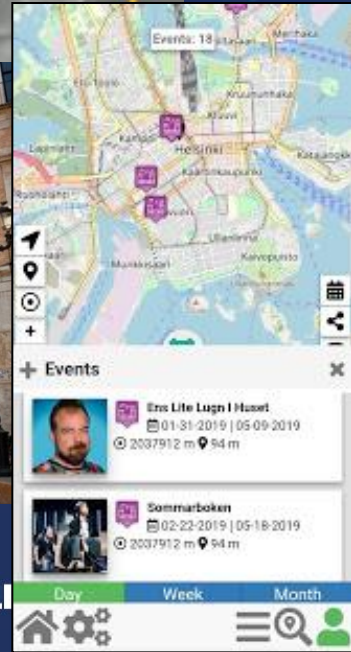




www.snap4city.org
www.snap4solutions.org



City Users' Services, Tourism Management and Safety, Digital Twin



DIGITAL TWIN SOLUTIONS TO SETUP SUSTAINABLE DECISION SUPPORT SYSTEMS AND BUSINESS INTELLIGENCE



UNIVERSITÀ
DEGLI STUDI
FIRENZE

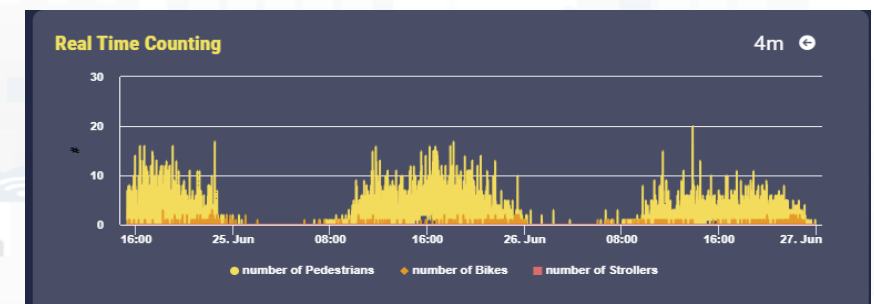
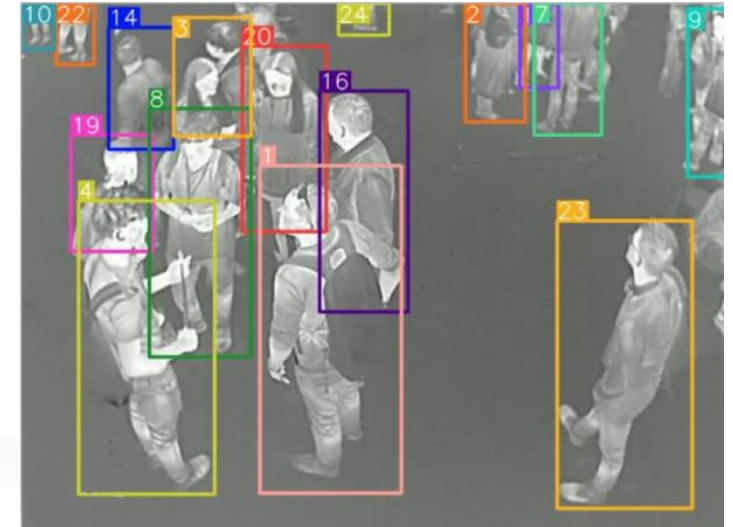
DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB



City User Behaviour/services, Tourism and Safety

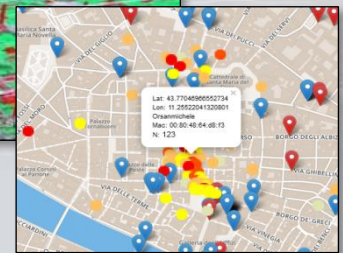
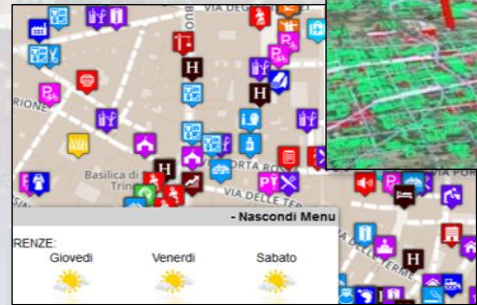
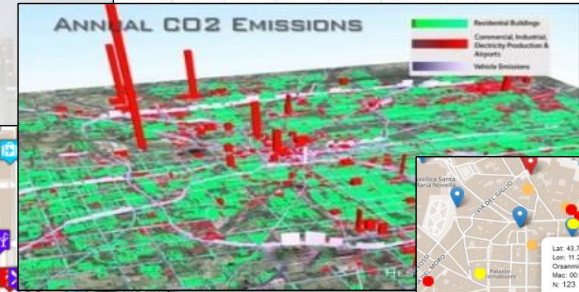
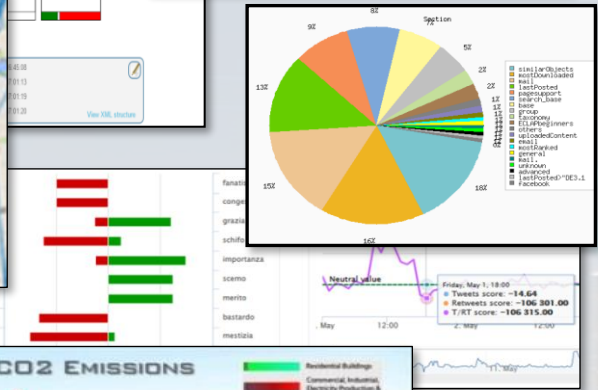
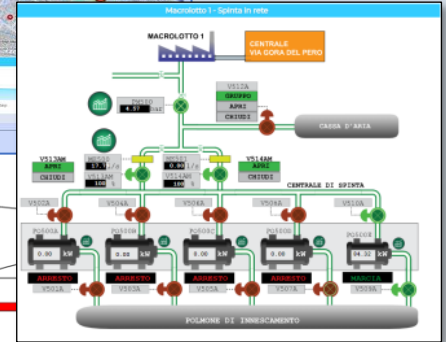
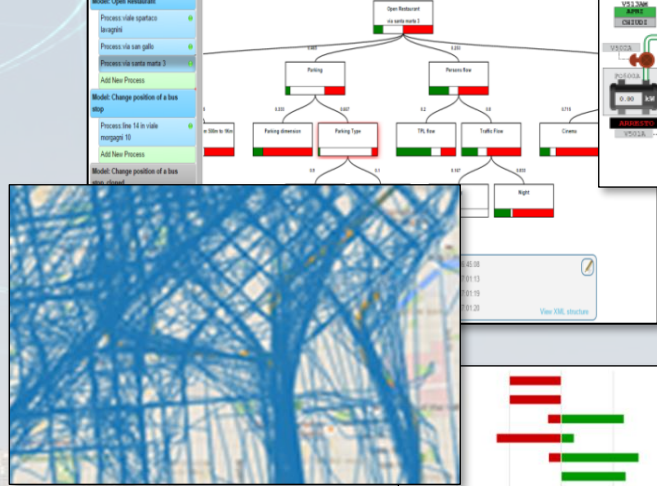
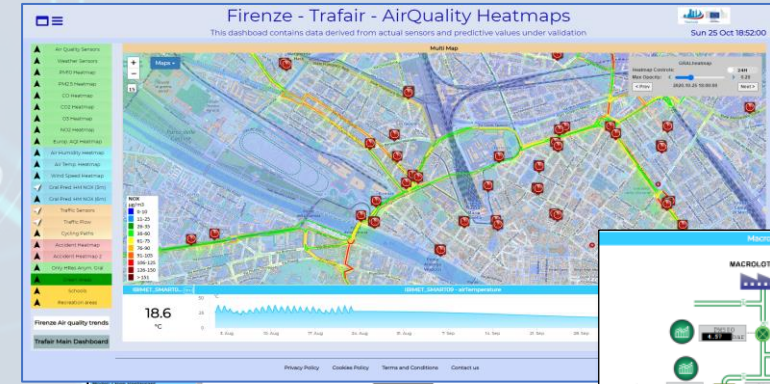
- **Goals:**
 - Improve Quality of Life and quality of services,
 - Over tourism mitigation, sustainability
 - Costs reduction of services
 - Improve accessibility to services: citizens, Tourists, commuters, etc.
 - Improve Security/Safety of city users
- **People Flow Analysis / Management:** in/out-door, retail, attractions
 - Counting, tracking, Flows, ODM, sentiment, etc.,
 - multiple sources: thermal & TV cameras, radar sensors, PAX sniffers, mobile data, ...
 - Data and/or OD matrices from: Wi-Fi, traffic data, mobile phone data
 - **Suggestions:** info Tourism, digital signages, engagement, ..
- **Tourists Flows & Retail Management:** predictions of presences, services' reputations, suggestions on second offer, over-tourism, notifications, early warning,
- **KPI:** 15 MinCityIndex, energy vs people, over-tourism, accepted suggestions, precision
- **Mobile App:** final users services/informing and operators
 - Info Tourism, people flows, info mobility, sharing, ...
 - Participation, engagement, ..
- **Participatory:** problem reporting, ticketing, etc.
- **Integration of any kind:** env/weather, mobility, ticketing, presences, POI, ..



Data Driven Decision Support



- Decision Support system
- Assessment / Strategies
- Data Rendering,
 - visual analytics, business intel..
- Data Analytics, ML, AI
- Data aggregation, Storage, indexing
- Data Ingestion





Digital Twin Solutions for Sustainability

OPERATION AND PLAN - CONTROL ROOMS - DECISION SUPPORT SYSTEMS - WHAT-IF ANALYSIS - OPTIMIZATION - APPLICATIONS

CONTROL AND PLAN

MOBILITY AND TRANSPORT

SMART ENERGY AND SMART BUILDING

ENVIRONMENT AND WASTE MANAGEMENT

CITY USER'S SERVICES AND TOURISM MANAGEMENT

- DEVELOPMENT ENVIRONMENT AND METHODOLOGY
- VISUAL PROGRAMMING, ML, AI, HPC
- TRAINING COURSES
- LIVING LABS
- GUI CUSTOM STYLES
- FULL APPLICATIONS, DASHBOARDS AND VIEWS
- MOBILE APPS



VISUAL ANALYTICS - SYNOPTICS - GRAPHICAL WIDGETS - ANALYTICS - BUSINESS INTELLIGENCE - SIMULATIONS

DASHBOARDS, WIDGETS TEMPLATES

PREDICTION - ANOMALY DETECTION - CLUSTERING - ROUTING - SENTIMENT NLP - TRAFFIC FLOW - PEOPLE FLOWS - SDG

15 MIN CITY INDEX - KPI - HEATMAPS - ORIGIN DESTINATION - ETC...

API - MICROSERVICES - GIS - BPM

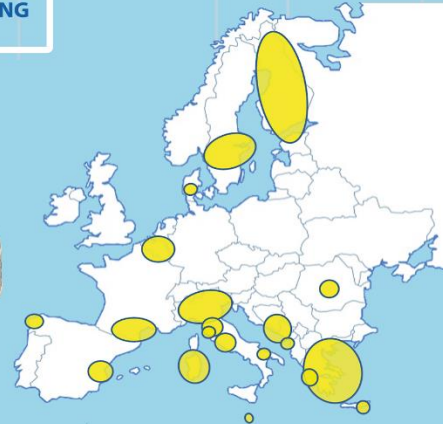
VIDEO - REPORTS - MAPS - 3D ...

EXPERT SYSTEM, KNOWLEDGE BASE SEMANTIC REASONING SMART DATA MODEL IOT DEVICE MODELS, STORAGE

BIG DATA ANALYTICS, ARTIFICIAL INTELLIGENCE EXPLAINABLE AI, MACHINE LEARNING, GENERATIVE AI OPERATIVE RESEARCH, STATISTICS

