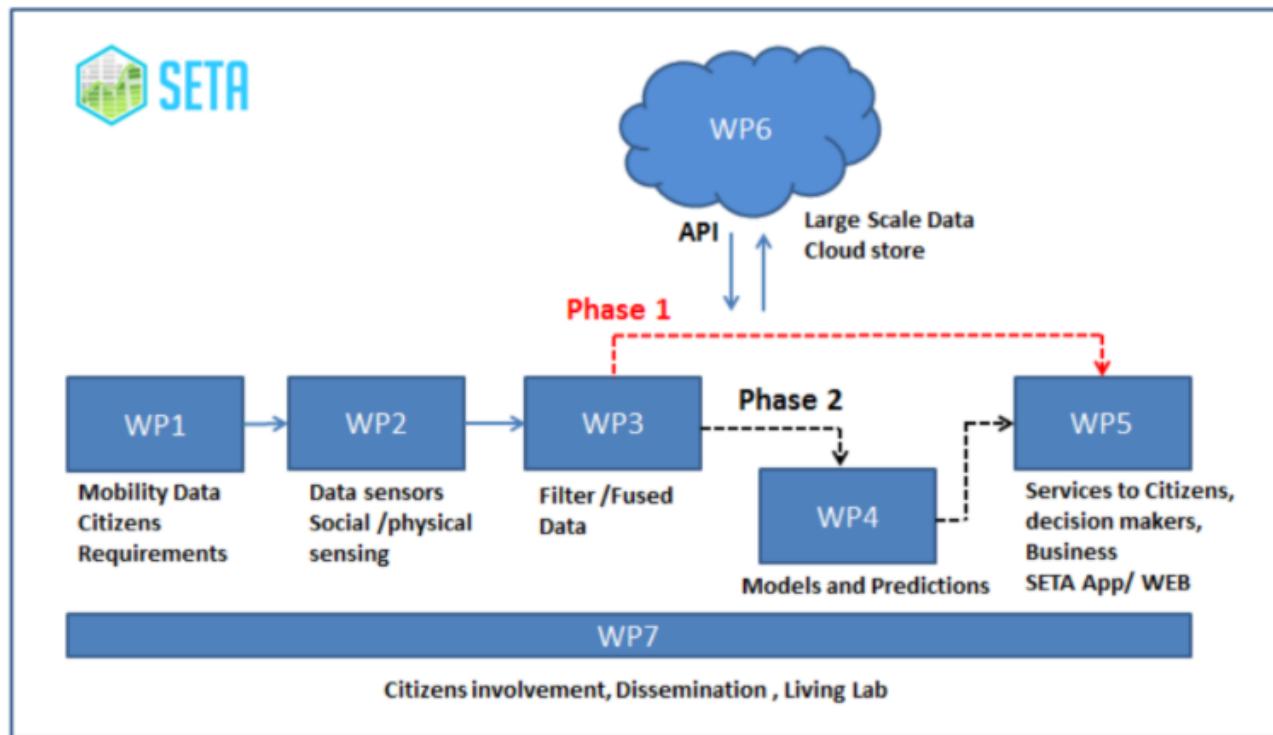


web.unican.es



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SETA – Work Packages structure



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SETA - Solution

Effective and efficient gathering of large-scale heterogeneous data and information sensed by/from physical sensors and mobile devices, collected over large scale via participatory sensing and crowdsourcing, as well as derived from institutional, public and private bases



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SETA - Application

Strategic planning of transport in the wide regions based on *ubiquitous, explicit or implicit, needs of citizens and businesses*

Detailed *long-term mobility planning* inclusive of plans for resilience to climate change as well as *shorter term* planning for large events (e.g. large city-wide festivals)



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SETA - Application

Decision support and scenario simulations to cope with everyday situations, smaller events and emergencies

Personalised services to citizens and businesses based on pervasive real time information and historical mobility information



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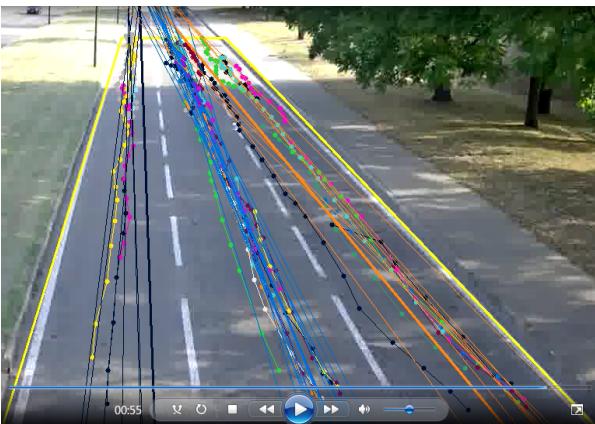
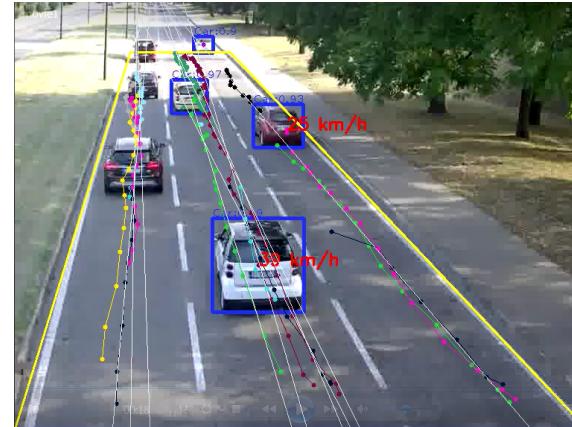
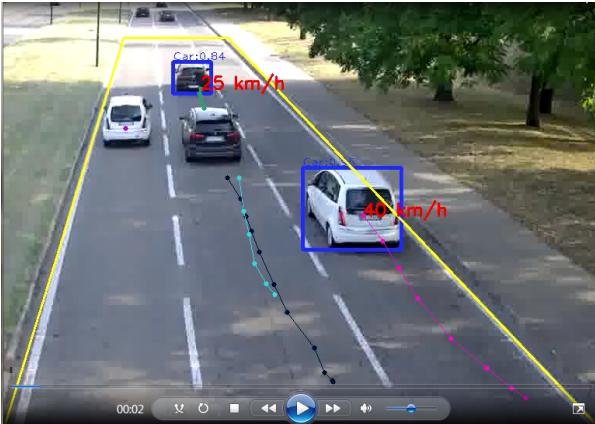
SETA – Prototypal Technologies



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SETA - Use case: Traffic management



Video analysis results:

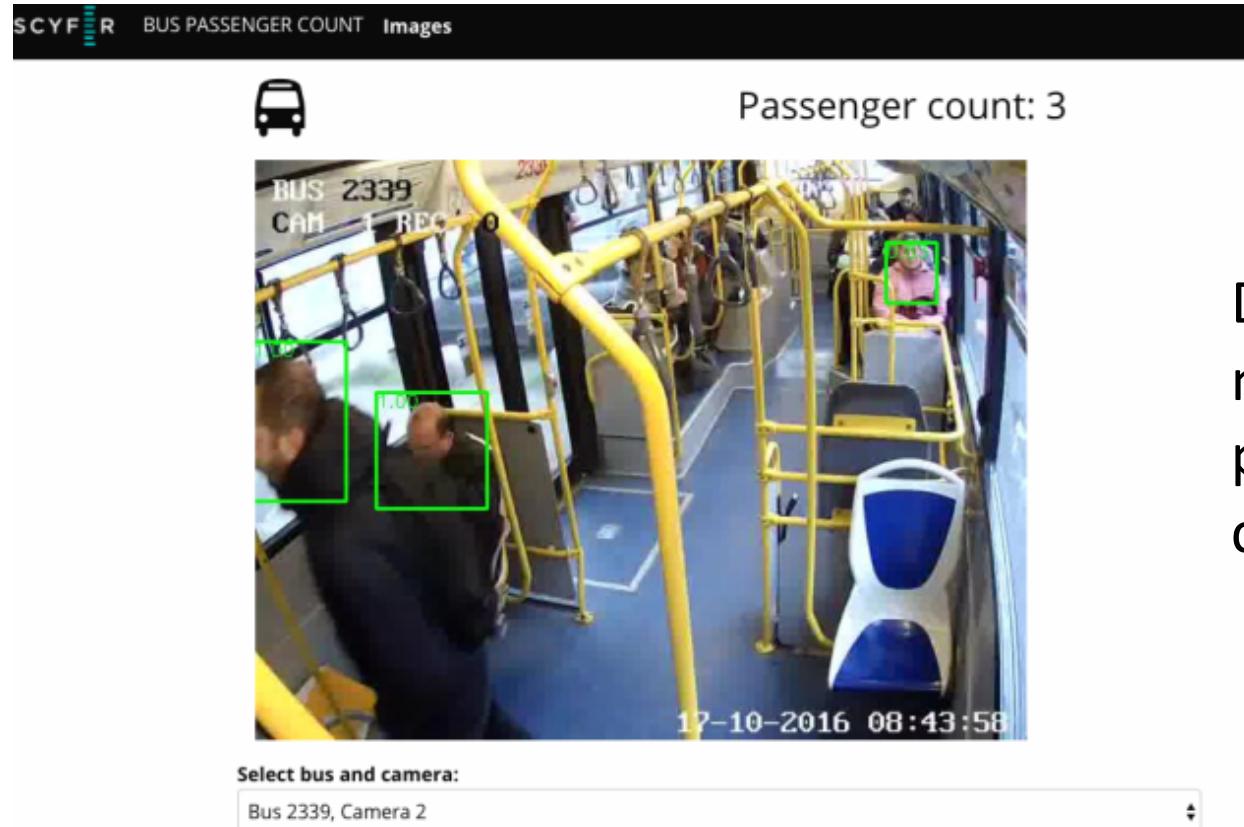
- ✓ Cars count
- ✓ Average speed
- ✓ Lanes occupancy



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SETA – People counting



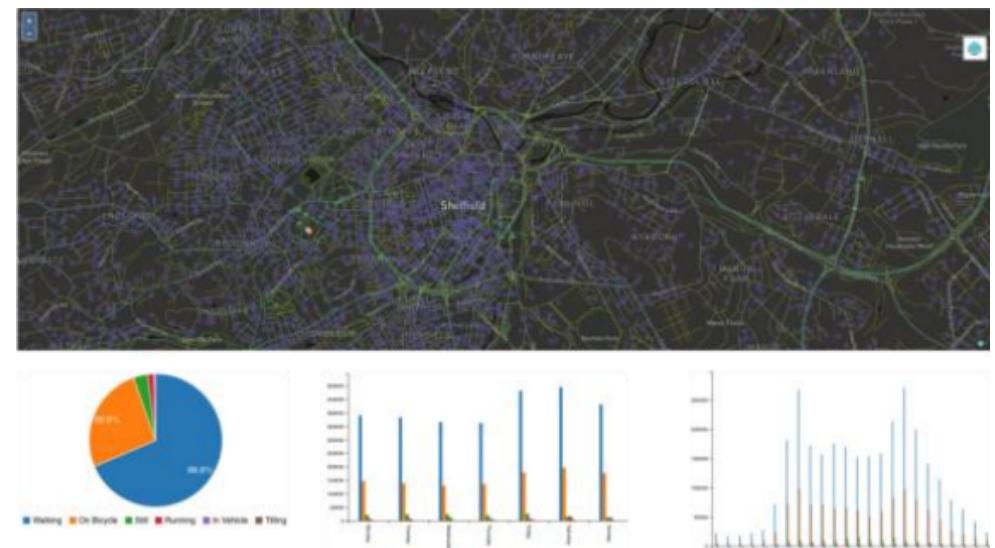
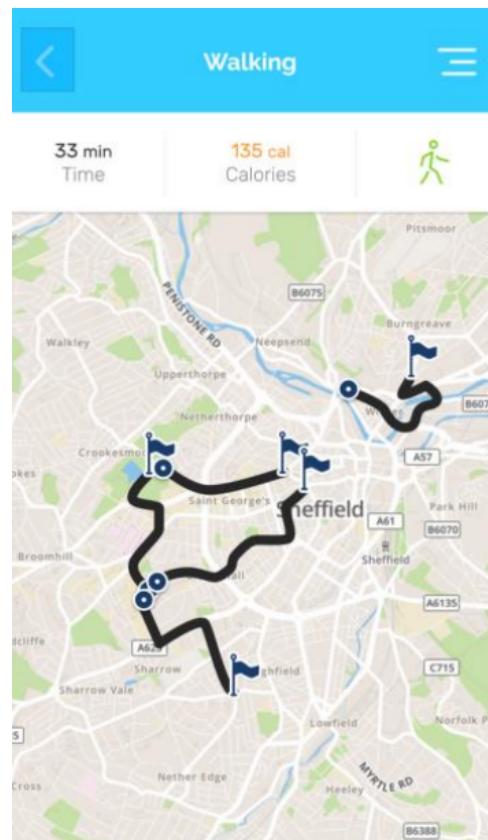
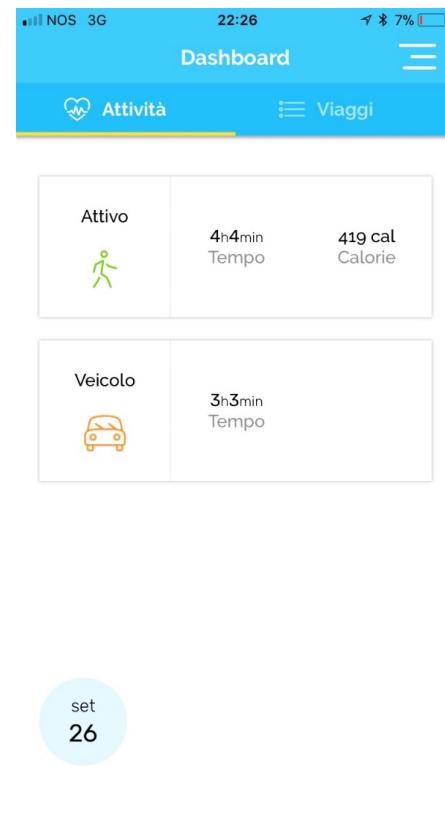
Deep convolutional neural networks are used to count passengers from security camera feeds



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SETA – Tracking



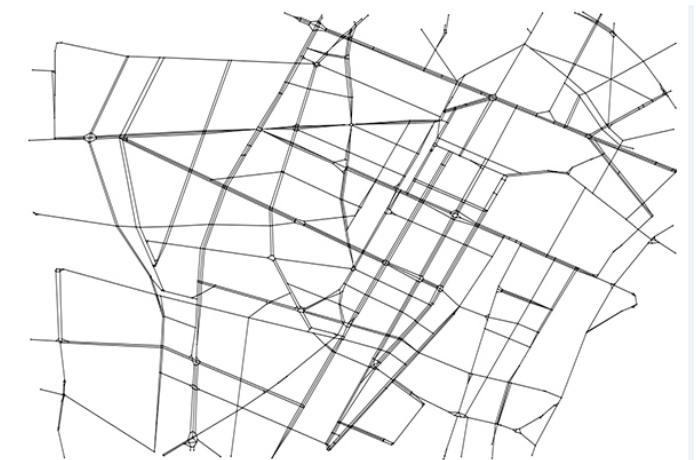
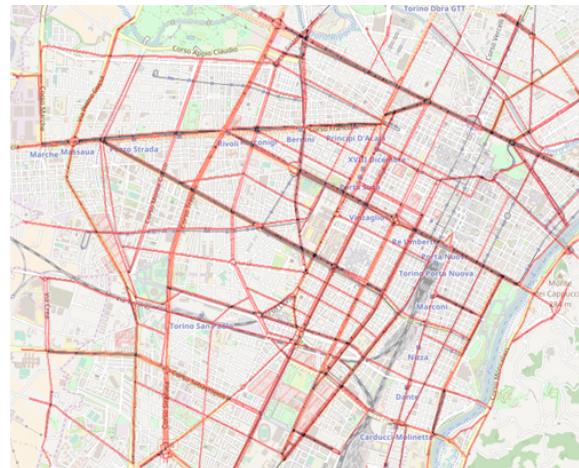
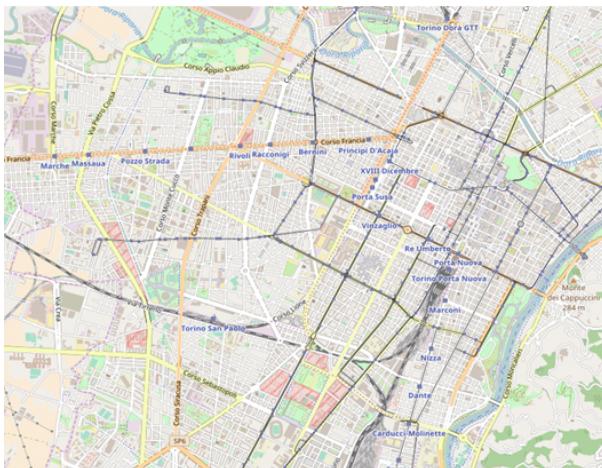
Tracking activities to generate modal OD matrices



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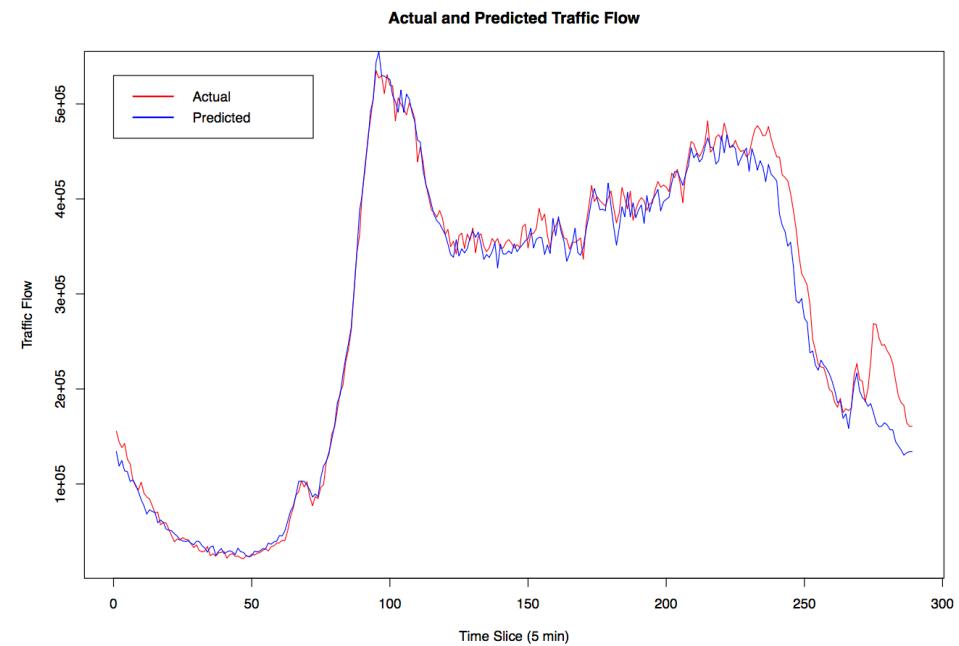
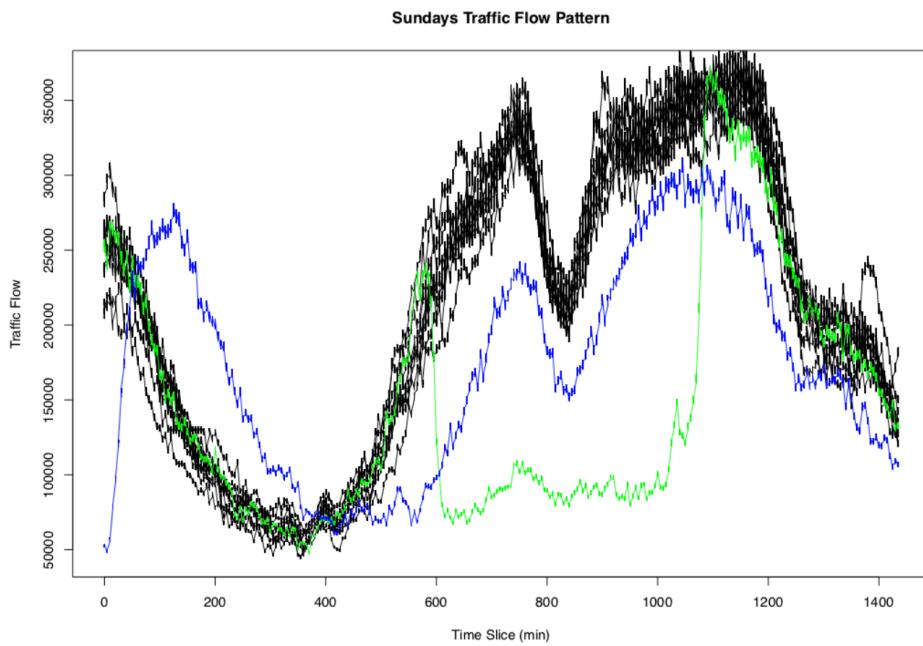
SETA – Graphs