VISUAL PROGRAMMING, ADAPTERS DATA FLOWS, WORKFLOWS PARALLEL DISTRIBUTED PROCESSING DATA DRIVEN

FULL INTEROPERABILITY, ANY: DATA, BROKERS, NETWORKS AND VERTICALS



Powered by FIWARE

FREE TRIAL

PEN Test Passed

EU GDPR COMPLIANT

SNAP4 Appliances and Dockers Installations

EUROPEAN OPEN SCIENCE CLOUD

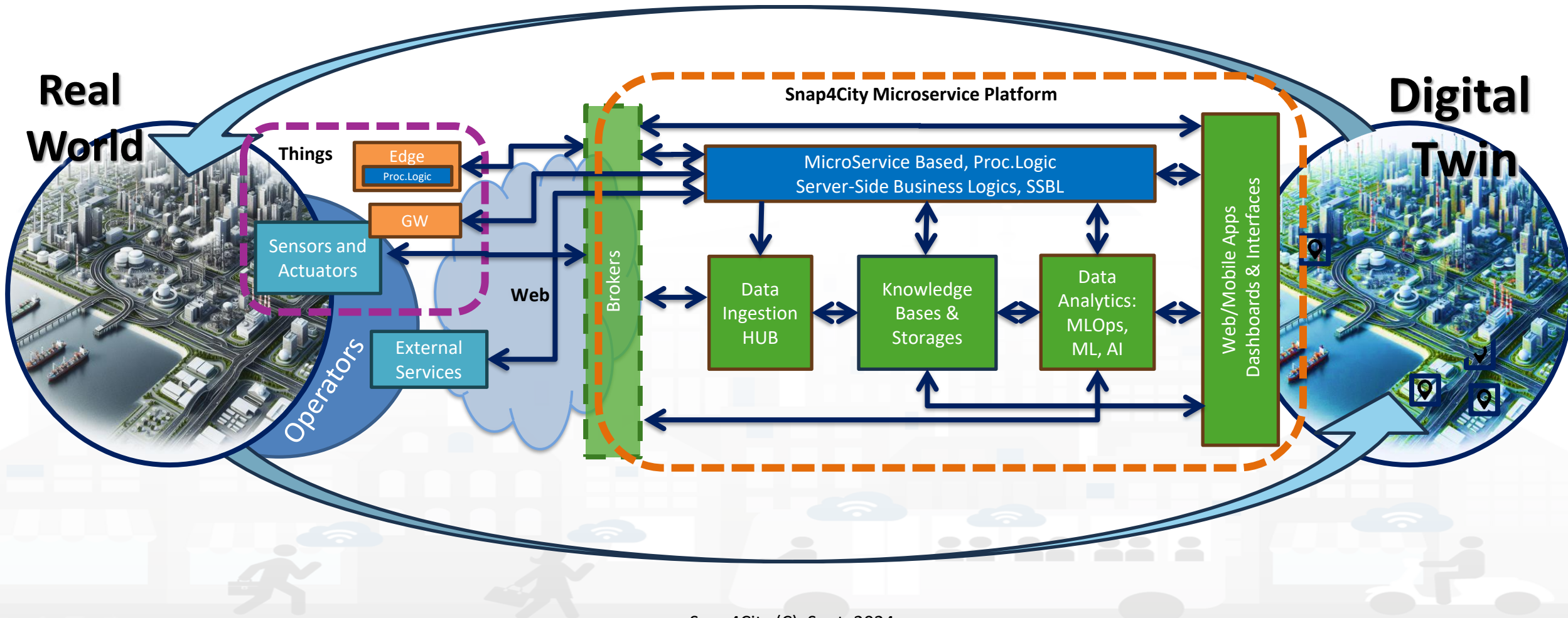
Node-RED

JS Foundation

E015 digital ecosystem

NVIDIA

Digital Twin Development Platform

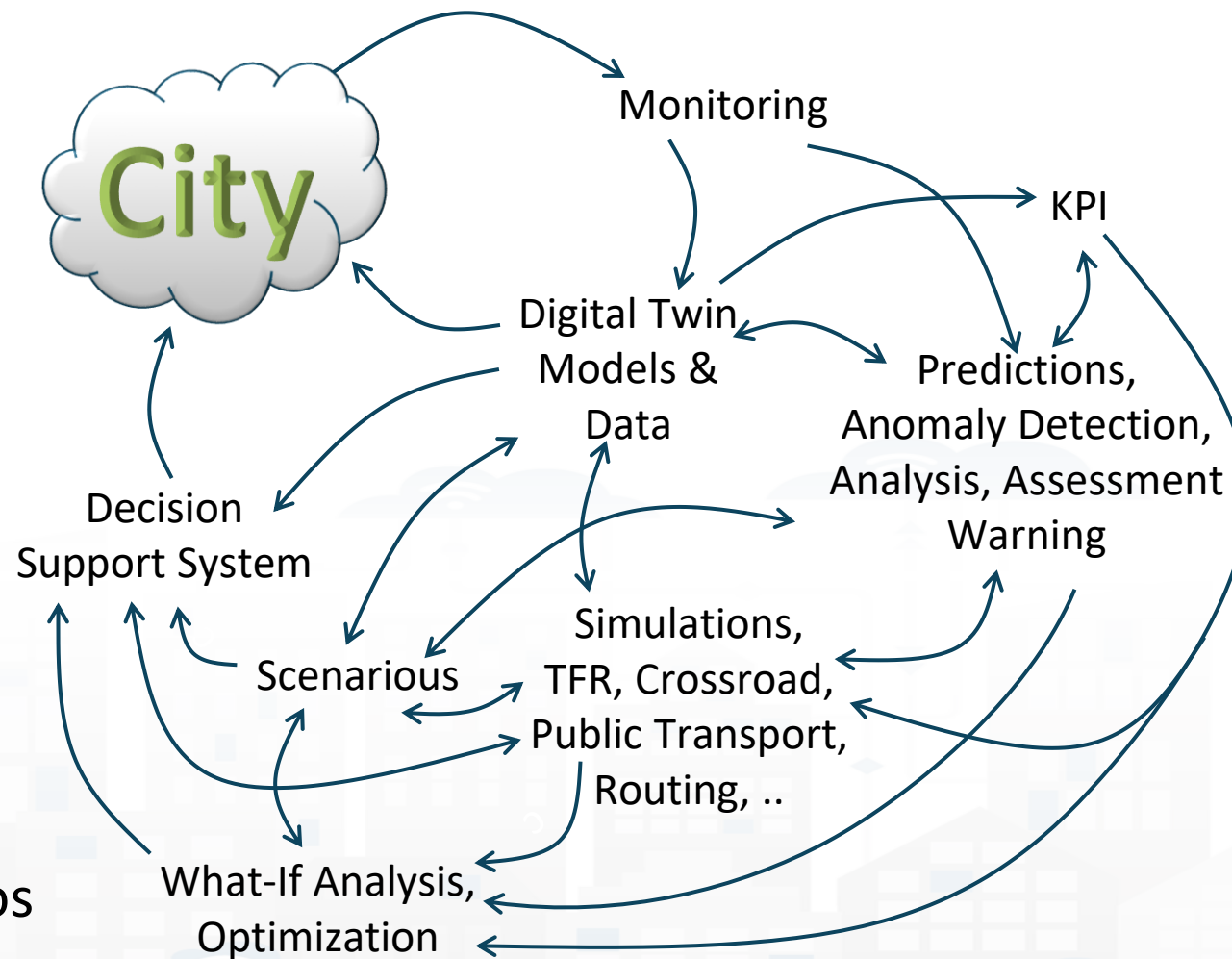


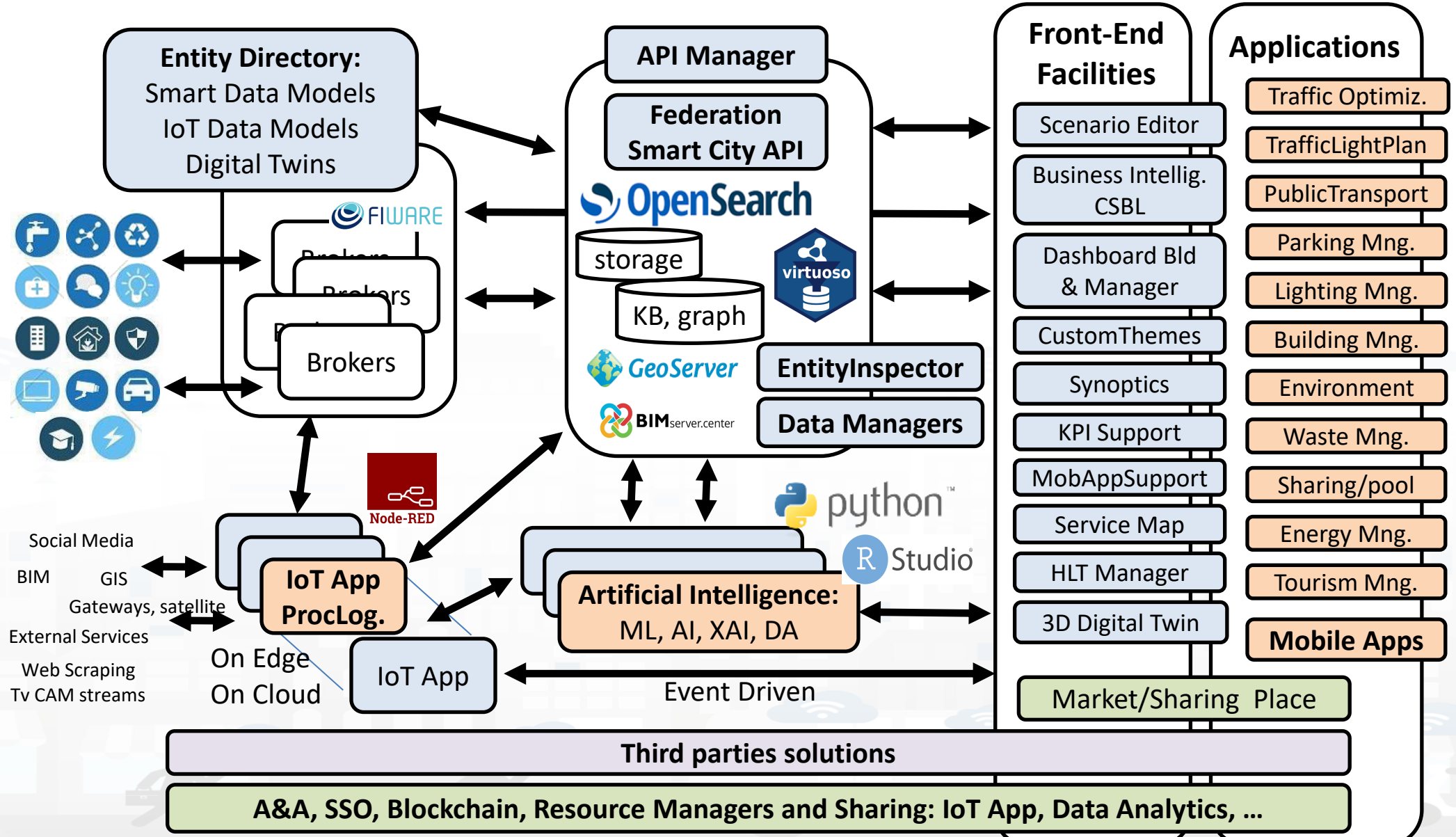
- **Controlling Status: management, and operational**

- Monitoring via KPI
- Predictions vs KPI
- Anomaly detection
- Neuro-Symbolic analysis
- Risk assessment
- Early warning on critical conditions

- **Making plan: tactic and strategic, medium and long range, micro/macro**

- Simulation & optimization
- Generative AI Prescriptions, scenarios
- Resilience to Unexpected unknowns
- What-if analysis wrt scenarios





TOP

Monitoring and control

FROM CITY DASHBOARD TO APPLICATIONS

DATA GATHERING AND CITY DATA KNOWLEDGE MANAGEMENT

FORGING & MANAGING OPEN AND FLEXIBLE WITH MODULAR MAP

IOT APPLICATIONS VS IOT EDGE DEVICES

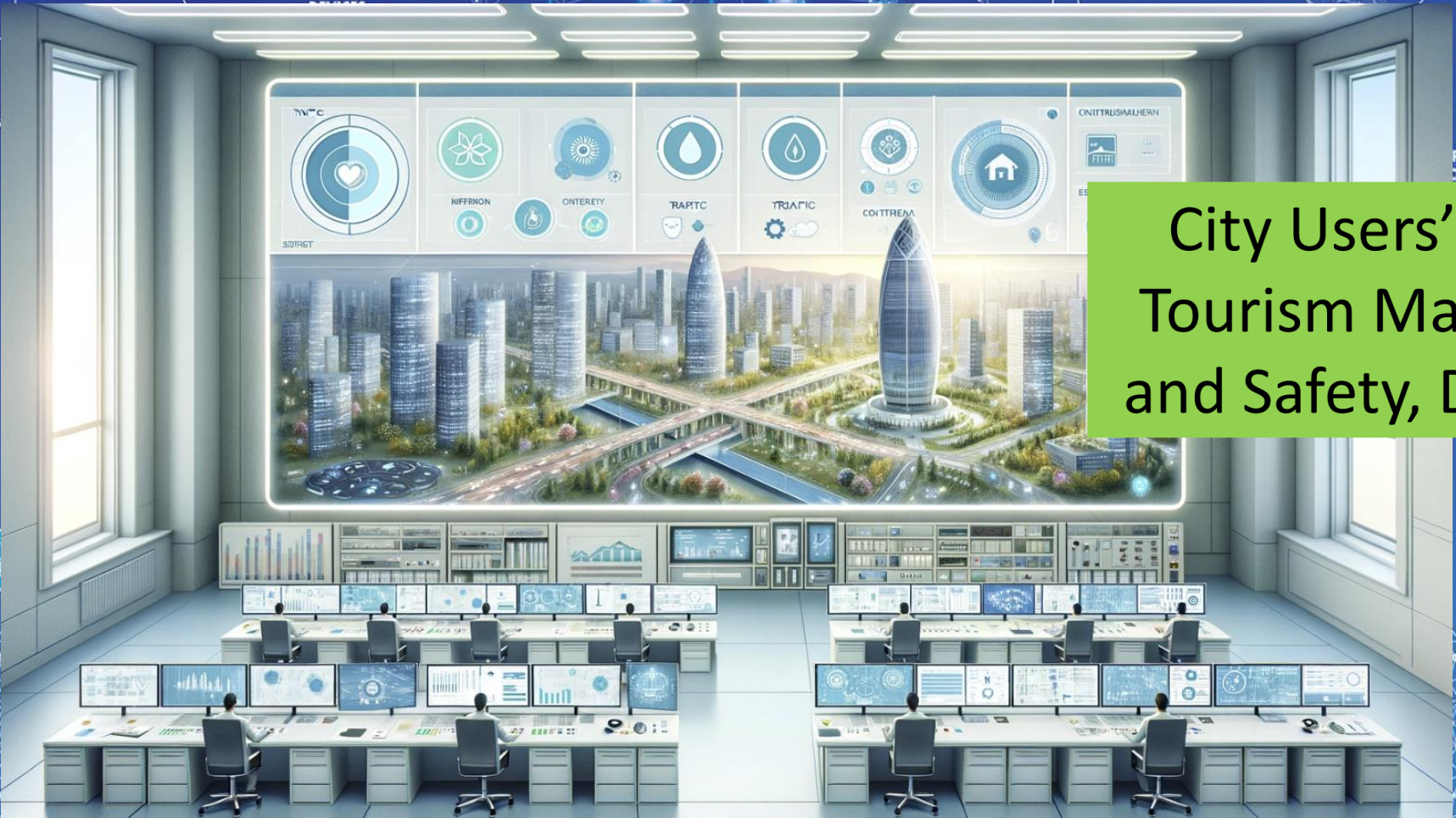
SNAP4CITY FOR BEGINNERS

SNAP4CITY ARCHITECTURE AND SYSTEM. OPEN TO DEVELOPERS AND STAKEHOLDERS

TWITTER VIGILANCE: SOCIAL MEDIA ANALYSIS

SNAP4CITY AND KM4CITY PROJECTS

HOW TO ADOPT SNAP4CITY, AND OUR ROADMAP

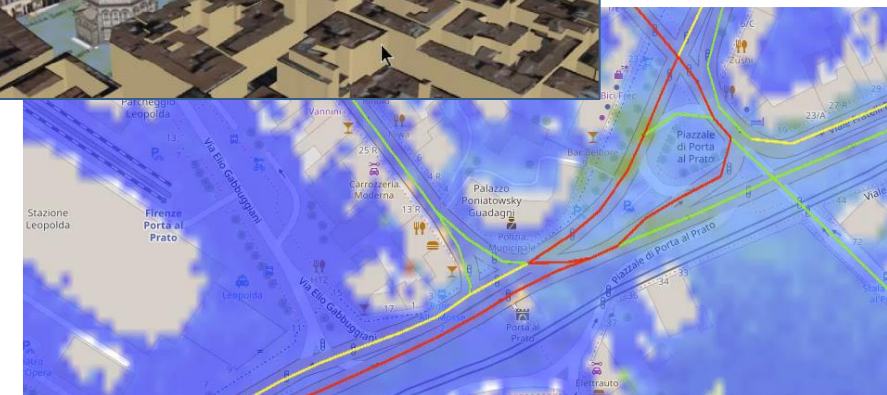
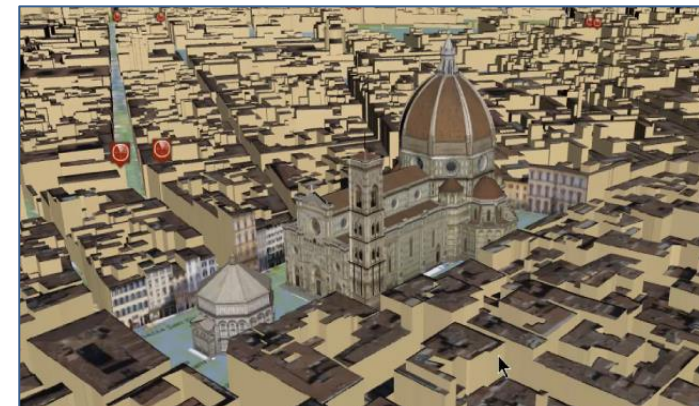


City Users' Services, Tourism Management and Safety, Digital Twin

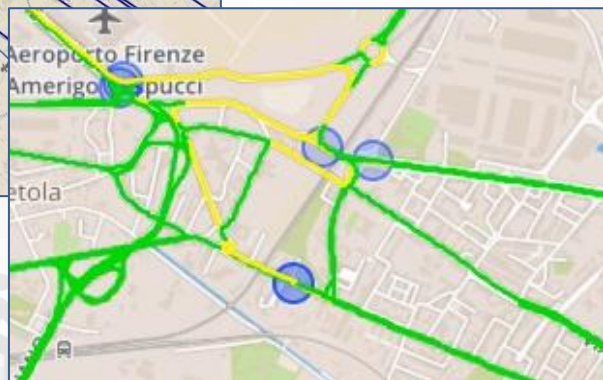
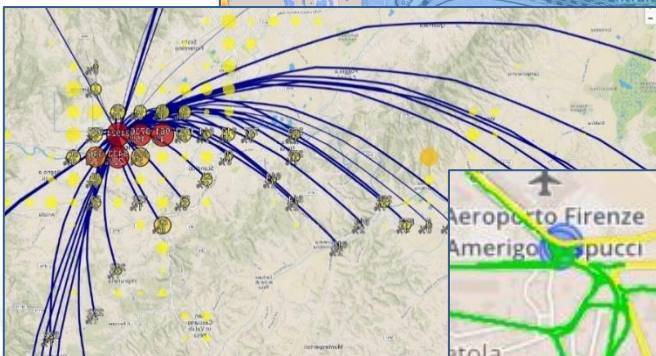
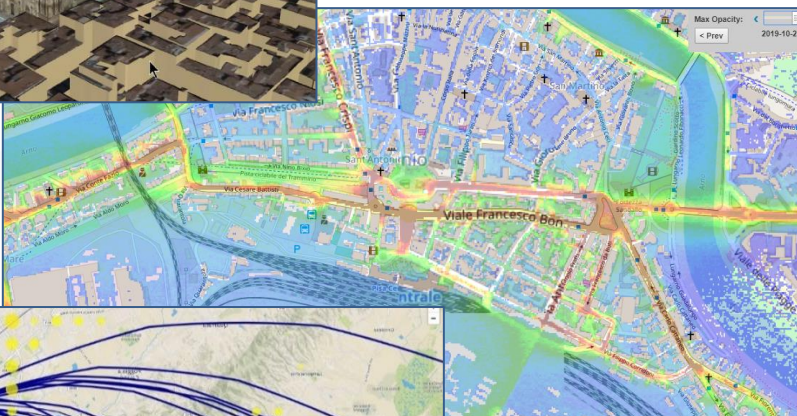
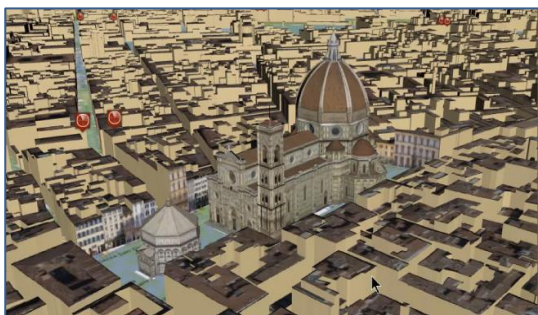
100% OPEN SOURCE



- **Controlling Status:** management, and operational
 - Monitoring via KPI
 - Computing predictions and KPI
 - Anomaly detection, Early warning
 - Control Rooms, situation rooms
- **Reacting: Computing in real time**
 - Changing semaphore maps
 - Changing Dynamic signage
 - Real time Info Mobility
 - User engagement via Mobile Apps
 - What-if analysis
 - etc.,



Smart City Digital Twin City Digital Model with...



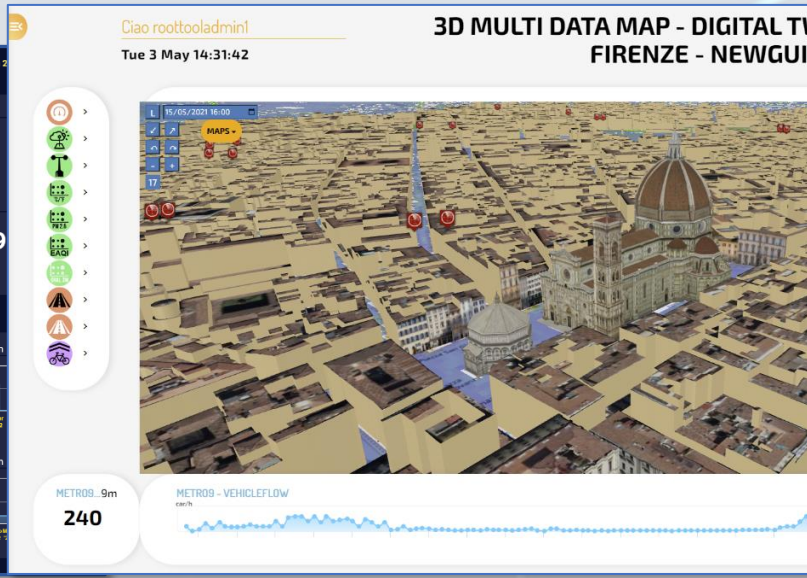
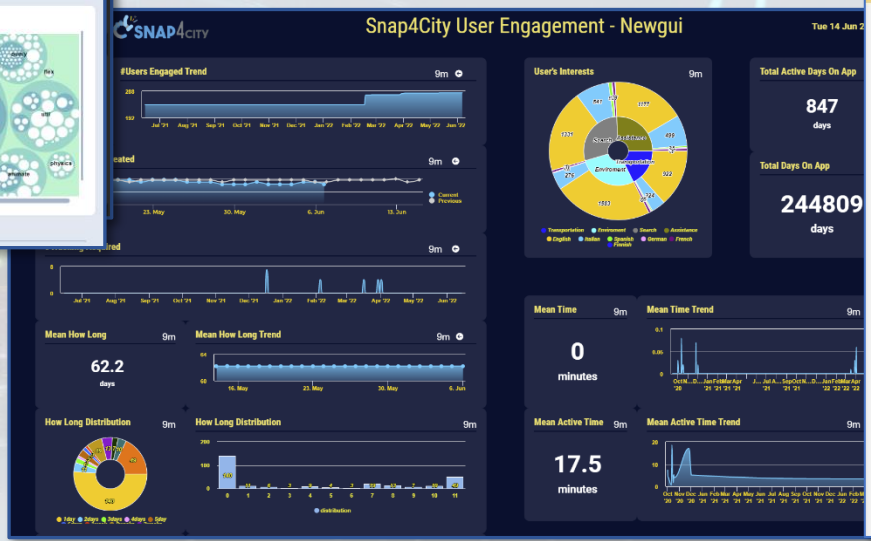
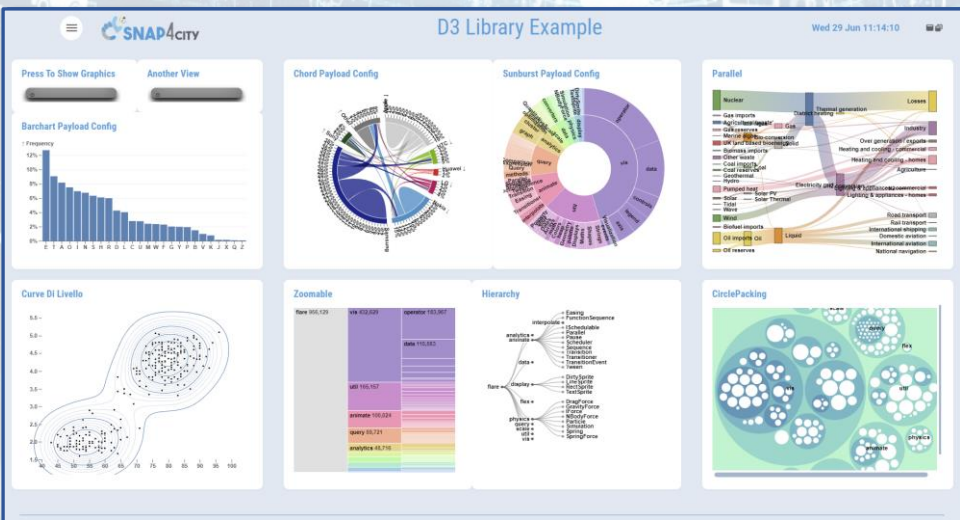
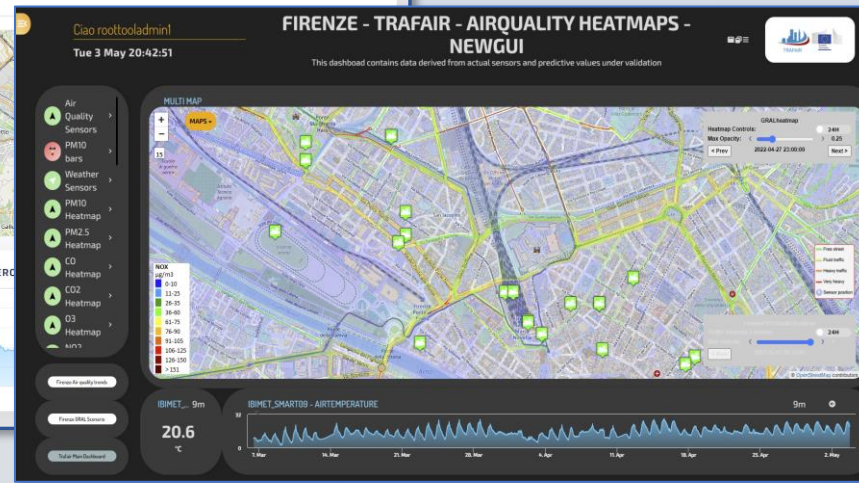
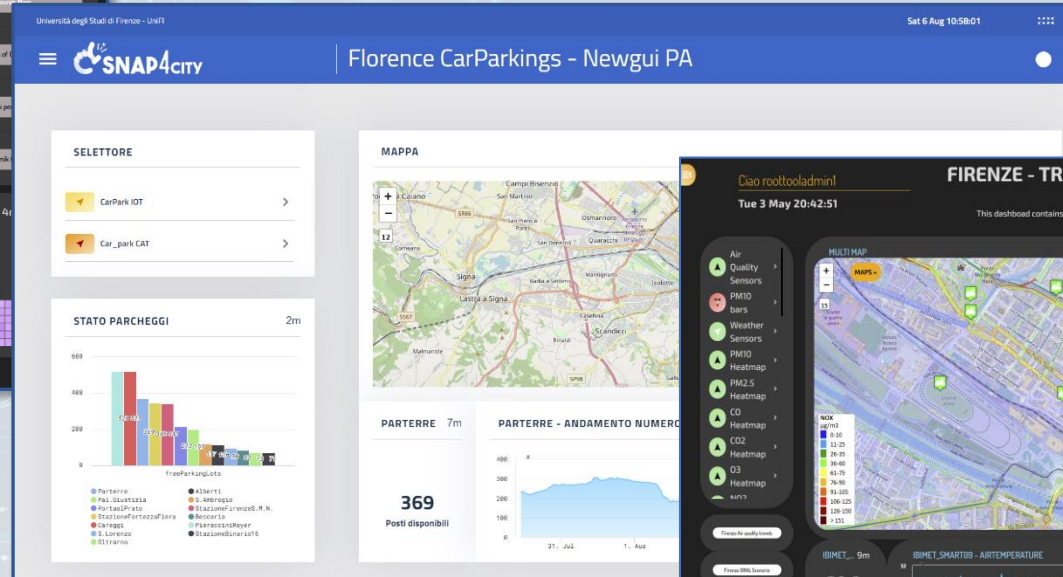
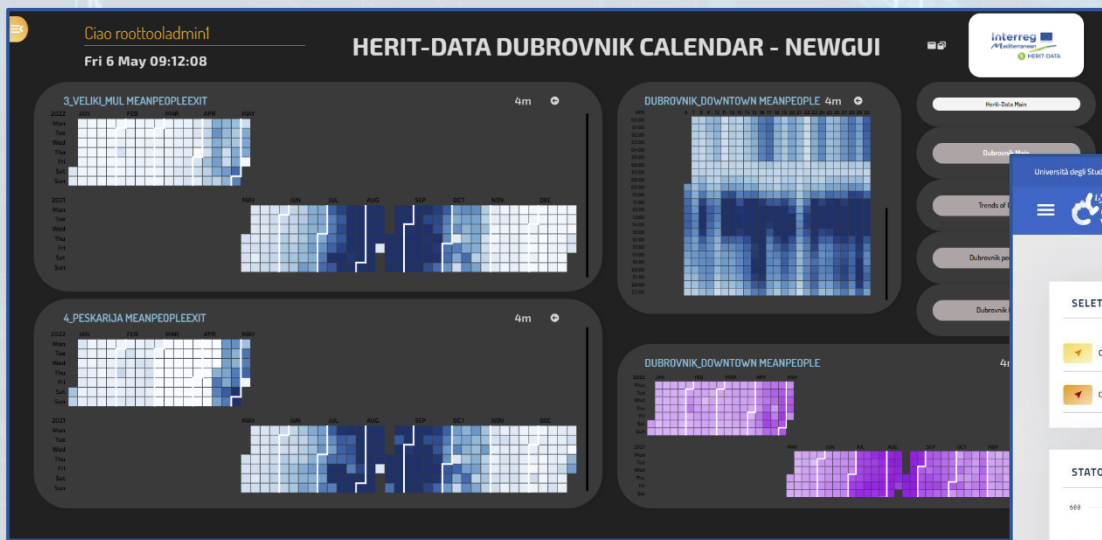
- Intuitive platform
- Any Data TYPE, any data source, any protocol
- Data storage seamless
- Data analytics → artificial intelligence, AI/XAI
- Data Ethics, AI Ethics, GDPR
- Interactive Data Representation, any kind
- Key Performance Indicators, any kind
- What-IF analysis – Simulation, prediction, 2D/3D
- Micro, Meso e macro scales
- Operation, planning tactic and strategic / optimization
- Collaborative and shared representation
- Sustainable, shared, open source 100%



Complex and heterogeneous information, interoperability

- GIS, ITS, AVM, IoT, BIM, CKAN, etc.
- Satellite services
- MaaS, last-mile delivery HUBs
- etc.

Different Themes



New styles/themes can be developed by specializing a few files from open source

<https://www.snap4city.org/793>

Control Room



Key Performance Indicators, KPI



| Air Quality Directive | | | | WHO guidelines | |
|-----------------------|---------------------------|--|---|---------------------------|---|
| Pollutant | Averaging period | Objective and legal nature and concentration | Comments | Concentration | Comments |
| PM _{2.5} | One day | | | 25 µg/m ³ (*) | 99 th percentile (3 days/year) |
| PM _{2.5} | Calendar year | Target value, 25 µg/m ³ | The target value has become a limit value since 1 January 2015 | 10 µg/m ³ | |
| PM ₁₀ | One day | Limit value, 50 µg/m ³ | Not to be exceeded on more than 35 days per year. | 50 µg/m ³ (*) | 99 th percentile (3 days/year) |
| PM ₁₀ | Calendar year | Limit value, 40 µg/m ³ (*) | | 20 µg/m ³ | |
| O ₃ | Maximum daily 8-hour mean | Target value, 120 µg/m ³ | Not to be exceeded on more than 25 days per year, averaged over three years | 100 µg/m ³ | |
| NO ₂ | One hour | Limit value, 200 µg/m ³ (*) | Not to be exceeded more than 18 times a calendar year | 200 µg/m ³ (*) | |
| NO ₂ | Calendar year | Limit value, 40 µg/m ³ | | 40 µg/m ³ | |

- **United Nations Sustainable Development Goals, SDGs** (for which cities can do more to achieve some of the 17 SDGs, <https://sdgs.un.org/goals>);
- **15 minutes cities** (where primary services must be accessible within 15 minutes on foot);
- **objectives of the European Commission** in terms of pollutant emissions for: NO₂, PM₁₀, PM_{2.5} (https://environment.ec.europa.eu/topics/air_en);
- **SUMI: mobility and transport vs env**
 - <https://www.snap4city.org/951>
- **SUMP/PUMS: mobility and transport vs env.**
- **ISO indicators:** city smartness, digitization, tech level.
- **Low Level/Real Time:** global traffic, quality of service, betweenness, centrality, queue, time to travel, etc.

Global
&
Local

Periodic
&
Realtime

15MinCityIndex

What would support my neighborhood to become a 15-Minute City?

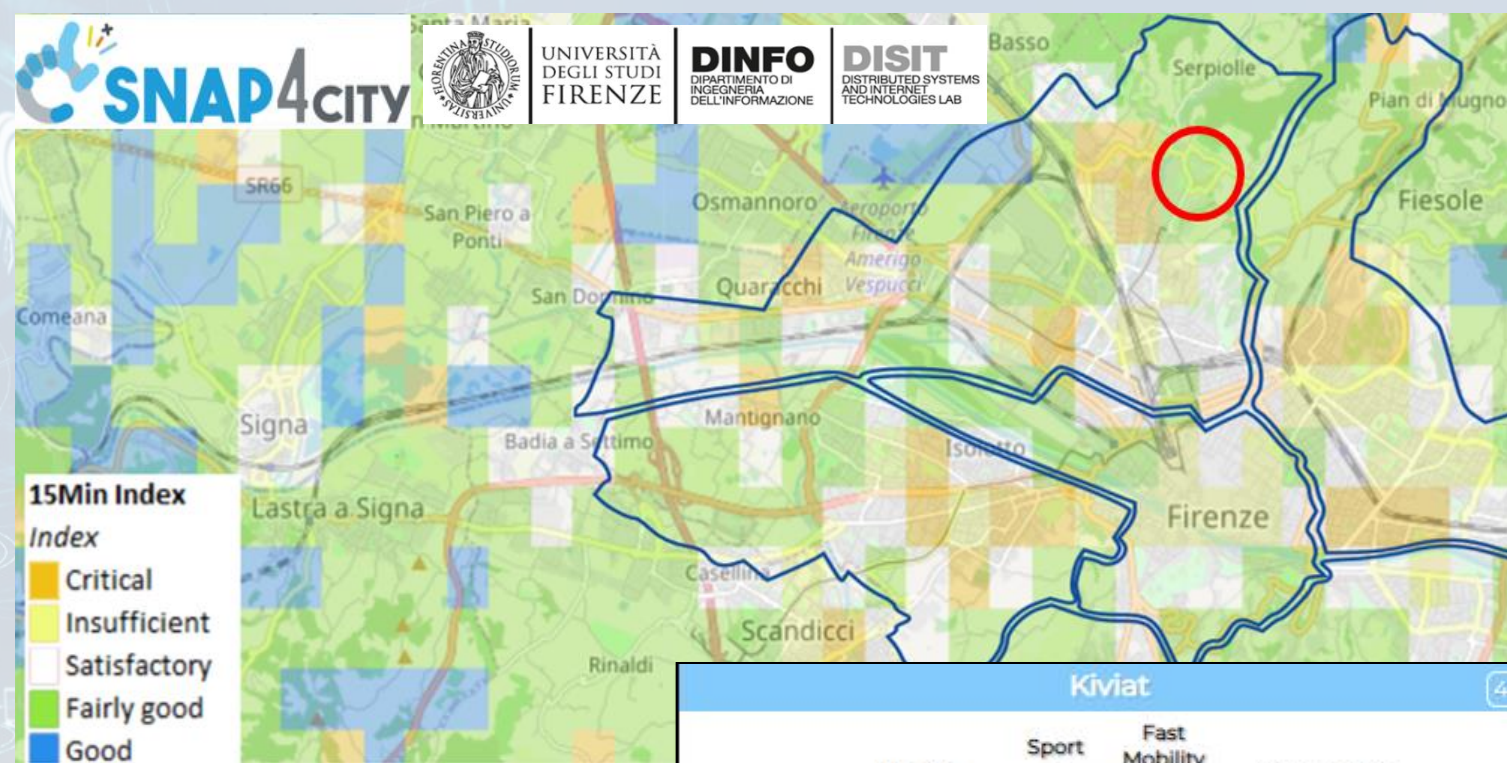
Using the Open Data:

We developed a data analytic tool based on municipal and national open data to assess services adequacy for people living in each 15 minutes areas of the city.