An abstract data structure (graph) is extracted from the city map



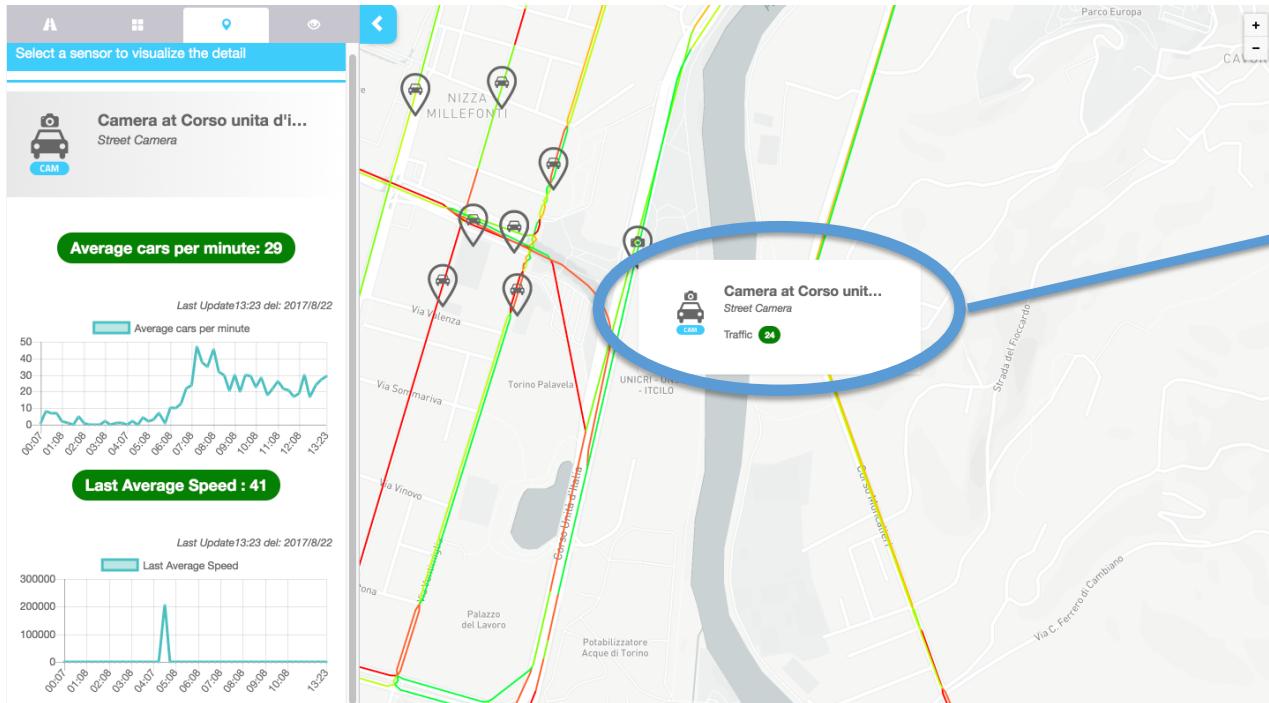
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SETA – Short-term traffic prediction



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SETA - Use case: Traffic management



Output visualised on decision makers dashboard:

- ✓ Vehicle count
- ✓ Average speed

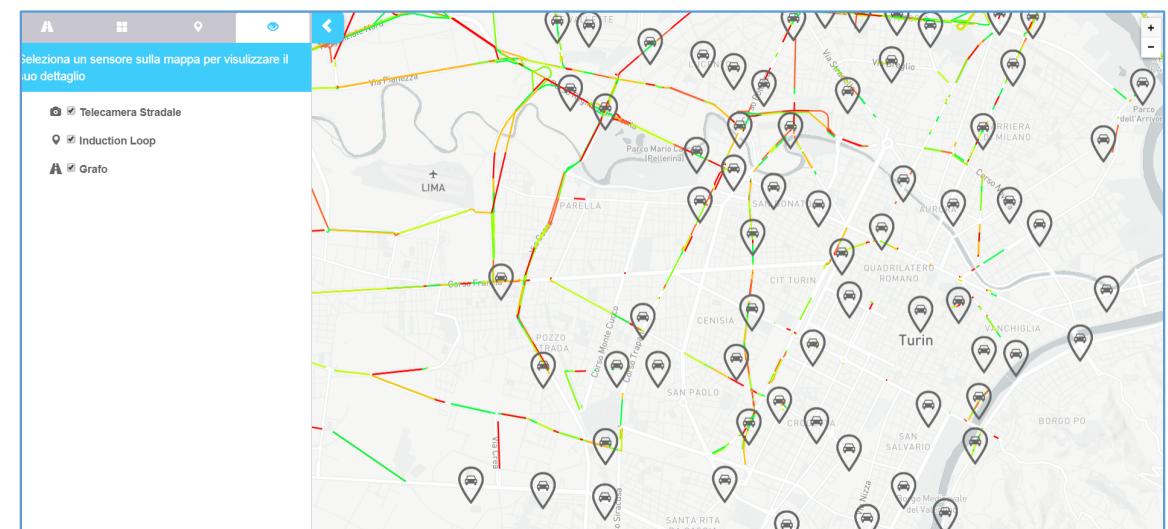
<https://seta.ailleron.com/app/>

Data from cameras will be implemented as input in the traffic models during the second phase of the project



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688082.

SETA – Real time data visualisation



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SETA – Routing engine



Sensed and predicted data are used as a base for custom object-driven route planning



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MOON: Network science for the human capital

CLAUDIO BORILE

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WHAT IS MOON



multidimensional company navigator

People analytics tool imagined to **support** the traditional **HR** methodologies through **data-driven** quantitative measures with a **network approach**.

WHAT IS MOON



multidimensional company navigator

People analytics tool imagined to **support** the traditional **HR** methodologies through **data-driven** quantitative measures with a **network approach**.

- Perception vs. Reality
- Monitoring
- Early detection
- Top and weak performers

- Organization
- People Review
- HR Transformation
- Talent Management

MOTIVATIONS

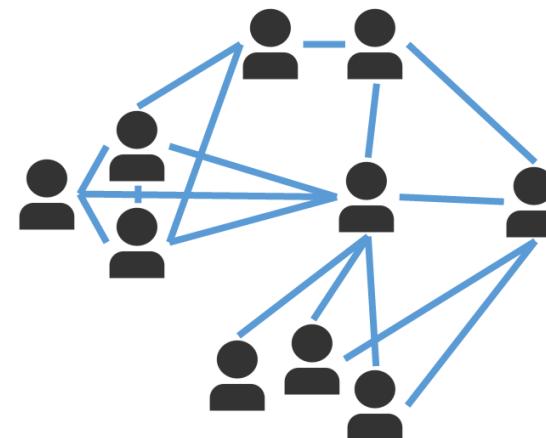


Network approach

from hierarchies...



...to networks



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MOTIVATIONS



Multidimensional



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MOTIVATIONS



Multidimensional



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DATA



Diversified sources of data to highlight different aspects of the organization and the people in it, and a coherent framework allows to navigate through these many layers of information

SOURCES Curricula and registries

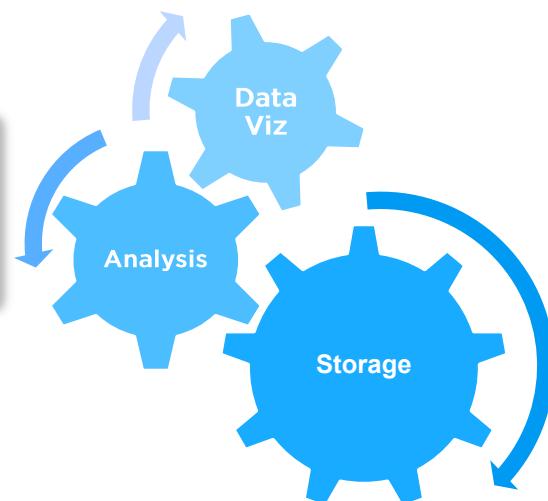
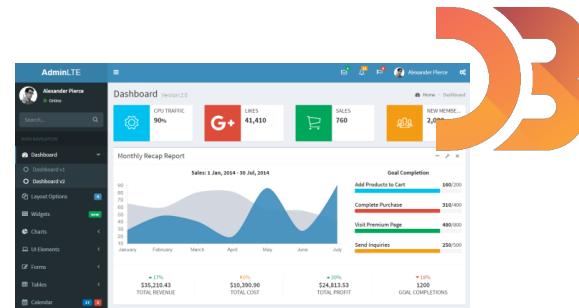
e-Mails

Calendars

Surveys

CRM

TOOLS



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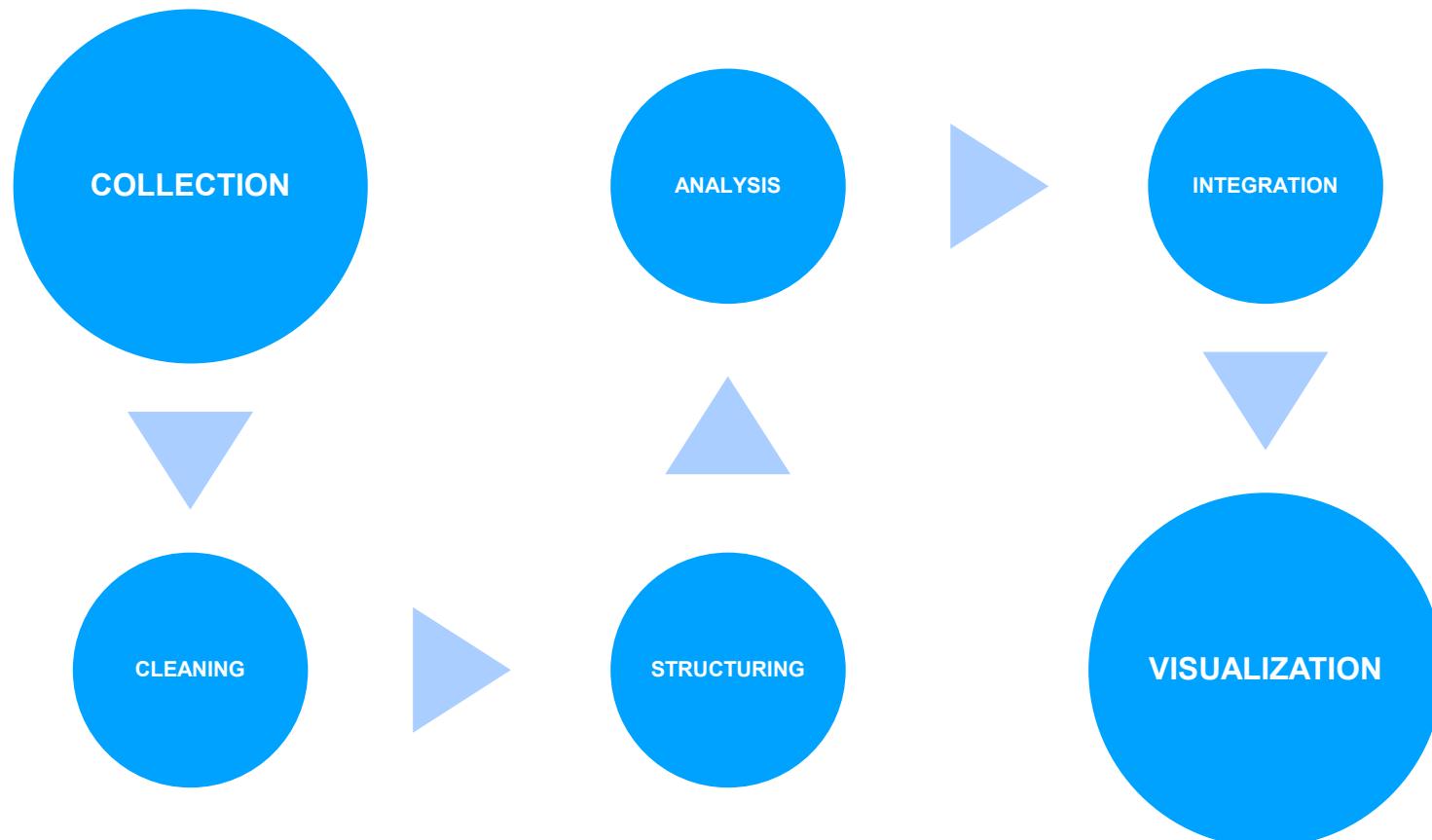
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WORKFLOW