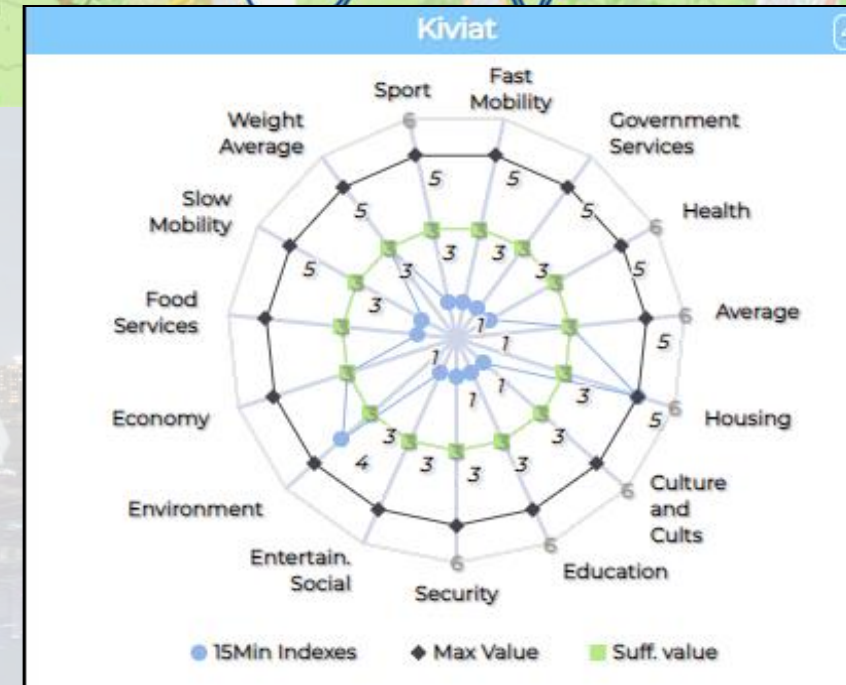
Good public transport services: bus, new tram line, train stations, cycle paths.



Careggi/Rifredi is a relevant district in Florence because of hosting the main Florence/Tuscany hospitals Careggi and Meyer, but also university headquarters and many other workplaces.



The tool supports the becoming of a 15-Minute city evaluating the service level in various domains.



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjkzOA==>

15MinCityIndex on Bologna

Ciao roottooladmin!

Tue 3 May 20:14:59

15 MINUTI INDEX BOLOGNA CITTÀ METROPOLITANA - NEWGUI

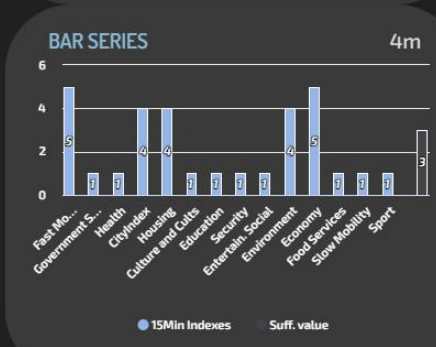
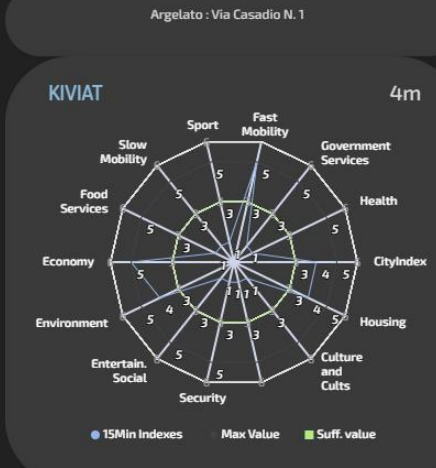
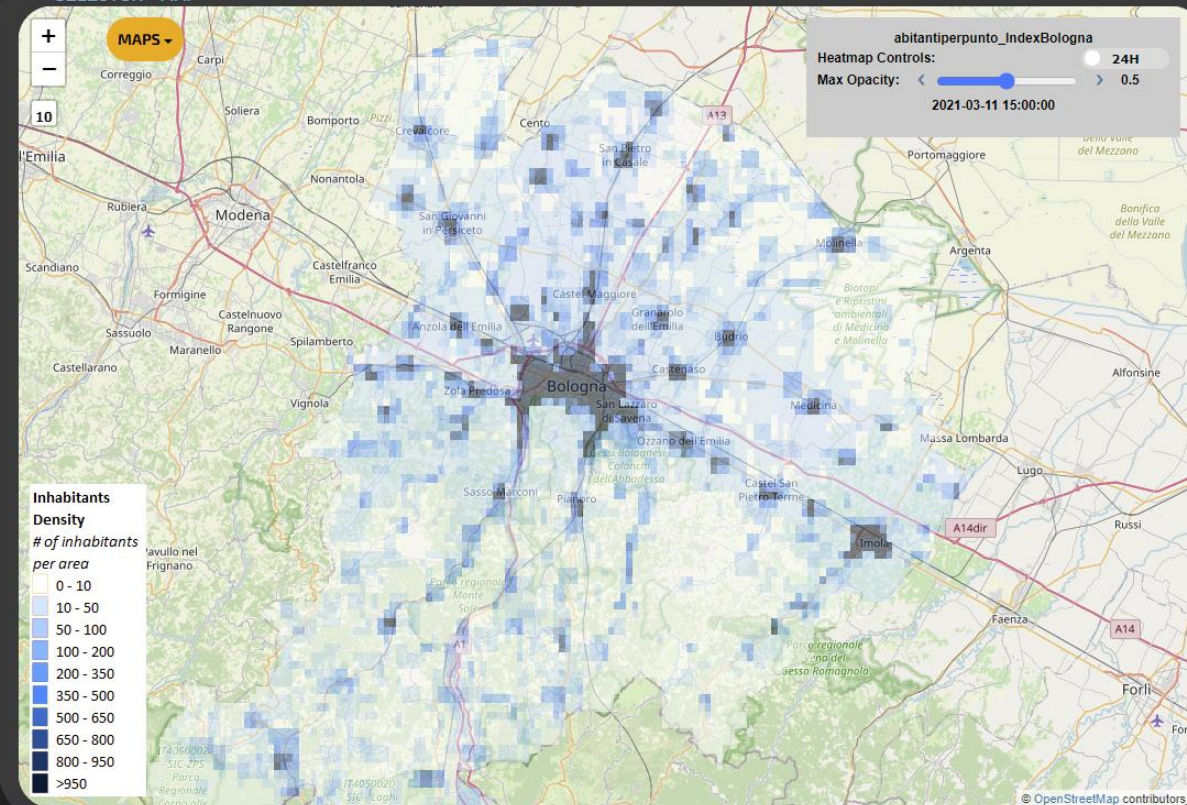
- # of Inhabitants >
- Green factor >
- Civil factor >
- Industrialization factor >
- Environment Index >
- 15Min Economy Index >
- 15Min Housing Index >
- 15Min Health Index >
- 15Min Food Index >
- 15Min Education Index >
- 15Min Slow Mob Index >

THE PICKED POINT

9m

City: Argelato
Address: Via Casadio N. 1
lat,lon: 44.61882,11.35437

SELECTOR - MAP



- 1 NO POVERTY**
- 2 ZERO HUNGER**
- 3 GOOD HEALTH AND WELL-BEING**
- 4 QUALITY EDUCATION**
- 7 AFFORDABLE AND CLEAN ENERGY**
- 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**
- 11 SUSTAINABLE CITIES AND COMMUNITIES**
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION**
- 13 CLIMATE ACTION**
- 15 LIFE ON LAND**



• **15 Minute City Index:**

- 13 subindexes: energy, slow mobility, fast mobility, housing, economy education, culture and cults, health, entertainment, gov, food, security...



- Monitoring and Prediction of energy consumption
- Stimulating: Bike sharing, e-bikes, car charge, etc.
- Community of Energy, planning energy plant



- Industry 4.0 integrated solutions
- Decisions Support Systems
- Process optimization, control
- Predictive maintenance



- Smart City infrastructure: monitoring and resilience, long terms predictions
- Effective and Low cost smart solutions
- What-if analysis, Simulations
- Origin Destination matrices computation



- business intelligence tools for decision makers
- Reduction production costs
- Monitoring resource consumption
- Optimization of Waste Collection



- Monitoring and Predicting: NO2, NOX, CO2, Traffic flow, pollutant, landslide, waste, etc.
- Traffic flow reconstruction
- Demand vs Offer of Mobility analysis



- Shortening justice time
- Anonymization and indexing legal docs.
- Prediction of mediation proneness
- Ethical Explainable Artificial Intelligence

Decision Support System:

Immediate response and Tactical and Strategic Plans, via What-if Analysis

FORGING & MANAGING OPEN AND LIBERATED 3D URBAN ILLUMINATIONS

IOT APPLICATIONS AND DEVICE

TWITTER VIGILANCE SOCIAL MEDIA ANALYSIS

SNAP4CITY ARCHITECTURE AND ECOSYSTEM. OPENED TO DEVELOPERS AND STAKEHOLDERS

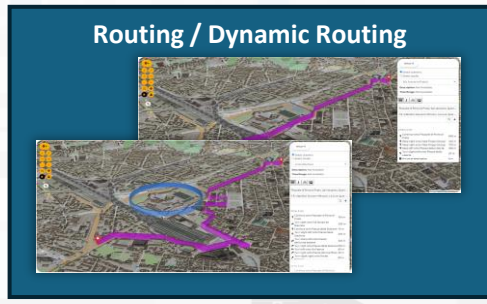
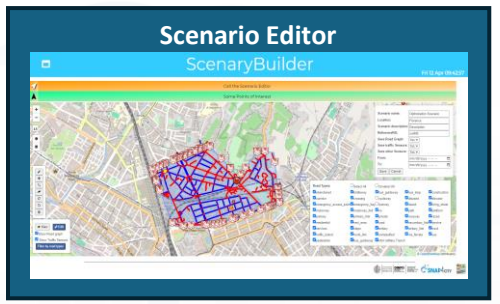
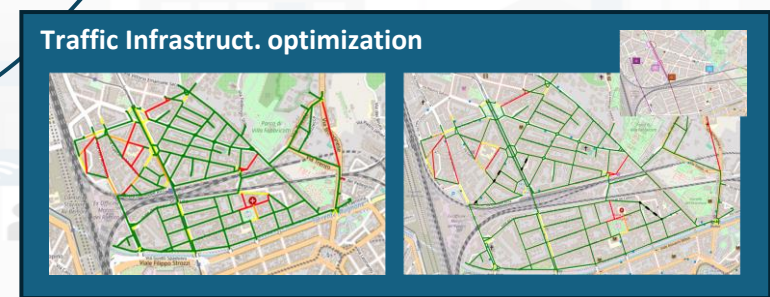
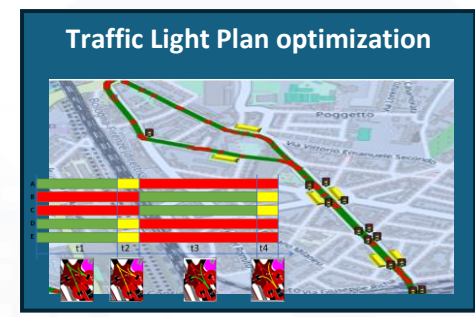
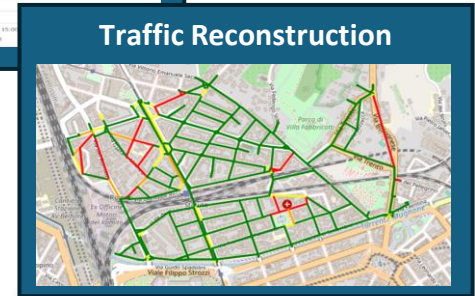
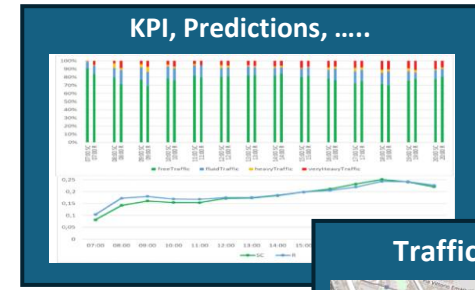
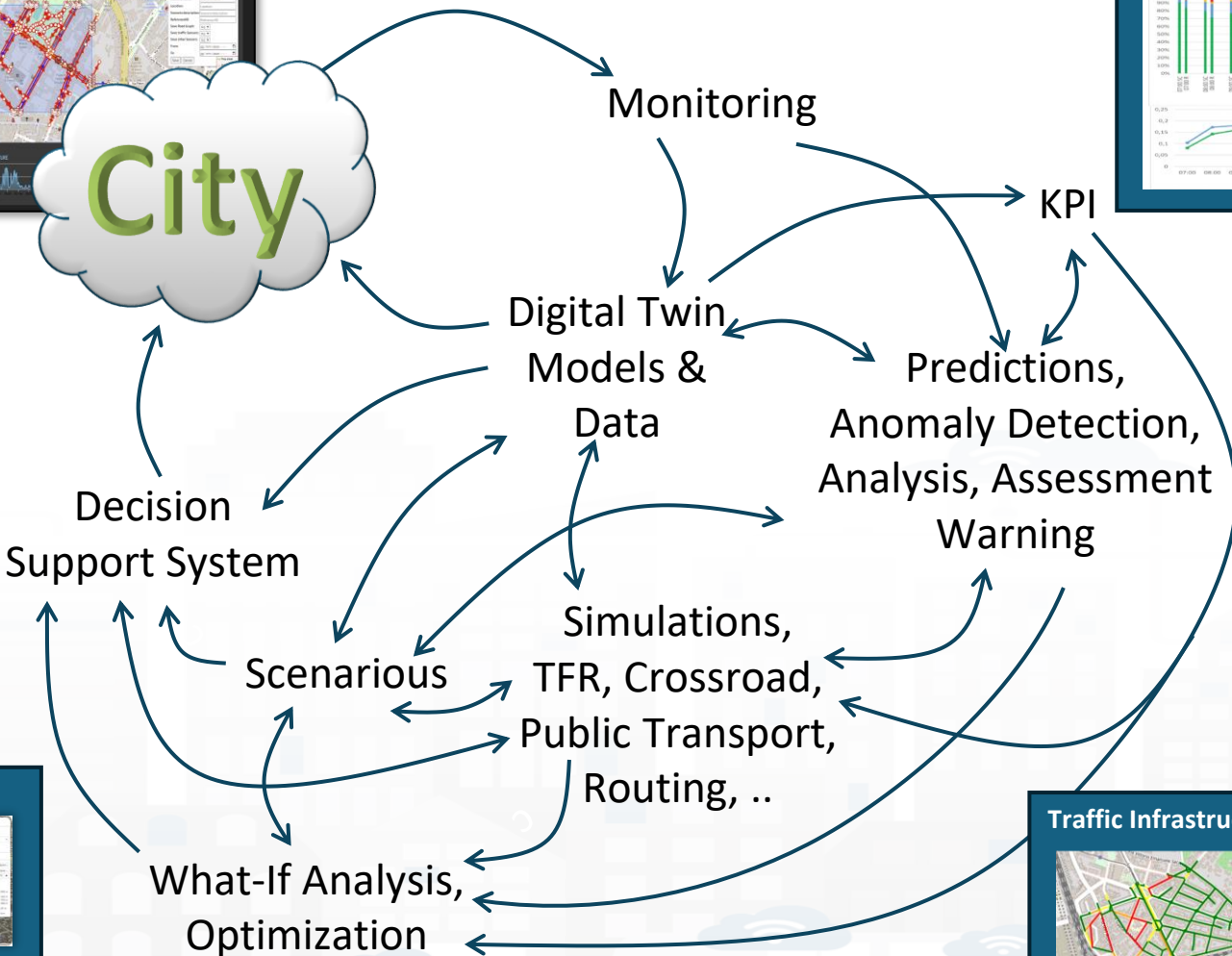
SNAP4CITY AND KM4CITY PROJECTS

FROM CITY DASHBOARD TO APPLICATIONS



City Users' Services, Tourism Management and Safety, Digital Twin

NAP4CITY THE VIEW OF THE ADMINISTRATORS



Ciao

Fri 13 Oct 18:29:18

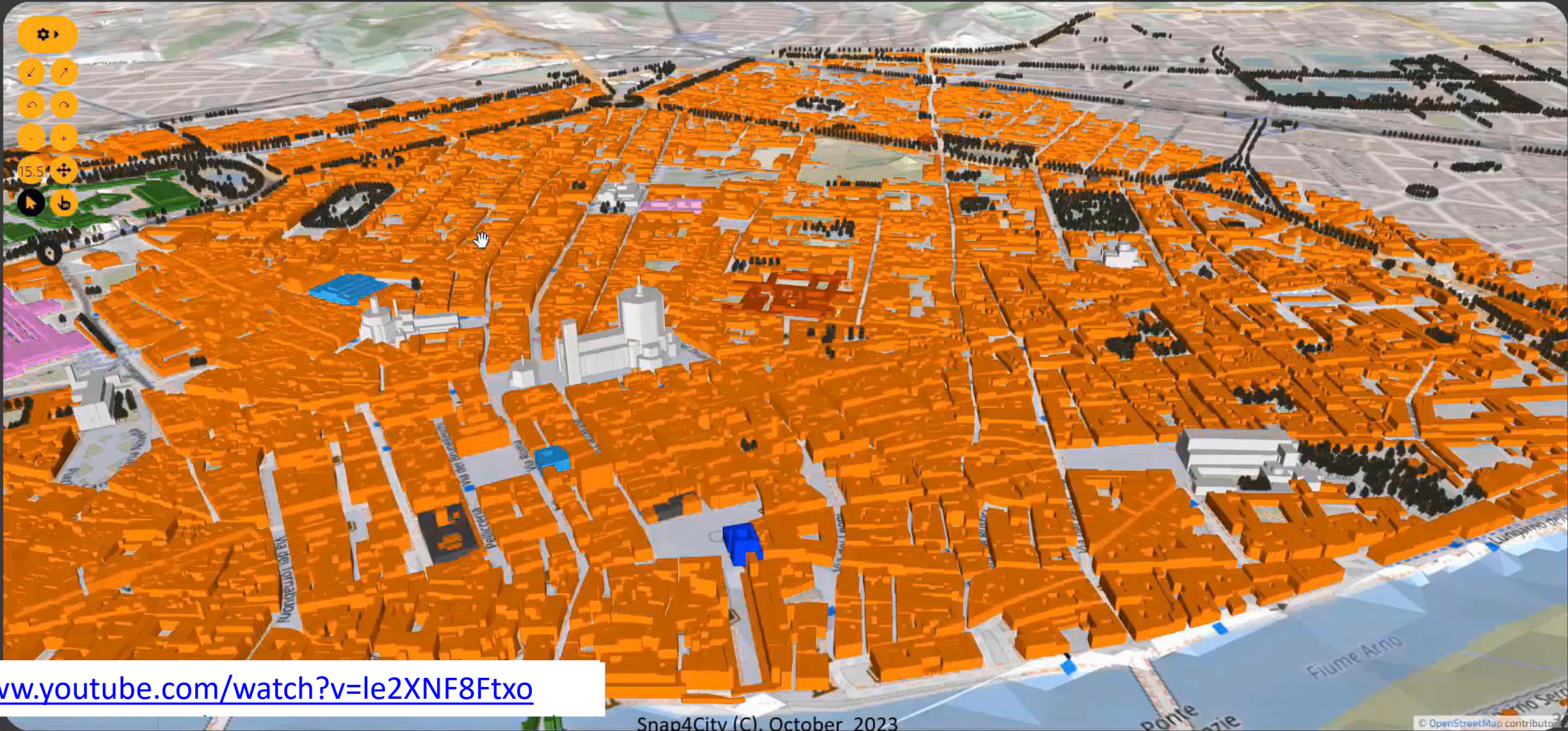
FLORENCE SCDT

SELECT...

- GRAL HD
- NO 2
-
-
-
-
-
-
- WHAT-IF
-
-
-

DOUBLE MAP

-
-
-
-
- 15.5
-
-
-



<https://www.youtube.com/watch?v=le2XNF8Ftxo>



Available AI Solutions on Snap4City

<https://www.snap4city.org/997>

More than 80 Available Solutions & 300 AI applic.

- **Mobility and Transport**
- **Environment, Weather, Waste, Water**
- **City Users Behaviour and Social analysis**
- **Energy and Control**
- **Tourism and People**
- **Security and Safety**
- **High Level Decision Support Solutions**
 - **Asset management**
 - **Resilience and Risks Analysis**
- **Low level Techniques**



https://www.snap4city.org/download/video/DPL_SNAP4SOLU.pdf

<https://www.snap4city.org/download/video/course/p4/>

City User Behaviour/services, Tourism and Safety (2024/8b)

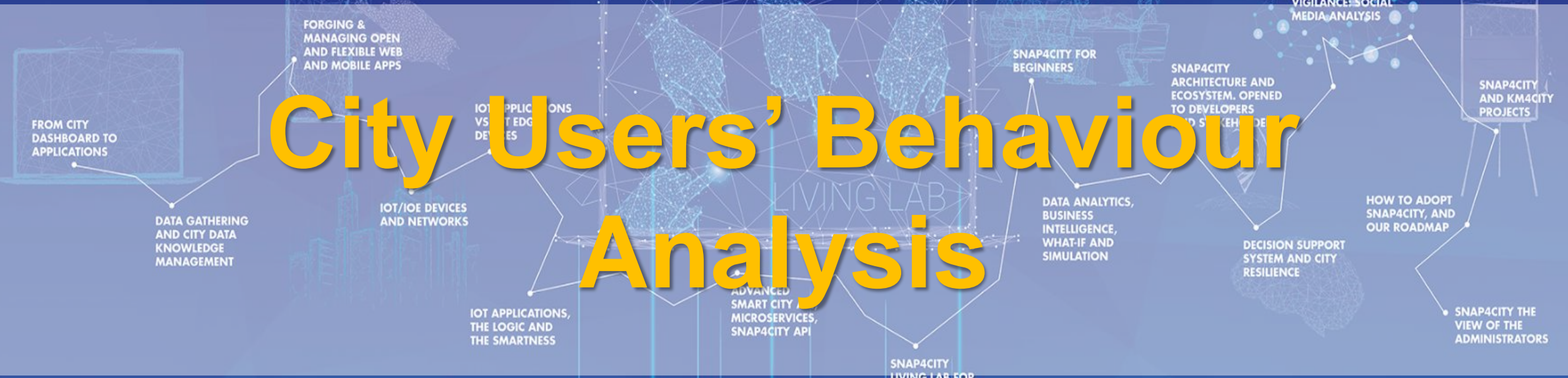
- **Goals:**
 - Quality of Life, quality of services, over tourism mitigation, sustainability
 - Costs reduction of services
 - Accessibility to services: citizens, Tourists, commuters, etc.
 - Security/Safety of city users
- **Solutions for Operation (monitoring, managing, mobile apps, digital signages, control rooms)**
 - Monitoring services: tickets, reputation, usages, areas, etc.
 - Monitoring user behaviour (counting, trajectories): indoor/outdoor, hot places/services, ports, beaches,
 - Computing: origin destination, trajectories, travel means, reputation, predictions, etc.
 - Early detection/warning of critical conditions, connection with Video Management Systems
 - Managing entrances in city areas: restricted areas, touristic busses, etc.
 - Production of info-tourism, recommendations, nudging to city users and operators, second offer promotion
 - Providing Virtual Assistants for City Services, Tourist Offices, etc.
 - Monitoring reputation of services via: social media, blogs, etc.
 - Collecting complains, requests, participations from City users via mobile apps
 - Computing predictions of any kind: people coming/moving, services and sites reputation, advertising impact and people reactions.
- **Solutions for Planning (optimization and what-if analysis)**
 - prediction of the effect of certain changes on the offer;
 - Reduction of Pollutant Emissions, via optimization
 - Optimization plan to distribution of workload on multiple touristic offers/services, area cleaning, etc.
 - Predicting reputation of services, touristic and operative
- **Algorithms and computational solutions, see next slide**

City Users Behaviour, Safety, Security and Social Analysis (2024/8)

- **People detection and classification:** persona, strollers, bikes, etc. (ML, DL)
- **people counting and tracking,** head counting, people trajectories (via thermal cameras, ML, DL)
- **People flows prediction** and reconstruction, (ML, DL)
 - Wi-Fi data, mobile apps data, Mobile Data, etc.
- **User's behaviour analysis, People flow analysis** from PAX Counters and heterogenous data sources (ML, AI)
 - origin destination matrices, hot places, time schedule,
 - Recency and frequency, permanence, typical trajectory, etc.
- **Computing User engagement and suggestions** for sustainable mobility (Rule Based, ML)
- **Social media analysis** on specific channel, specific keywords: see Twitter Vigilance,
 - Reputation, service assessment: MultiLingual NLP and Sentiment Analysis, SA
 - Tweet proneness, retweet-ability of tweets, impact guessing
 - Audience predictions on TV channels and physical events, locations
 - Prediction of attendance of events and on attractions
- **Virtual Assistant construction, LLM, NLP, Sentiment Analysis (DL, NLP)**
- **Video management System integration for security**
- **15 Minute City Index** , etc. (modeling and computability)
- Computing **SDG**, etc., (DP)
- Etc.

TOP

City Users' Behaviour Analysis



City User behavior analysis multiple data sources

- **Main Data Sources on the market**
 - Mobile Cell data from telecom operator, macro areas
 - Mobile App data from their operators, micro areas
 - OBU from Insurance operators, only private vehicles
 - Social media: limited information and quality
 - Local Operators of: museum, ticket office, restaurants, etc.
 - Data integrators: a mixt of the above, not clear methods
- **Sensor Data:**
 - PAX Counters, Sniffer, Wi-Fi sniffers, Radar, laser, etc.
 - TV Camera color, Thermal Cameras, radar
- ***Snap4City: integration and computing tools for deductions***



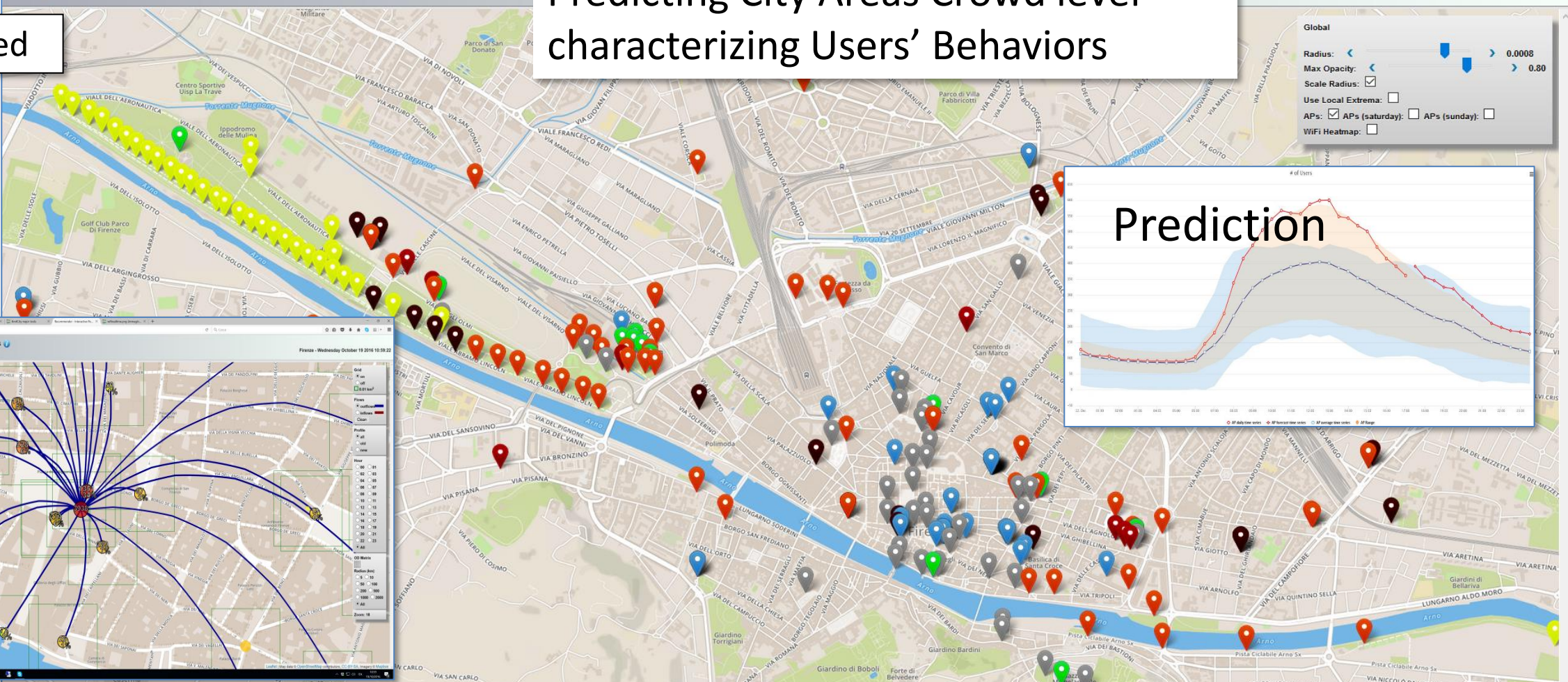
Characterizing City Areas

DISIT Firenze Wi-Fi: Access Points Clusters Coverage Map
DISIT - Distributed Systems and Internet Technologies Lab

Wi-Fi based

Predicting City Areas Crowd level characterizing Users' Behaviors

Firenze - Saturday November 12 2016 19:16:33



Global

Radius: < 0.0008 >

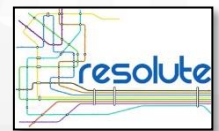
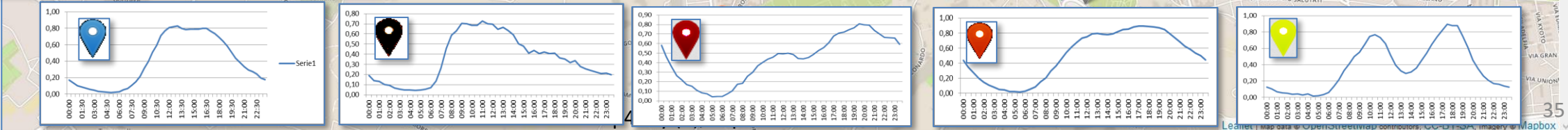
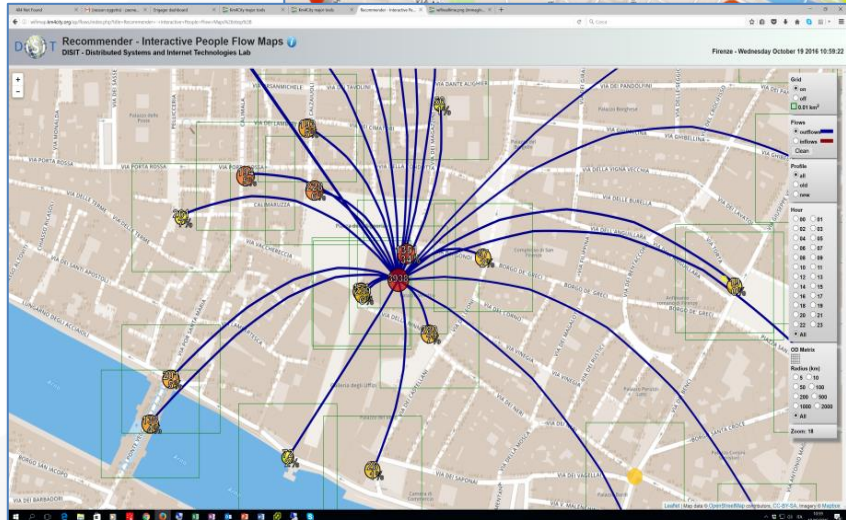
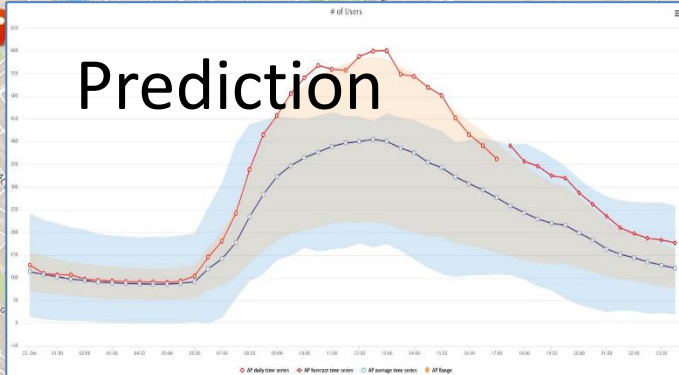
Max Opacity: < > 0.80