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EXAMPLE



MAIL



COLLECTION

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COLLECTION



Test dataset: complete dump of the mail server from **2017/01/01 to 2017/06/30**, a total of **1000000+** mail logs in the format **timestamp | sender | recipient(s) | subject**

Data completely **anonymized**, subject used only for discussion tags (**reply, forward, etc.**)

MAIL



CLEANING

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CLEANING

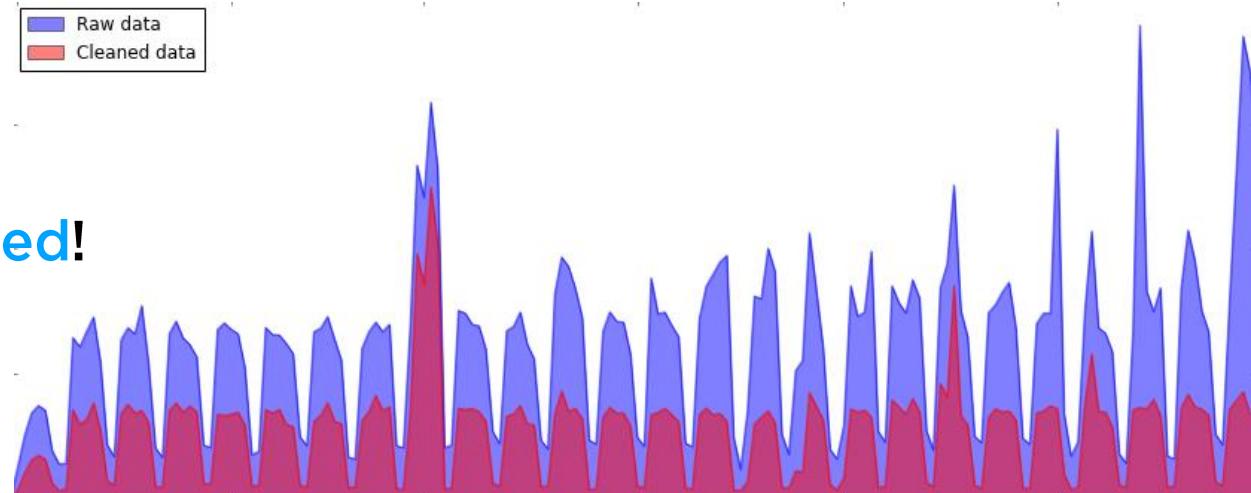


Remove all irrelevant logs (spam, newsletters, promotions, undelivered, ...)

Text standardization (lower all cases, stopwords, ...)

Extraction and aggregation of unique ids for each single user

90% of the mail traffic is discarded!



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MAIL



STRUCTURING

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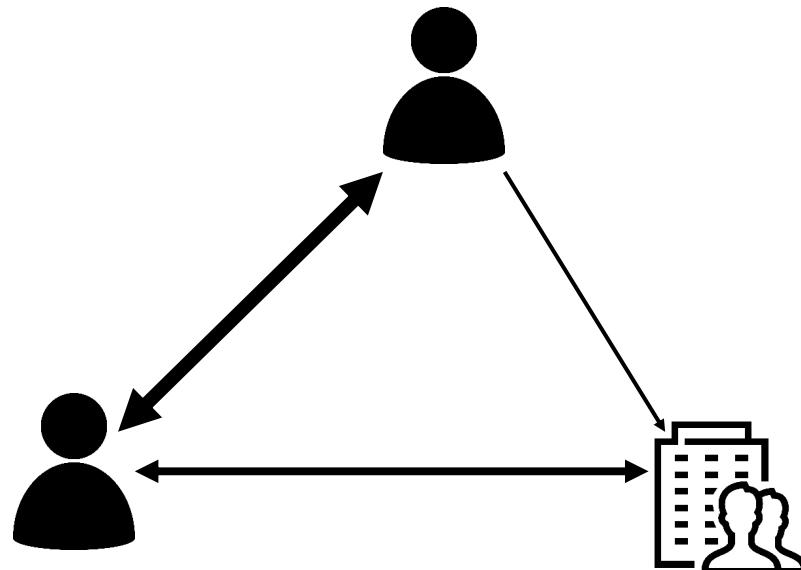
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STRUCTURING



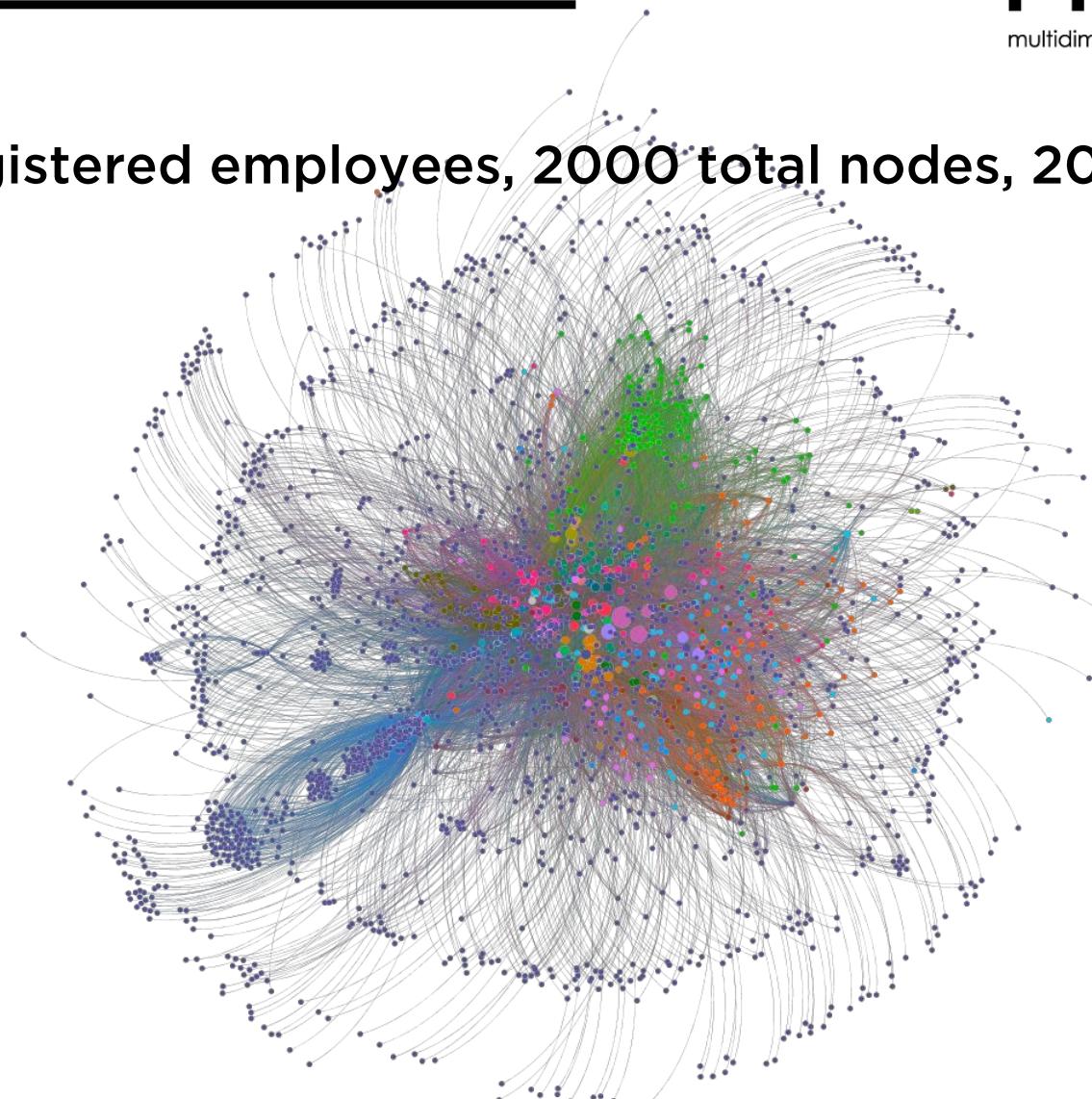
The most natural framework for our analysis is **graph** (network) theory. **Nodes are people** or customer companies, **links are communication** relations. The more two nodes “talk”, the stronger is the tie.



STRUCTURING



500 registered employees, 2000 total nodes, 20000 links



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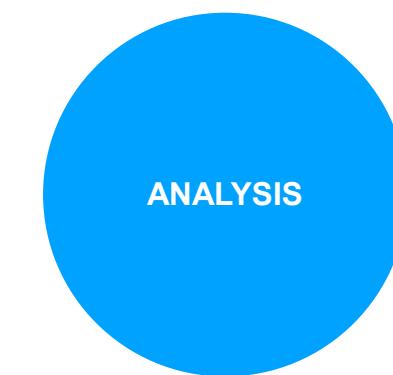
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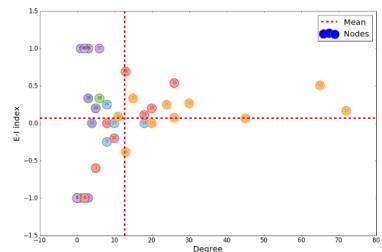
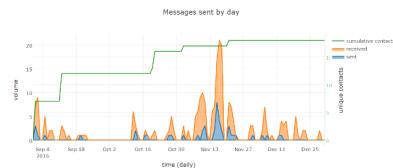
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ANALYSIS

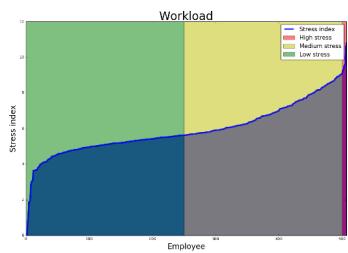


We can **extract meaningful indicators** of single nodes or departments, or other groups of interest, focusing on the **time component** and the **structural properties** of the network. The network approach provides powerful mathematical tools for this analysis.

ANALYSIS



Person-specific analysis

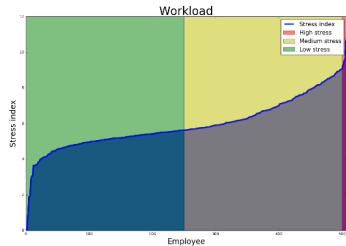
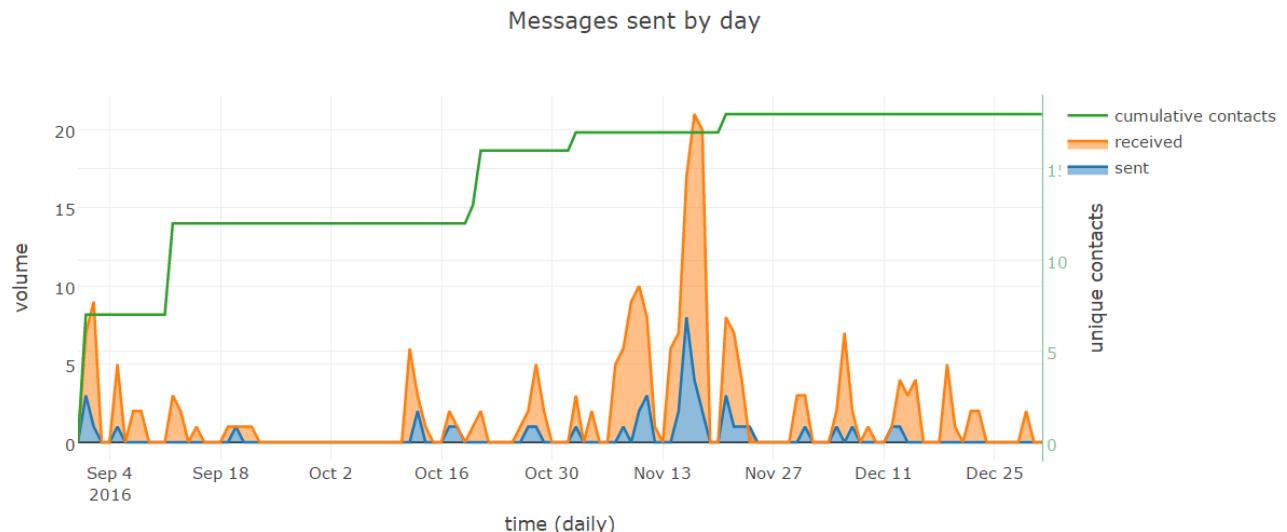
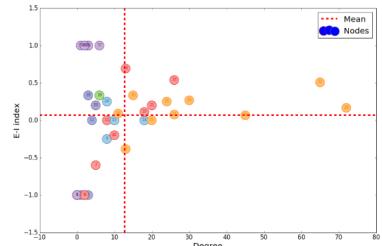


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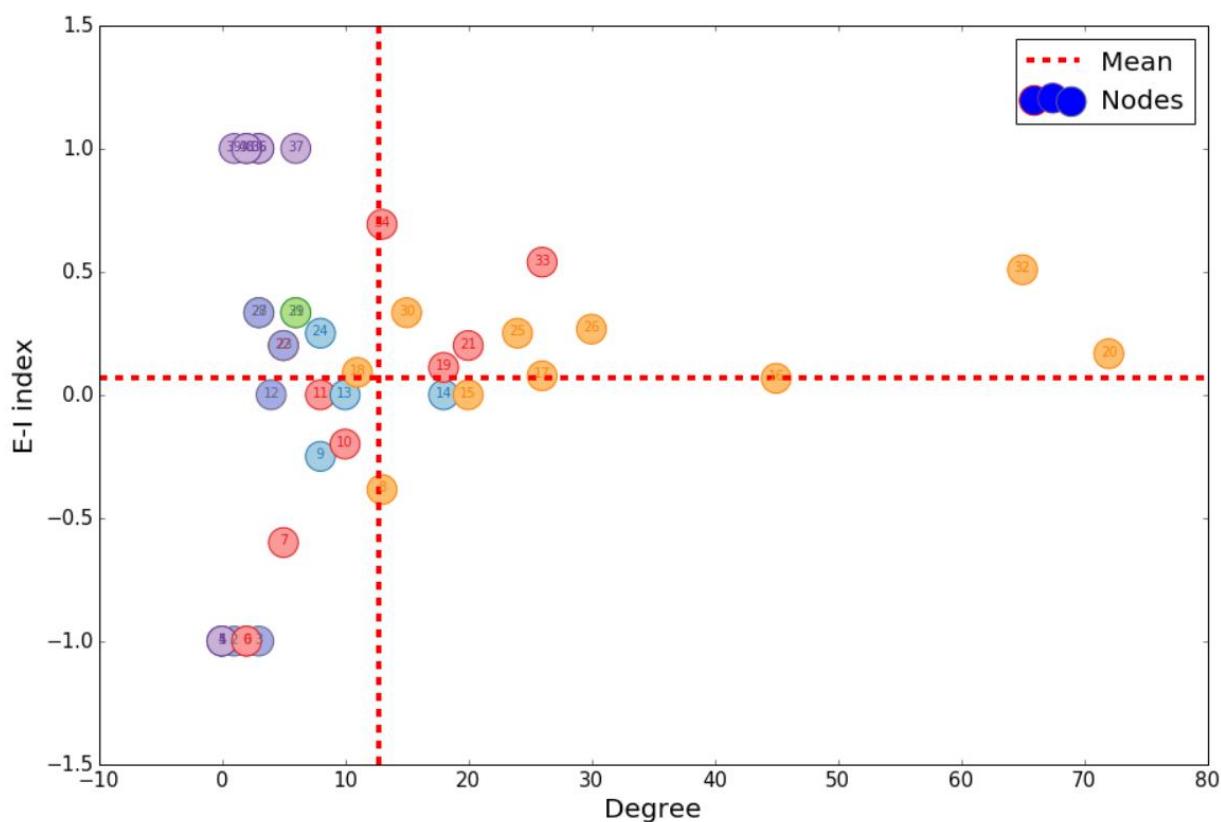
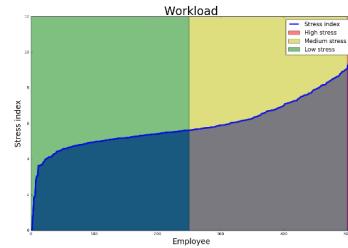
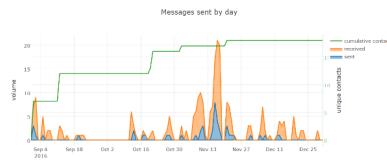


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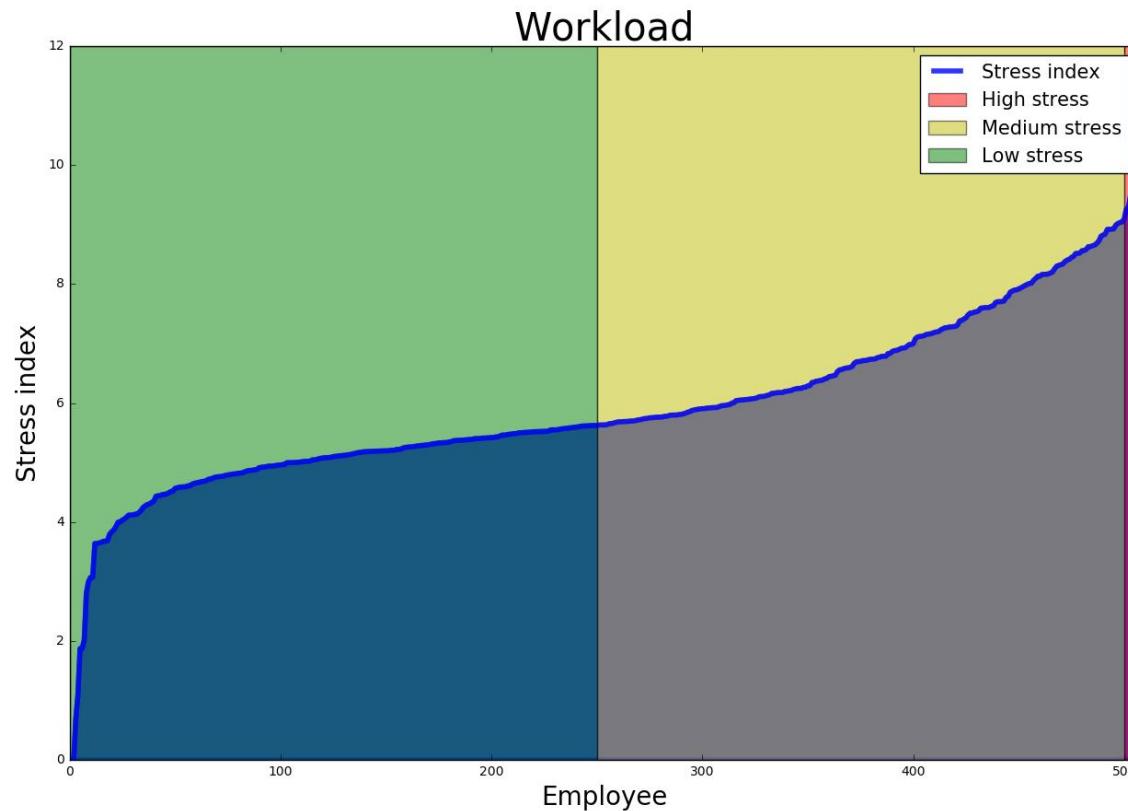
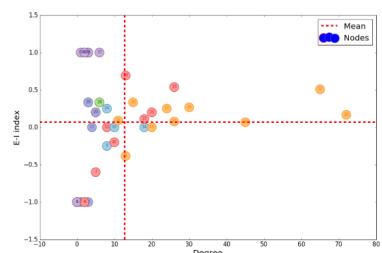
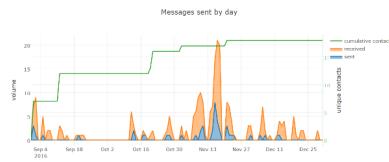


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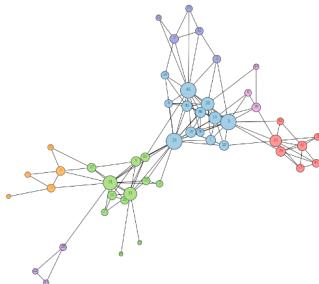
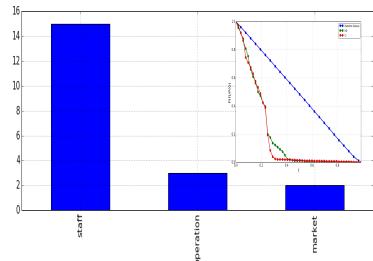
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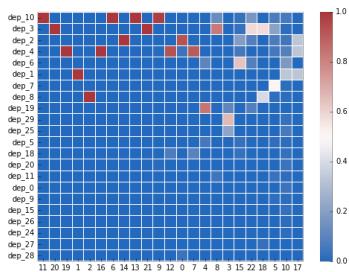
ANALYSIS