Scale Radius:

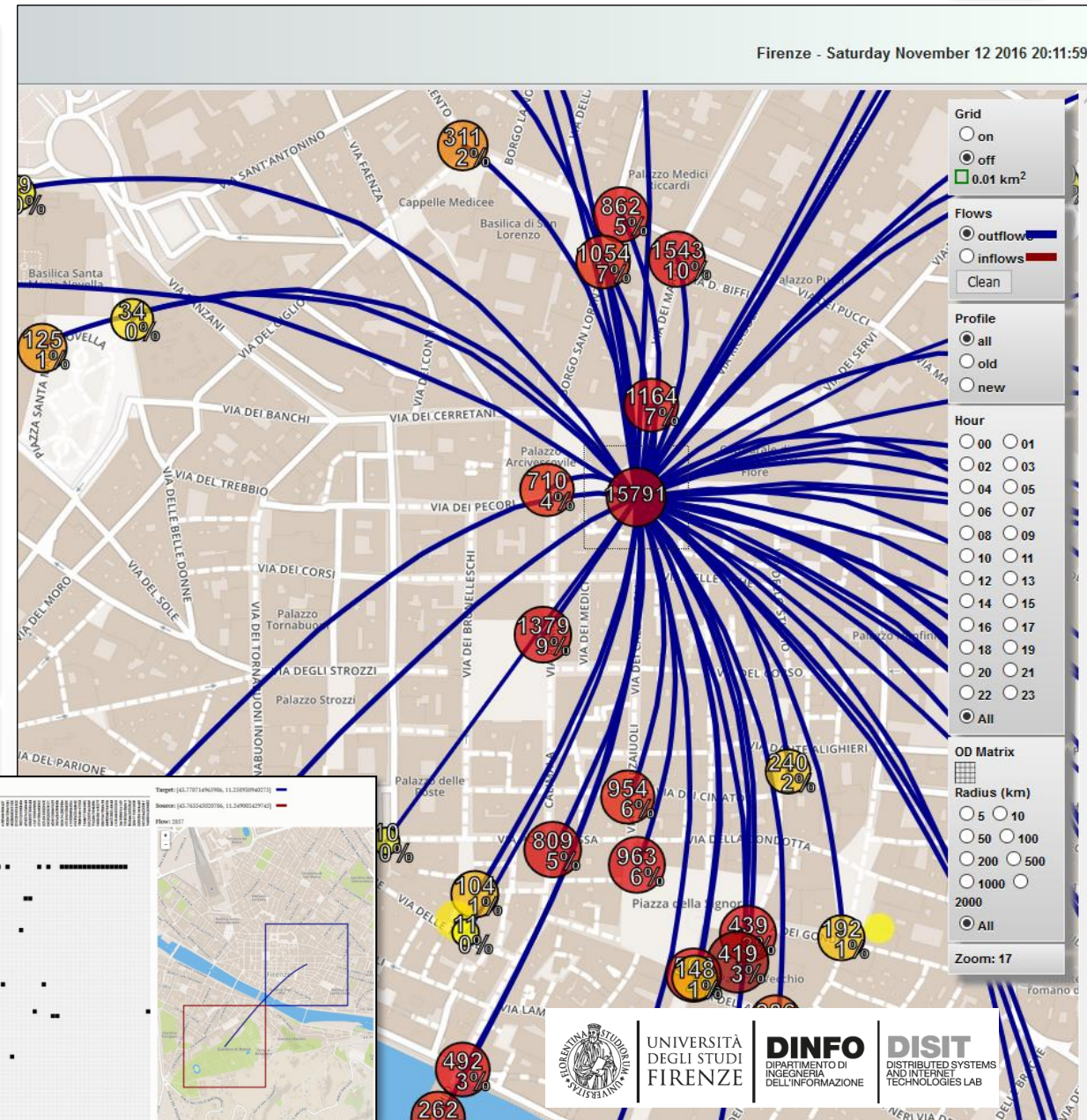
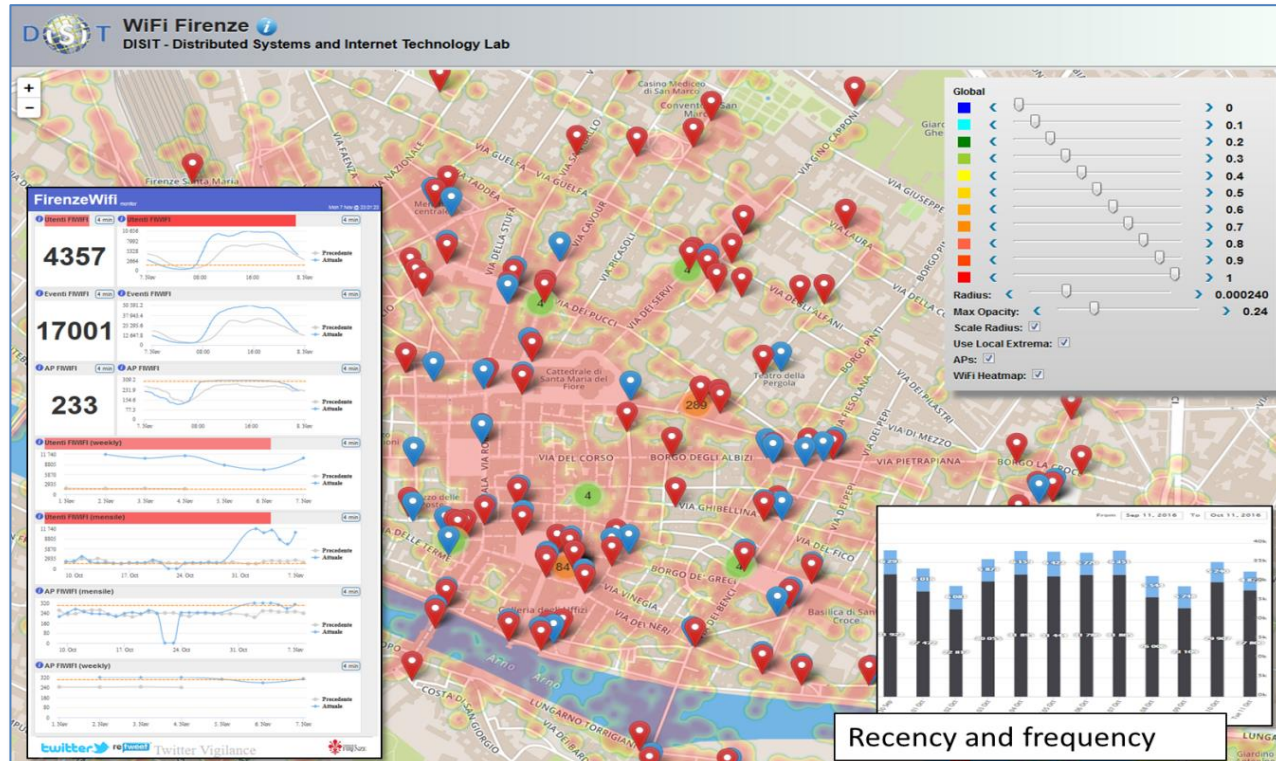
Use Local Extrema:

APs: APs (saturday) APs (sunday)

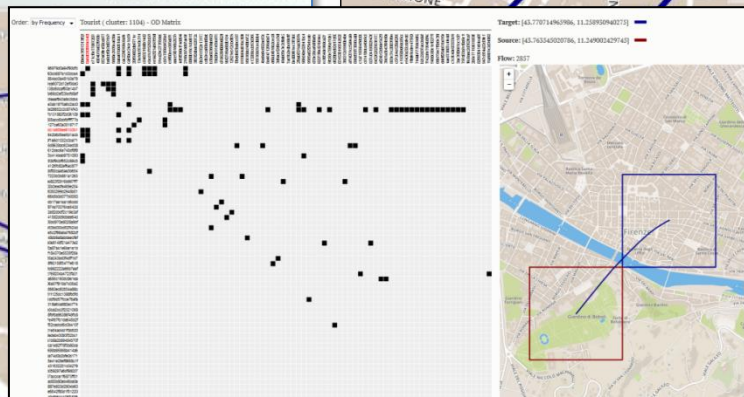
WiFi Heatmap:



Origin Destination Matrix Estimation



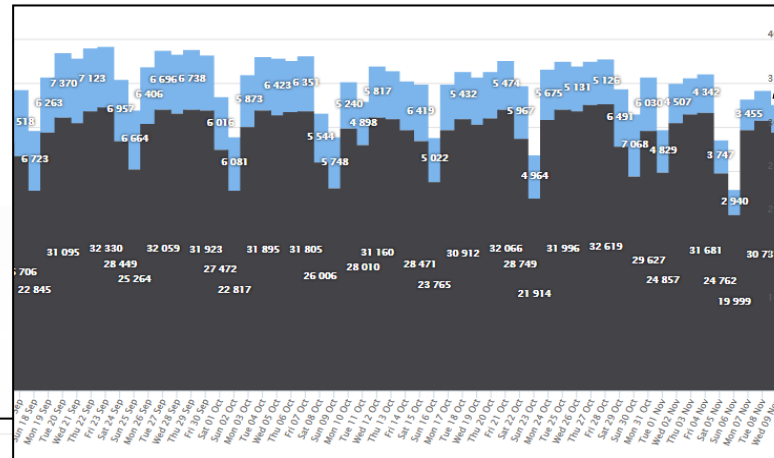
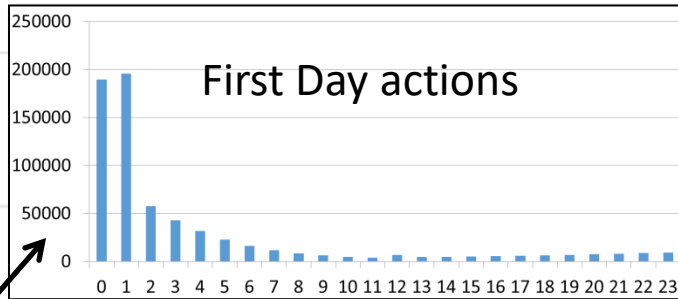
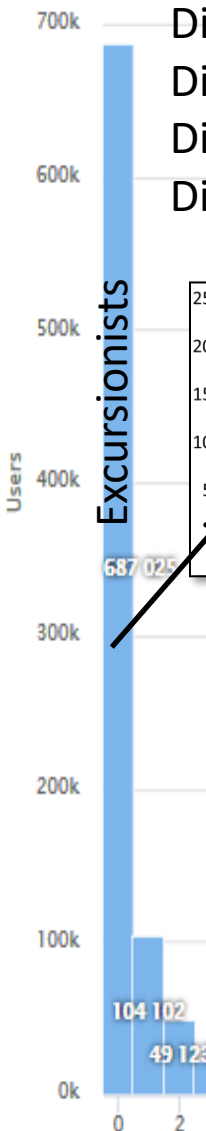
Wi-Fi based



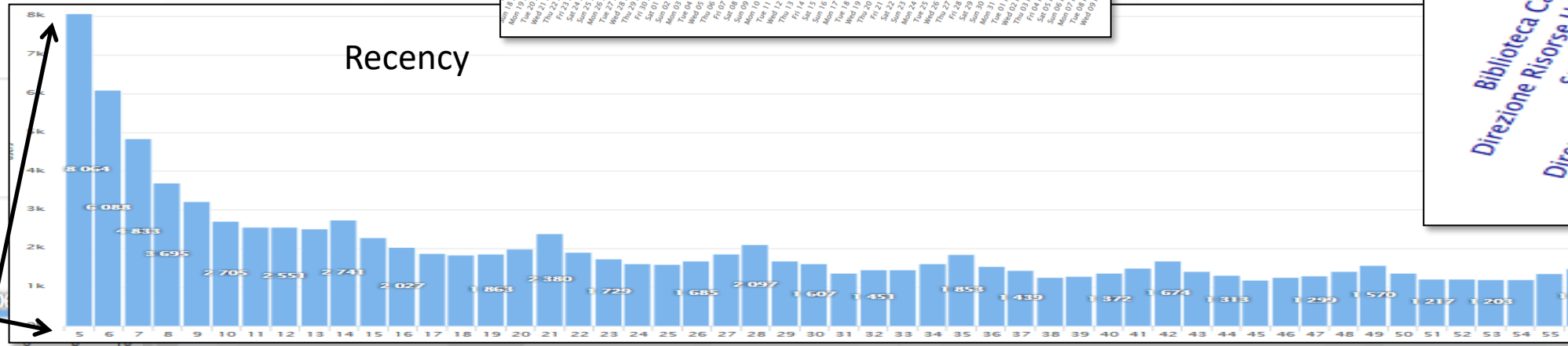
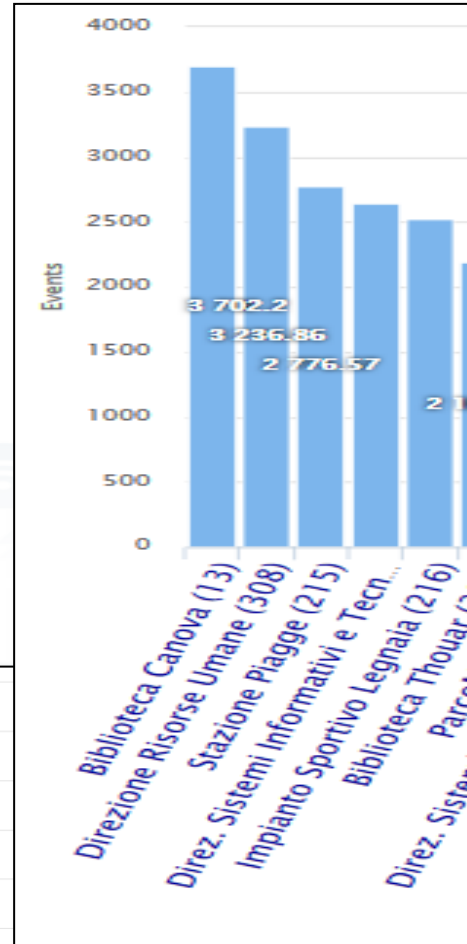
User Behaviour Analysis

Where

Distinct APs: 343
 Distinct APs (last 24 hours): 311
 Distinct Users (last 180 days): 1102098
 Distinct Excursionists (last 180 days, < 24 h): 687025

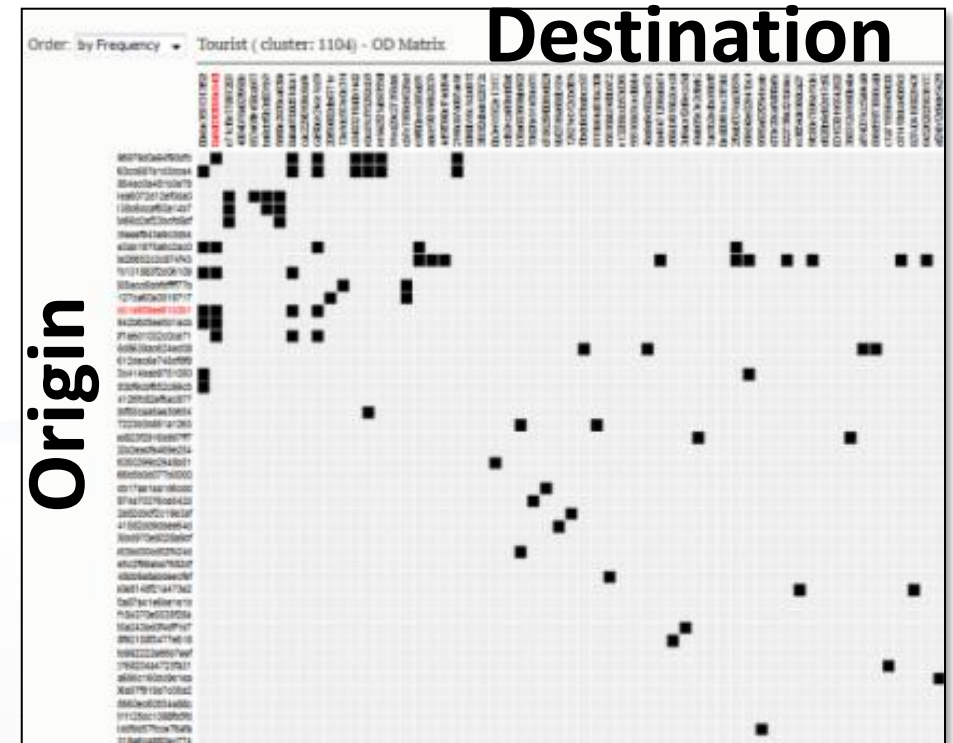


New City Users
VS
Returning



Origin Destination Matrices

- **computed** from several kinds of data
 - Census Data
 - Cellular Mobile Data
 - Mobile App Data **trajectories**
 - OBU from vehicles **trajectories**
 - Composition of multiple sources: ODM + Trj
- **may represent:**
 - Demand of mobility
 - Offer of transportation
- **refer** to different area kinds for Origin and of Destination
 - Different kinds of OD areas
 - Different kinds of temporal resolutions → animations
 - Hourly, daily, weekly, monthly, etc...