ANALYSIS



Structure and processes

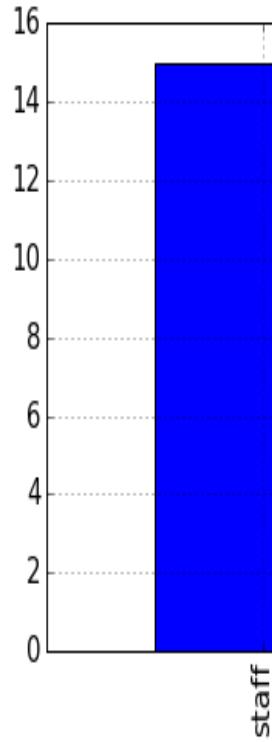
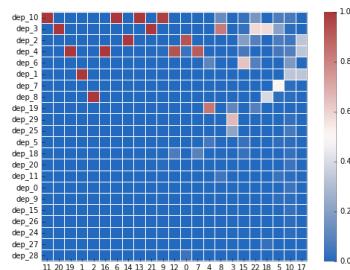
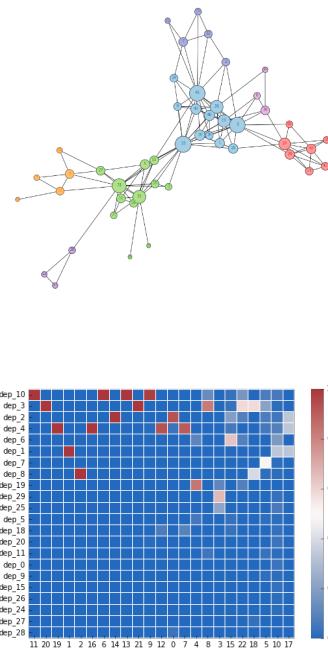


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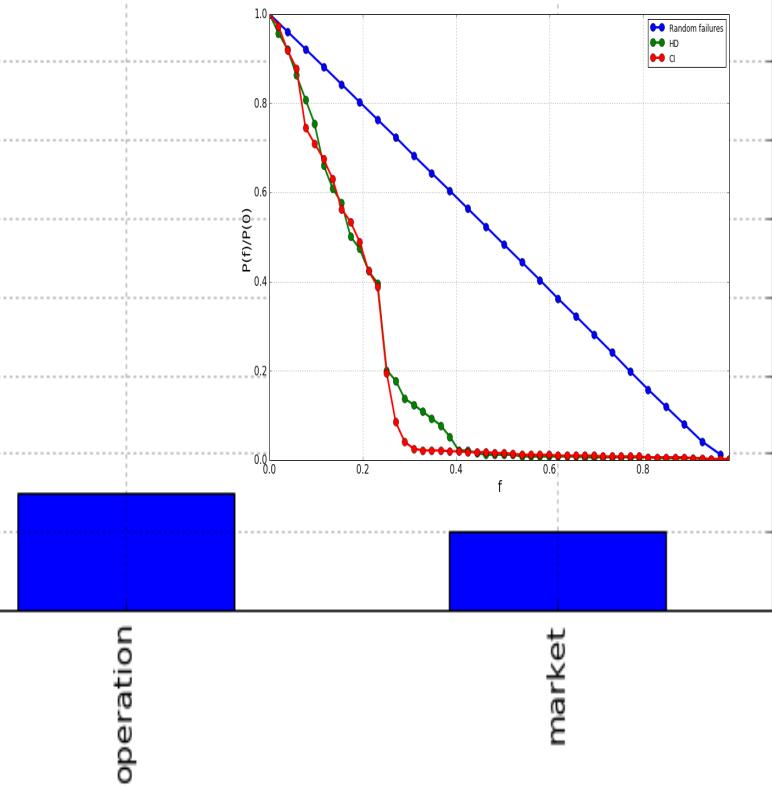
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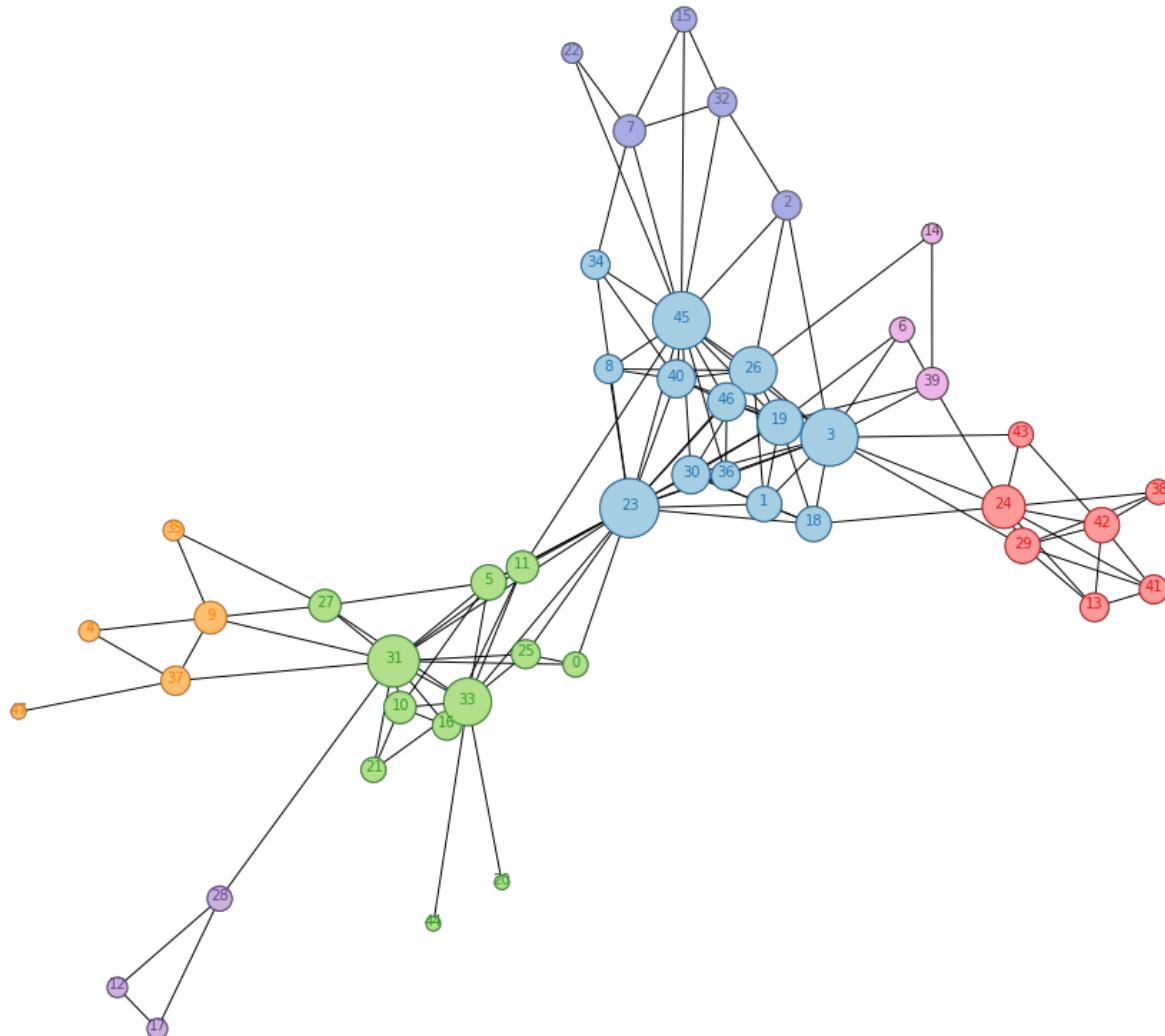
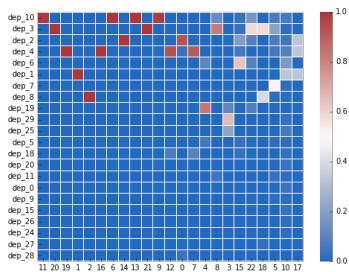
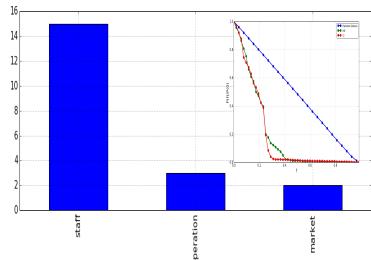
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operation

market

ANALYSIS



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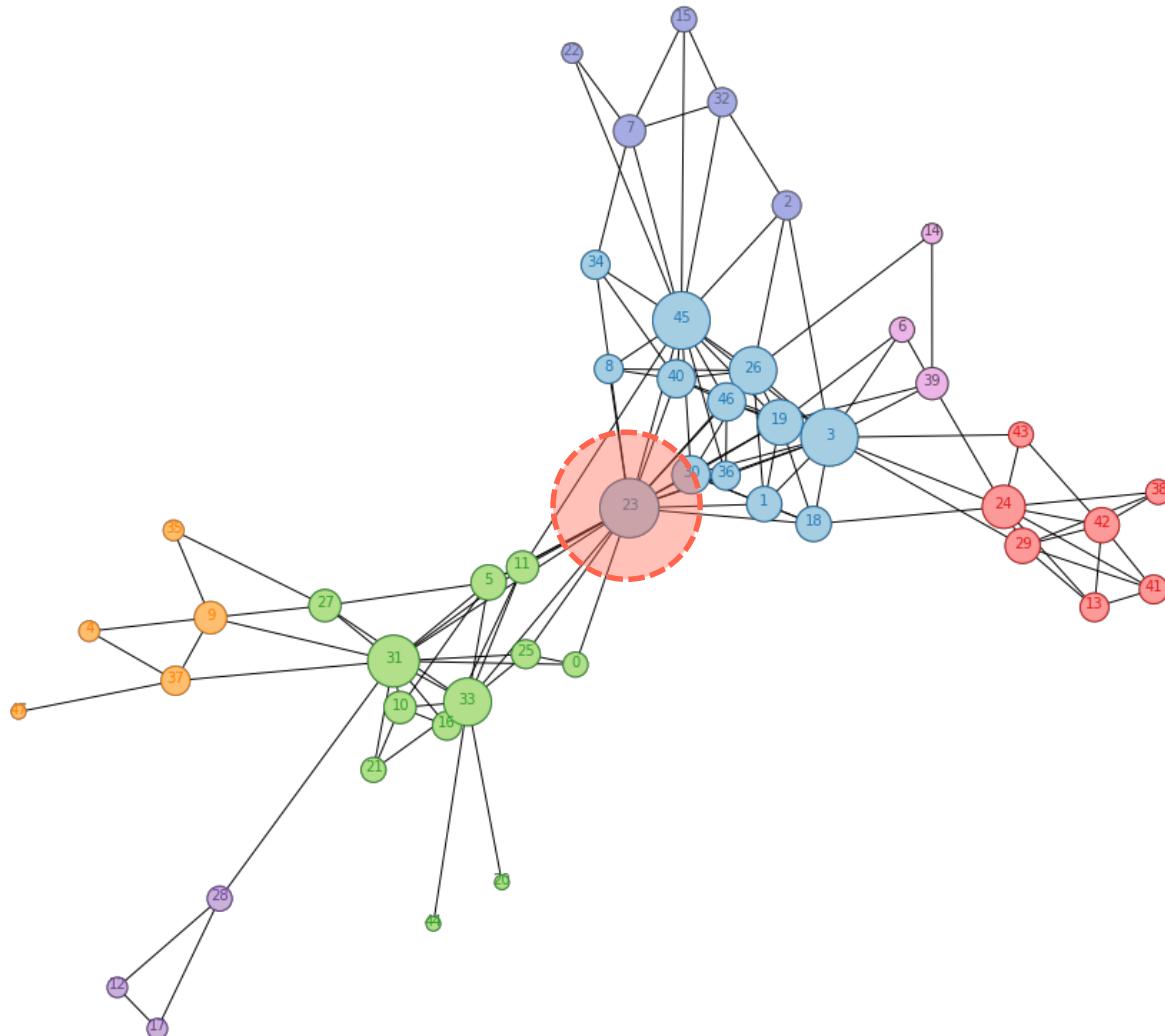
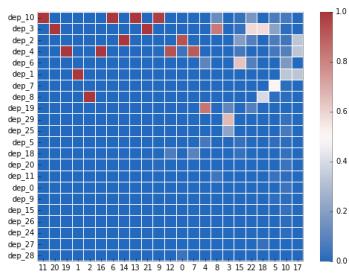
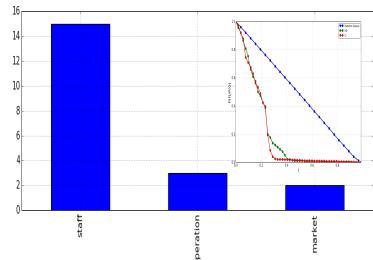
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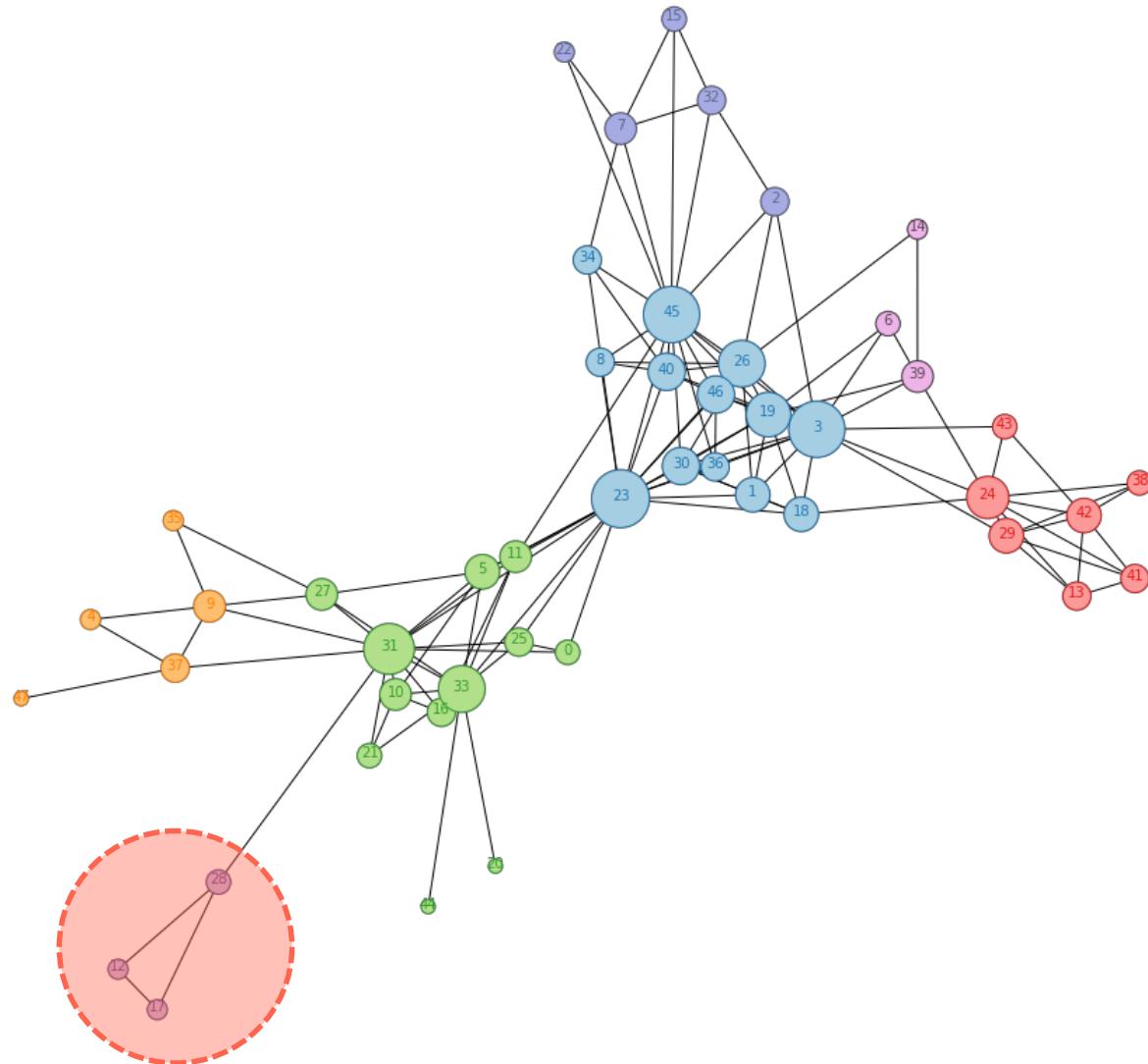
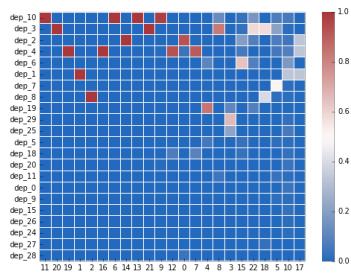
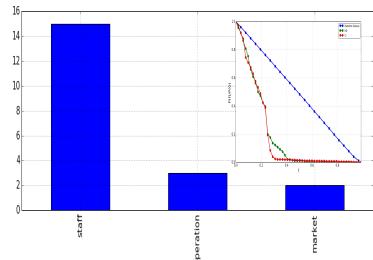


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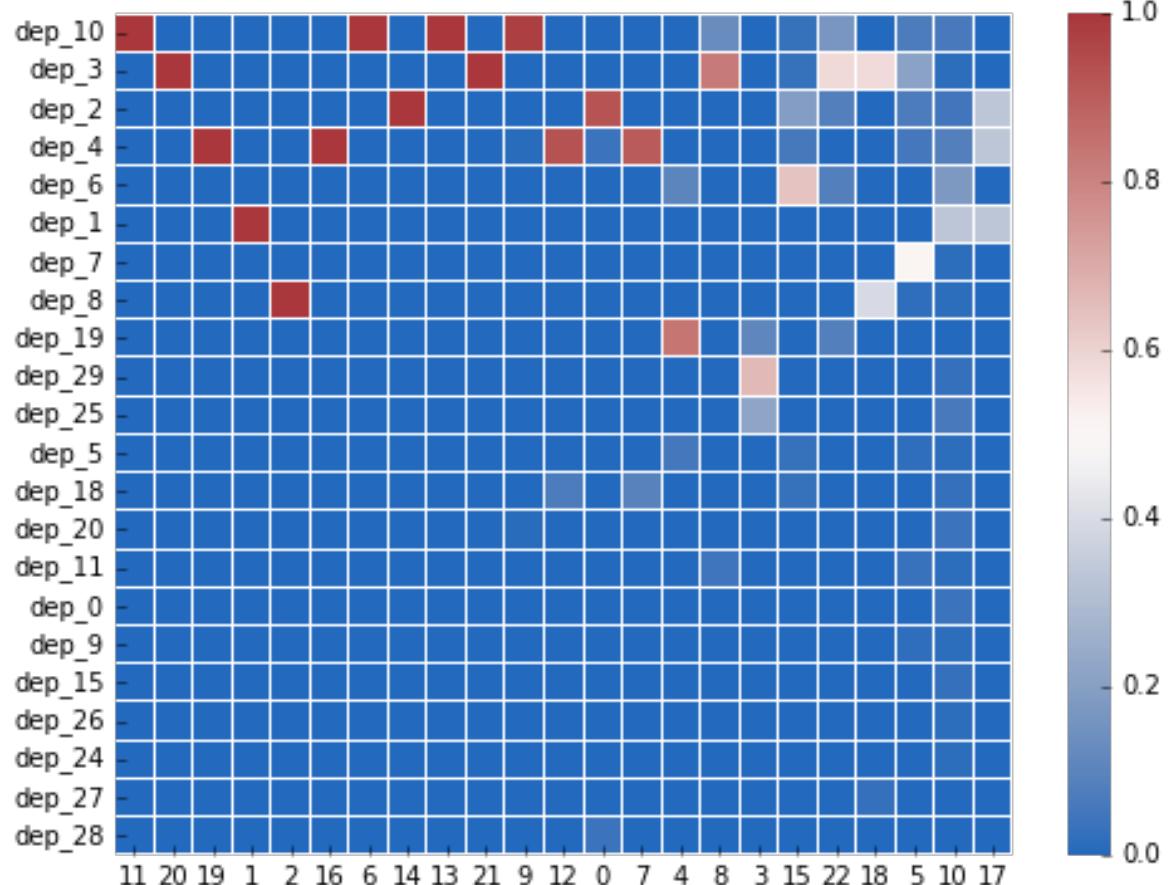
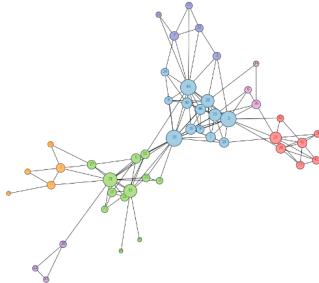
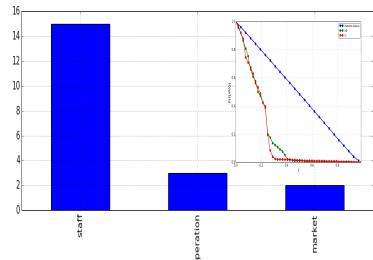