ODM, Traffic Flow

ODM Origin Destination Matrices

Wed 1 Nov 10:47:28

Selectornew

- ▶ Admin Areas
- ▶ Areas or grids
- ▶ Traffic Sensors
- ▶ Traffic Flow
- ▶ Traffic Flow Manager New

Map

10 Seravezza

10-100%

Origin-Destination Map

Controls:

Show all polygons: ON

Time period: week

Precision: municipality

Flow: outflow

Max Opacity:

< Prev 2022-07-07 00:00:00

<< week

Flow

- 0-2%
- 2-3%
- 3-4%
- 4-5%
- 5-6%
- 6-7%
- 7-8%
- 8-9%
- 9-10%
- 10-100%

FloresFIPITrafficRealtime

Traffic Heatmap Controls: 24H

Max Opacity:

< Prev 2023-11-01 03:00:00

<https://www.snap4city.org/dashboardSmartCity/view/Gea-Night.php?iddashboard=Mzk3Nw==>



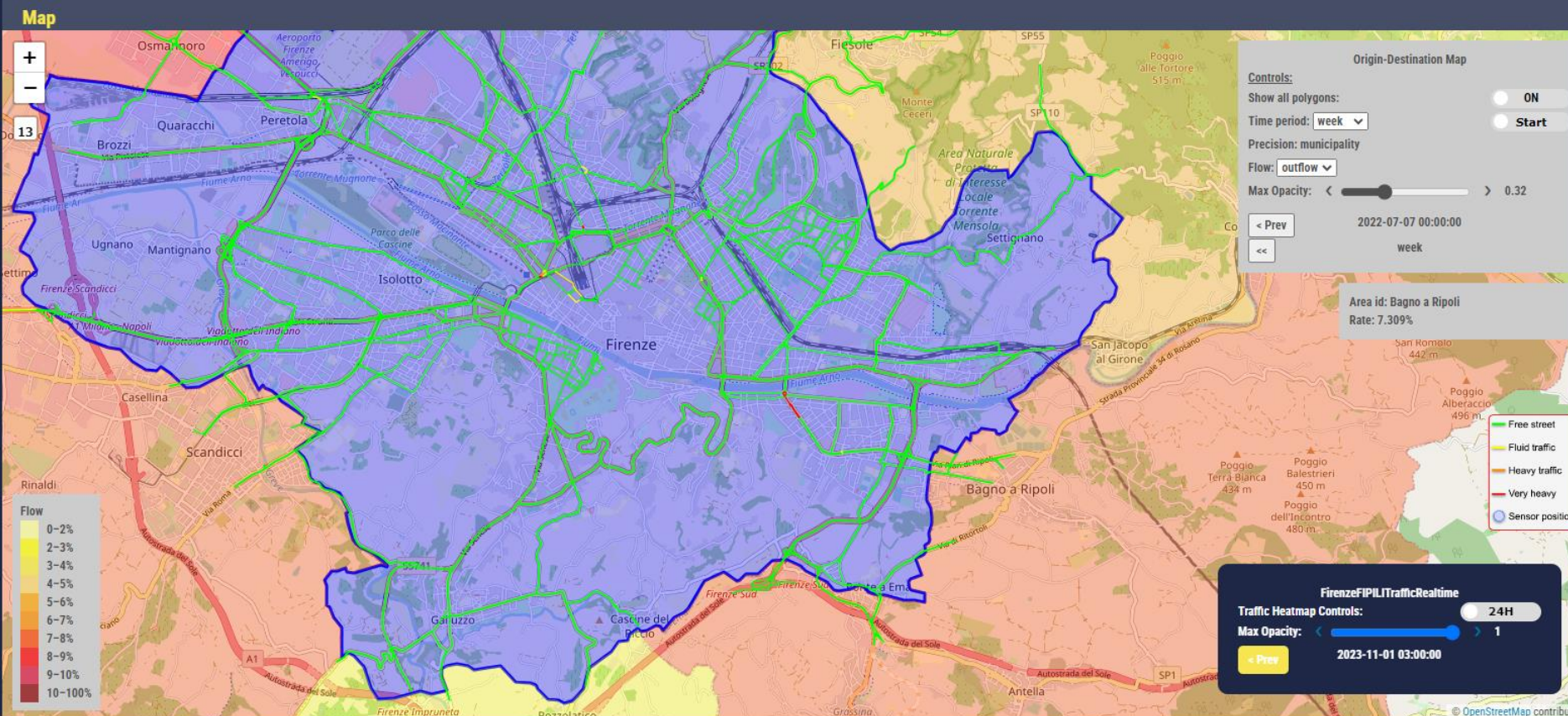
ODM Origin Destination Matrices

Wed 1 Nov 10:50:01



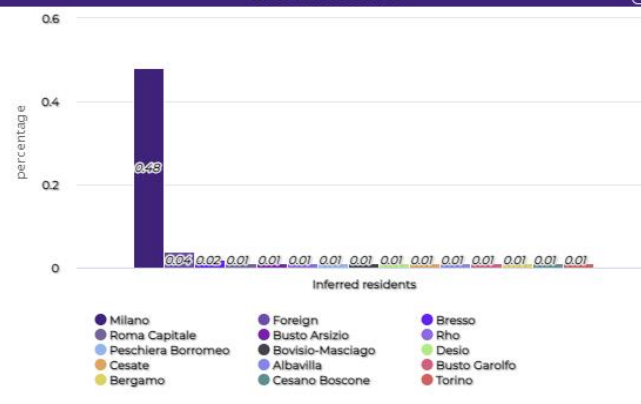
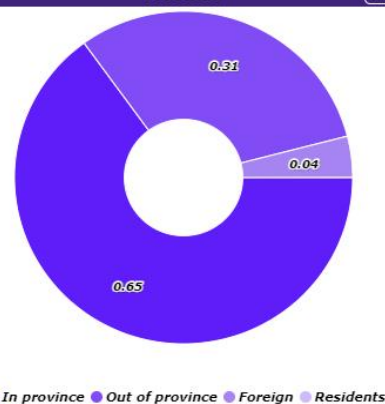
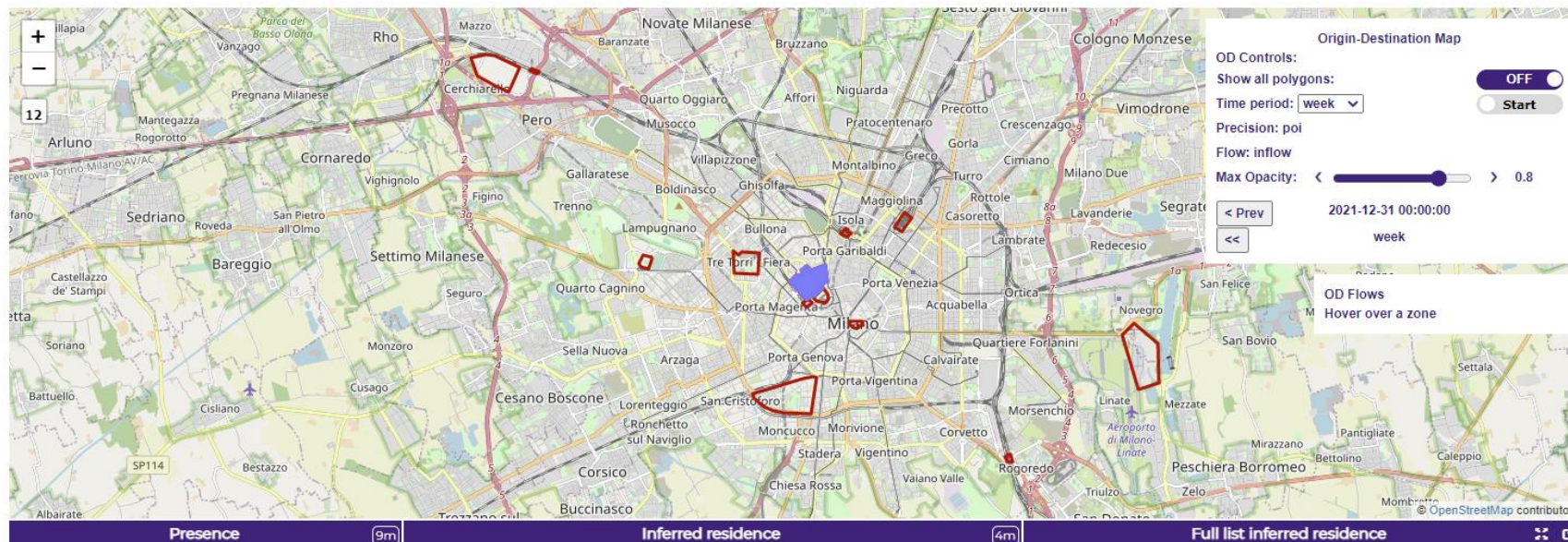
Select or new

- Admin Areas >
- Areas or grids >
- Traffic Sensors >
- Traffic Flow >
- Traffic Flow Manager New >



My Profile

ODM Visual Analytic on Milan Area



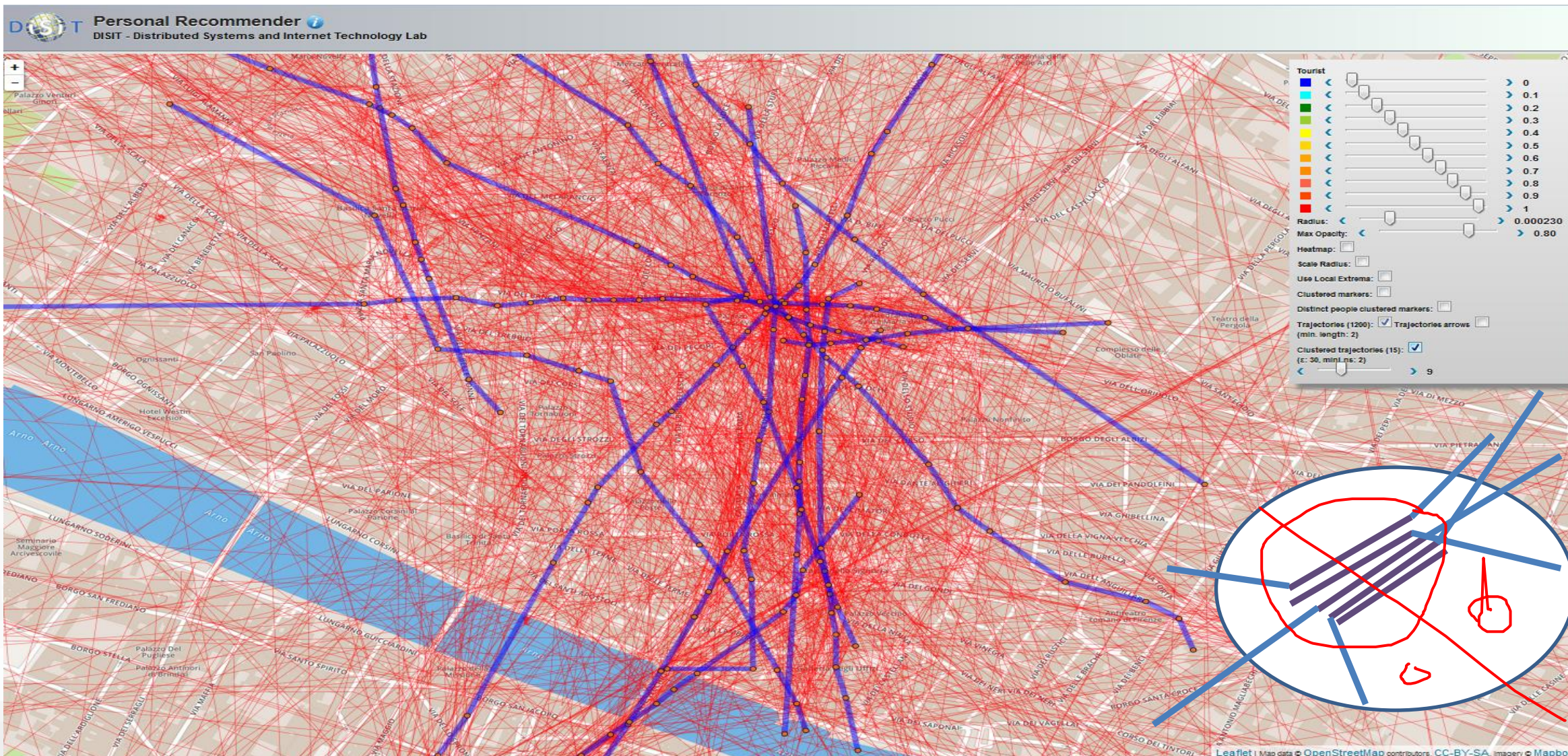
Parco Sempione

Region Province Municipality Census block

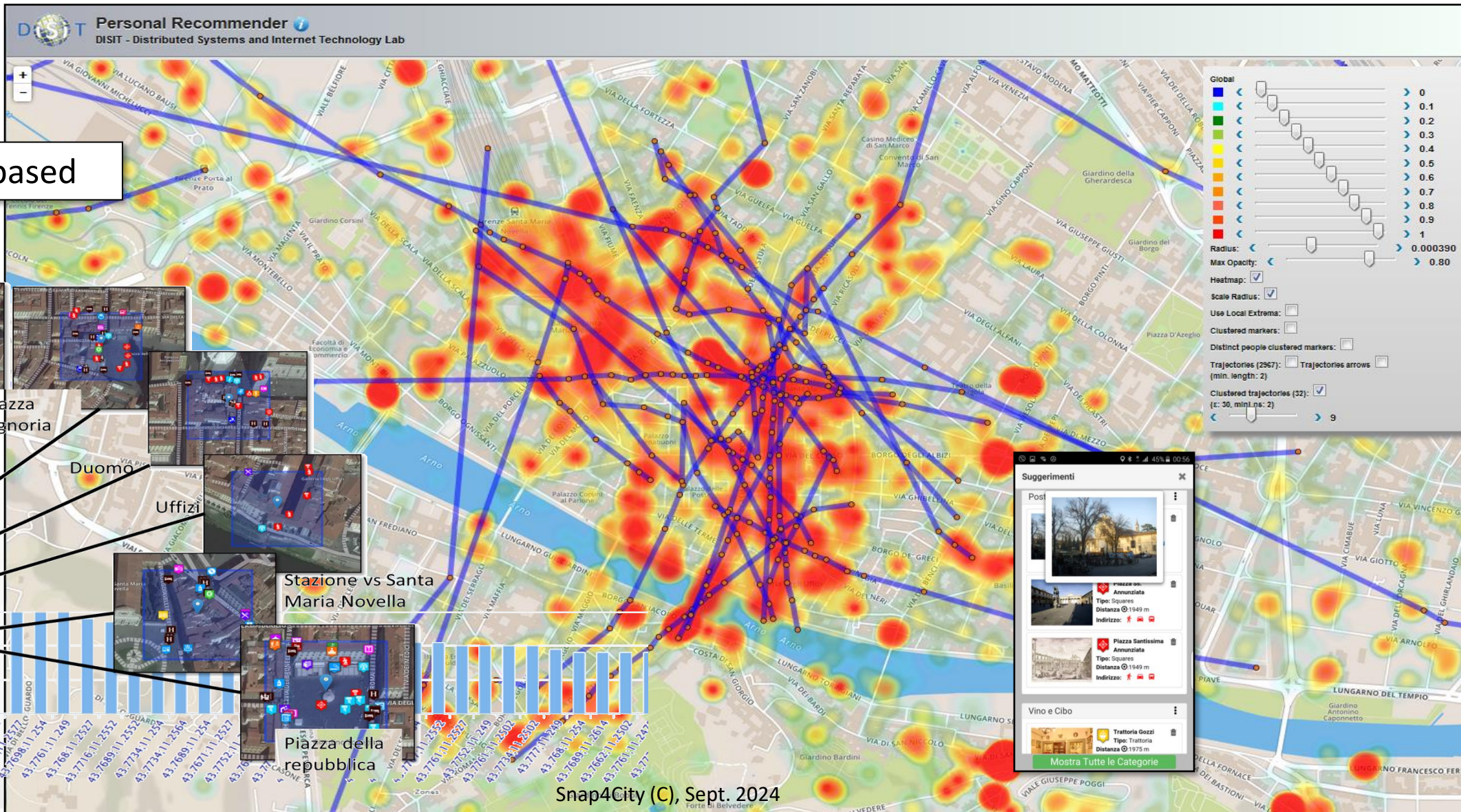
| | |
|--------------------|---------|
| Milano | 48.078% |
| Foreign | 4.229% |
| Bresso | 1.741% |
| Roma Capitale | 1.392% |
| Busto Arsizio | 1.044% |
| Rho | 1.044% |
| Peschiera Borromeo | 1.044% |
| Bovisio-Masciago | 1.044% |
| Desio | 1.044% |
| Cesate | 0.696% |
| Albavilla | 0.696% |
| Busto Garolfo | 0.696% |



Cluster di Trajectories



User Behavior Analyzer



Mobile App based



Piazza Signoria

Duomo

Uffizi

Stazione vs Santa Maria Novella

Piazza della repubblica



Tuscany Region

• Dashboards & Services:

- **Mobility:** public transport operators schedule and paths, traffic Fi-Pi-Li main road, parking status and predictions, traffic sensors, Origin Destination matrix, routing, multimodal routing, etc.