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ANALYSIS



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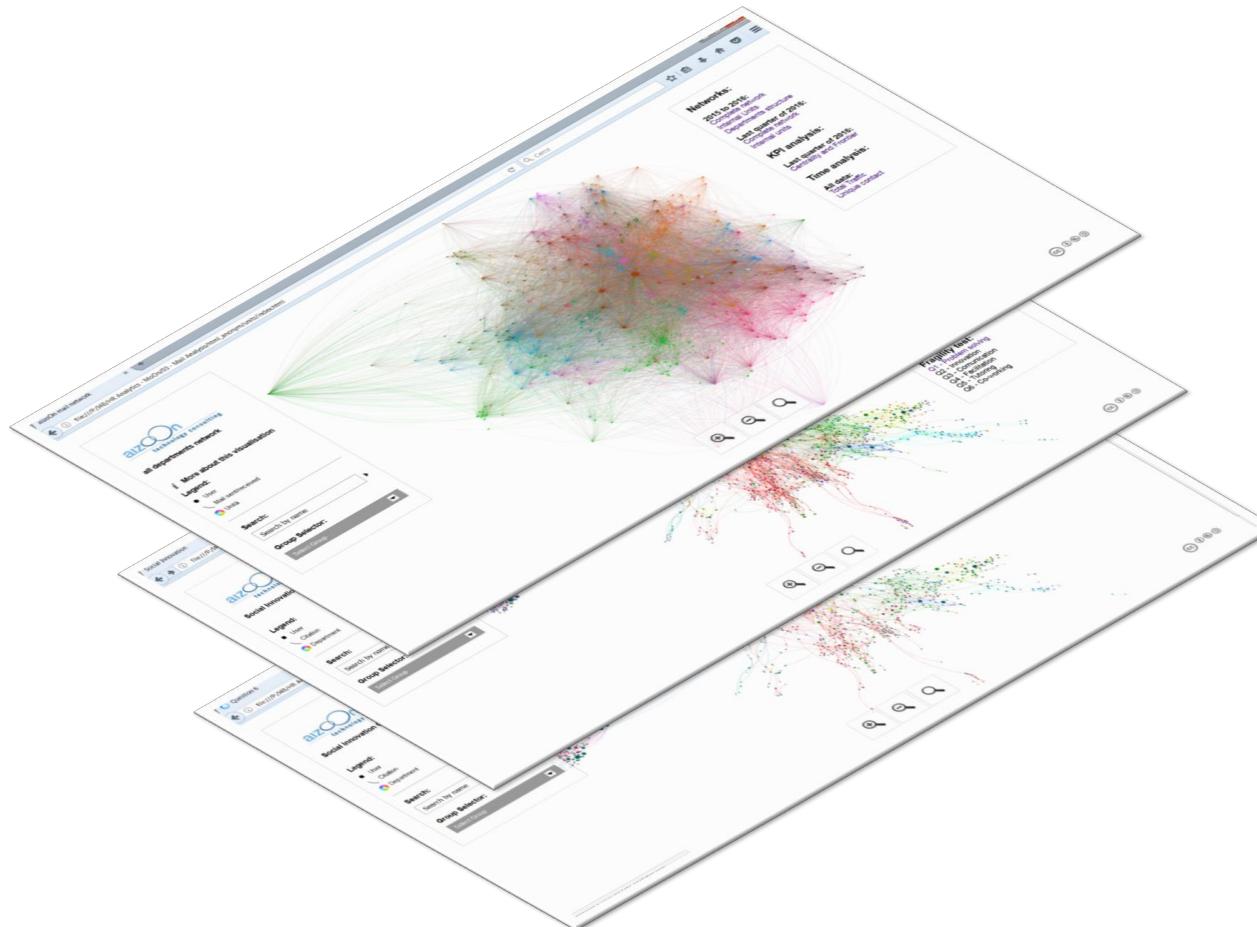
INTEGRATION

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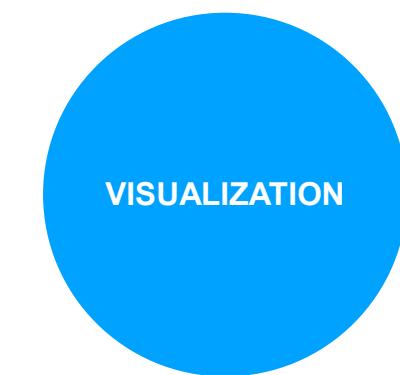
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- Dashboard
- Dashboard
- Survey Analytics
- Registry
- Network
- Settings

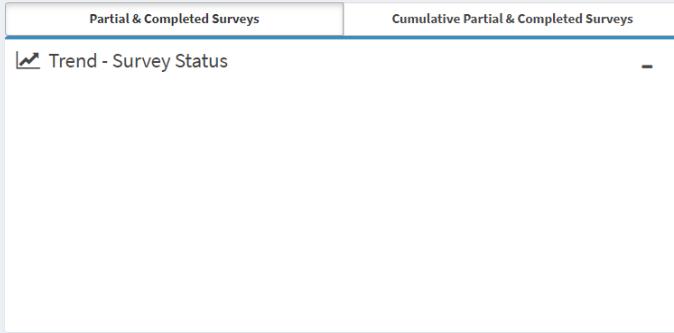
Filters: No Filters Applied

Response Statistics

Status	Progress	Percentage	Number
Complete		93%	491
Not started		5%	24
Partial		2%	13

Partial & Completed Surveys | Cumulative Partial & Completed Surveys

Trend - Survey Status



Question Statistics

Question	KPI	Progress	Percentage	Number
Q1-Problem Solving	Normal		31%	163
Q1-Problem Solving	Isolated		22%	116
Q1-Problem Solving	Trained		22%	116
Q1-Problem Solving	Problem solver		16%	85
Q1-Problem Solving	Hub		9%	48

Word Cloud Top 10 Departments



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Filters: No Filters Applied

528 Q1-Problem Solving 528 Q2-Innovation 528 Q3-Facilitation

Fragility problem solving

KPI From best to worst: Keystone, Bypass, Assistant and Peripheral

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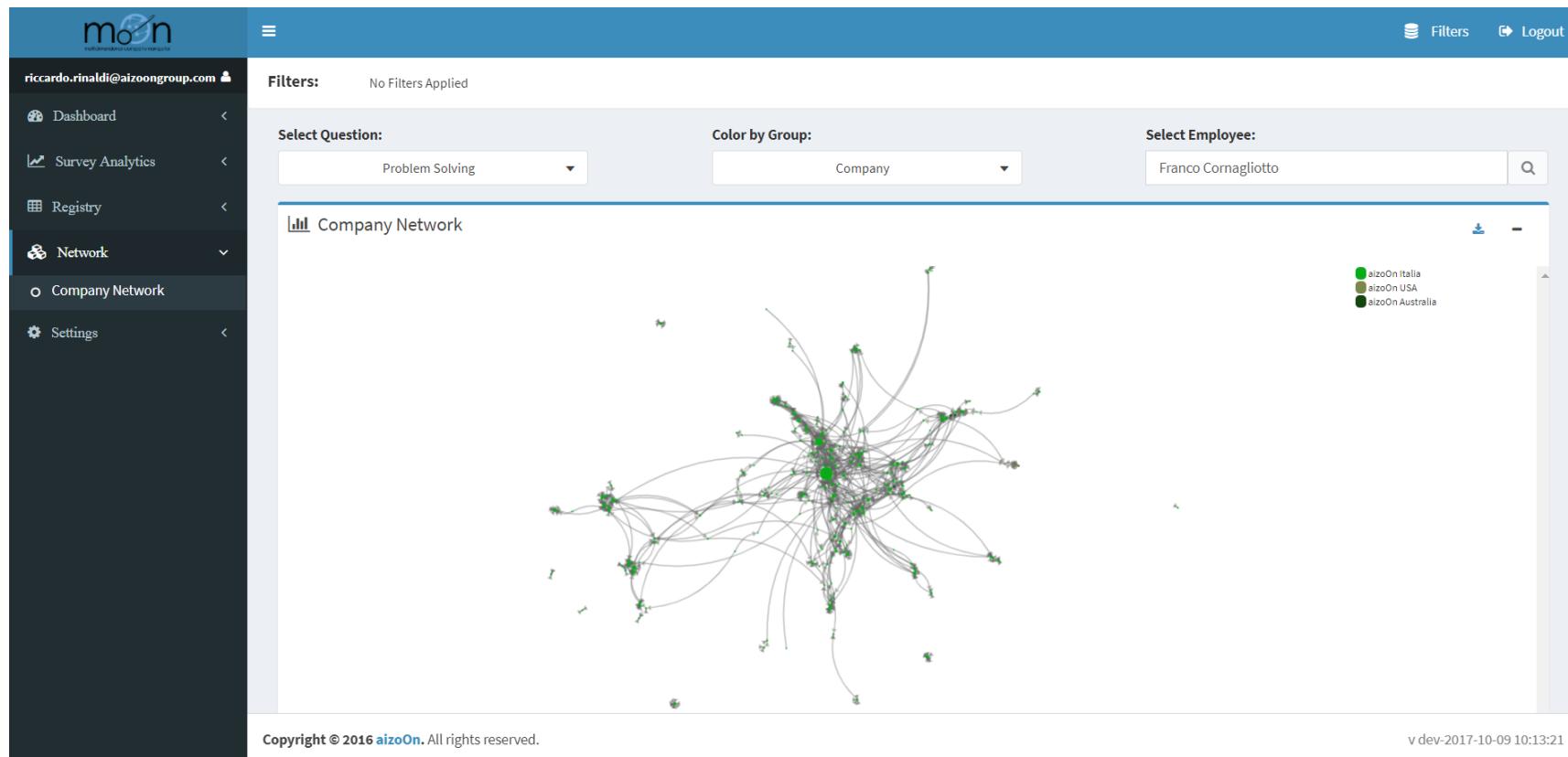
A screenshot of the moOn dashboard. On the left is a dark sidebar with navigation links: Dashboard, Survey Analytics (selected), Fall-Off, Questions, Fragility, Personal KPI, Registry, Network, and Settings. The main area has a blue header with the user's email and a "Logout" button. Below the header, it says "Filters: No Filters Applied". There are three blue boxes labeled "528 Q1-Problem Solving", "528 Q2-Innovation", and "528 Q3-Facilitation", each with a question mark icon. A section titled "Fragility problem solving" contains a bubble chart on a grid. The chart has four quadrants: "Assistant" (top-left), "Keystone" (top-right), "Bypass" (bottom-right), and "Peripheral" (bottom-left). The bubbles are clustered in the "Keystone" and "Bypass" areas. Below the chart, text reads "KPI From best to worst: Keystone, Bypass, Assistant and Peripheral". At the bottom of the page, there is copyright information and a timestamp.

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CONCLUSIONS



- Simple sources of information and data can help us know and manage our organization better.
- Multidimensionality gives us the opportunity to scrutinize our organization on various levels, from the formal to the informal, and compare them to the official structures and hierarchies.
- Fine and coarse grained data-driven analytics give us ready-to-use information from single employees to the whole business.
- All information can be translated in easy-to-interpret visualizations for all users.

THANK YOU



multidimensional company navigator



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