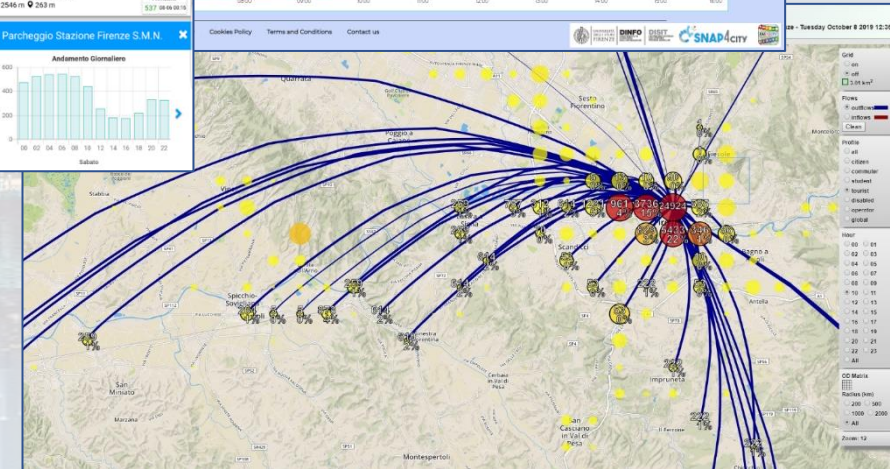
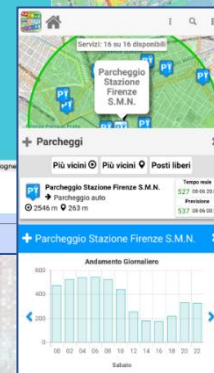
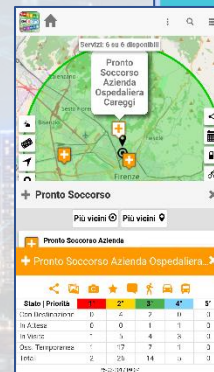
- **Social:** Hospitals and triage, etc.
- **Environment:** sensors, heatmaps, alerting,
 - **Pollution Forecast:** NOX, NO2
 - **Weather Forecast,**
- **Culture and Tourism**
- Etc.

• Mobile App and MicroApplications:

- Tuscany in a Snap (all stores)
- Tuscany where what... km4city (all stores)

• Numbers: 1.5 M complex events per day

Snap4City (C), Sept. 2024



Pont du Gard

- **Tourism Domain**

- KPIs
- Social Media
- People Flows
- Bike Flows

- **Dashboards**

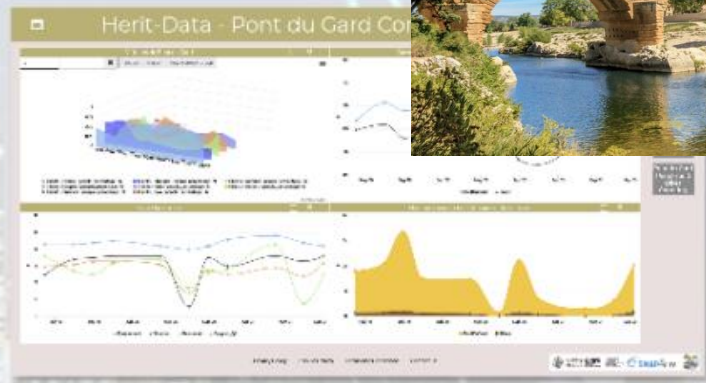
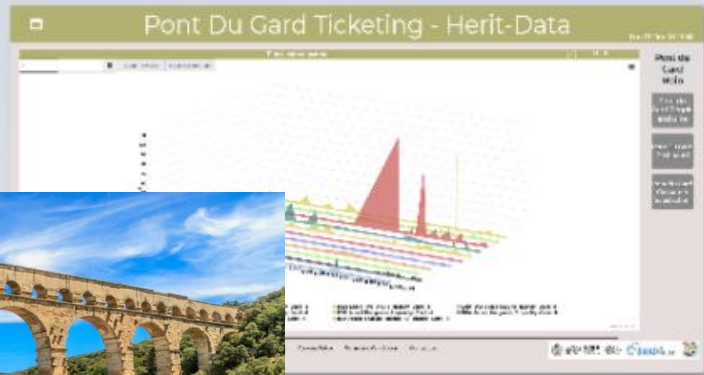
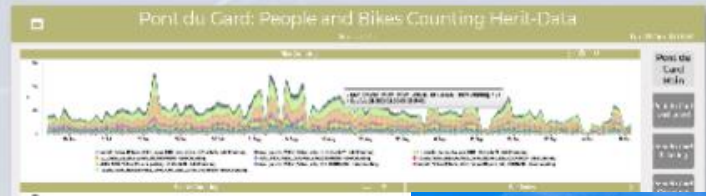
- Monitoring KPI
- People and bikes flows
- Twitter Vigilance

- **Historical and updated data**

- **Services Exploited on:**

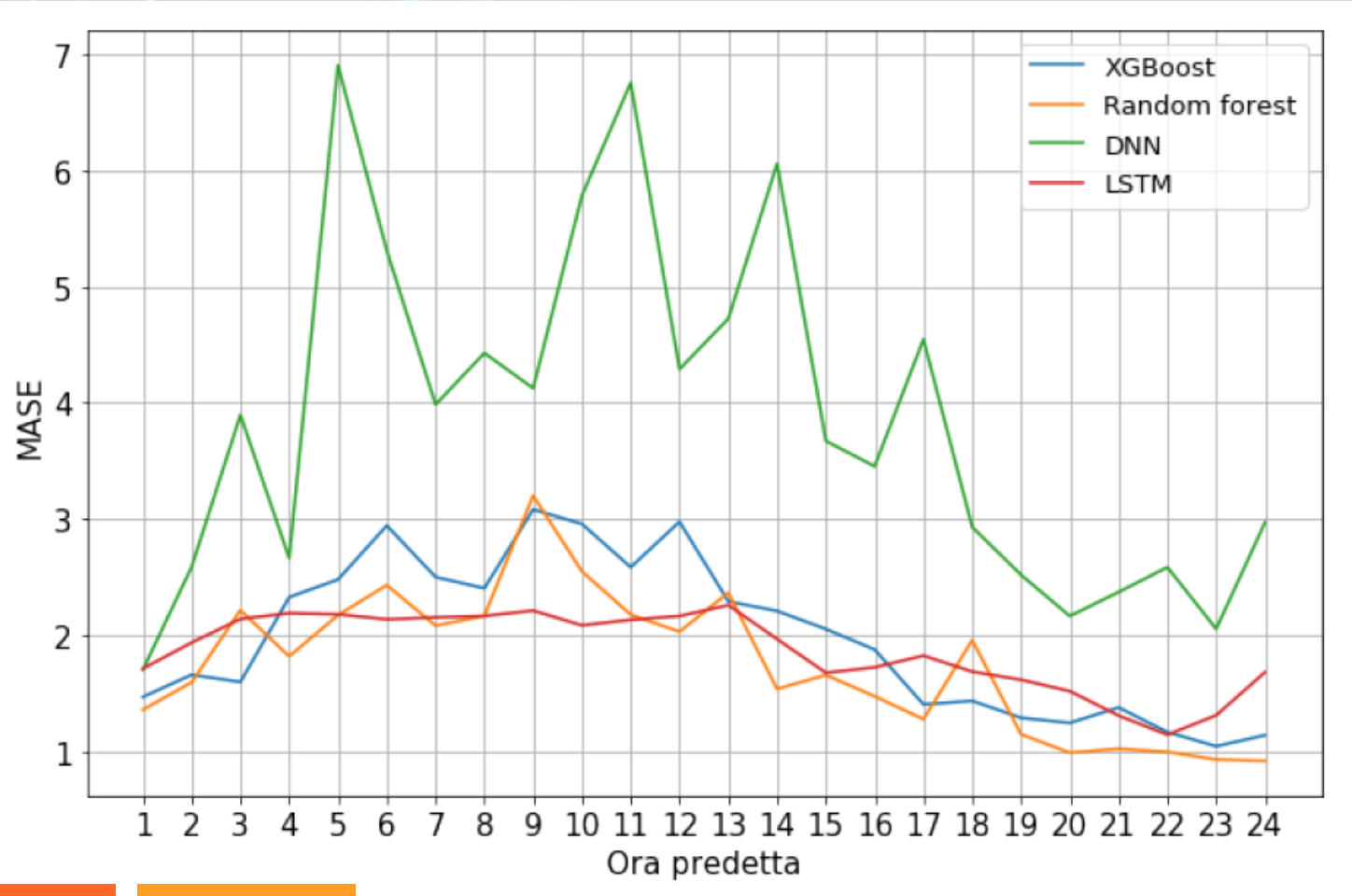
- Dashboard

- **Since 2020**



Pont du Gard: data analytics

- Prediction of the number of sold tickets 24 hours in advance
- Using:
 - Historical data
 - Weather conditions
 - Social Media



Twitter Vigilance

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



11 SUSTAINABLE CITIES AND COMMUNITIES



Dubrovnik

- **Tourism Domain**

- Counting People
- TV Cameras and WiFi
- Social Media

- **Dashboards**

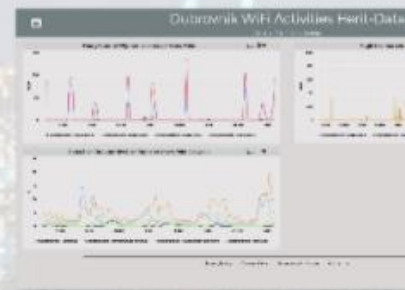
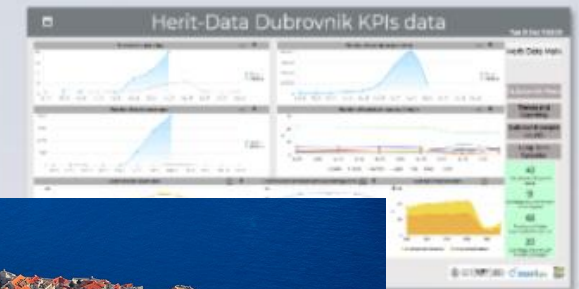
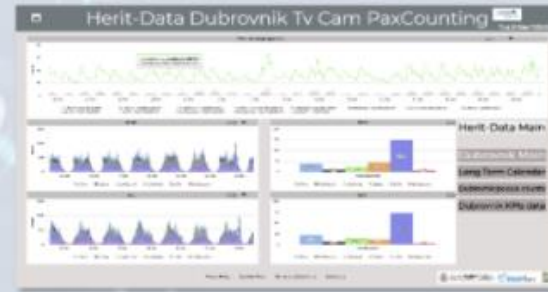
- Monitoring and real time control
- People flow
- Twitter Vigilance

- **Historical and Real Time data**

- **Services Exploited on:**

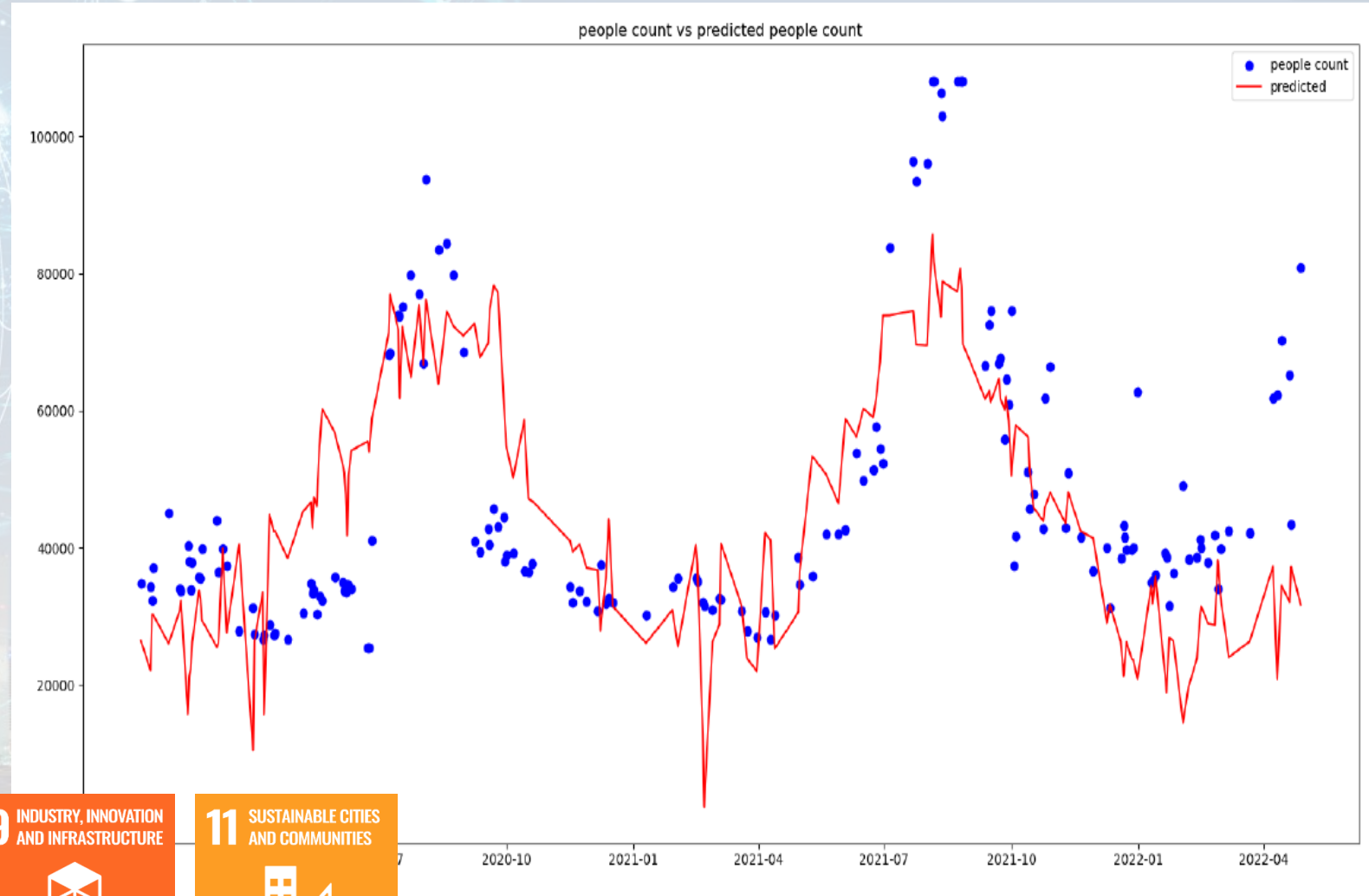
- Dashboard

- **Since 2020**



Dubrovnik: Data Analytics

- Assessing impact of advertising
- Prediction of presences on the basis of
 - Social Media Twitter Vigilance
 - weather conditions
 - Historical data



Twitter Vigilance



Valencia, FSMLR

- **Tourism Domain**

- Counting People
- Environmental data
- Social Media

- **Dashboards**

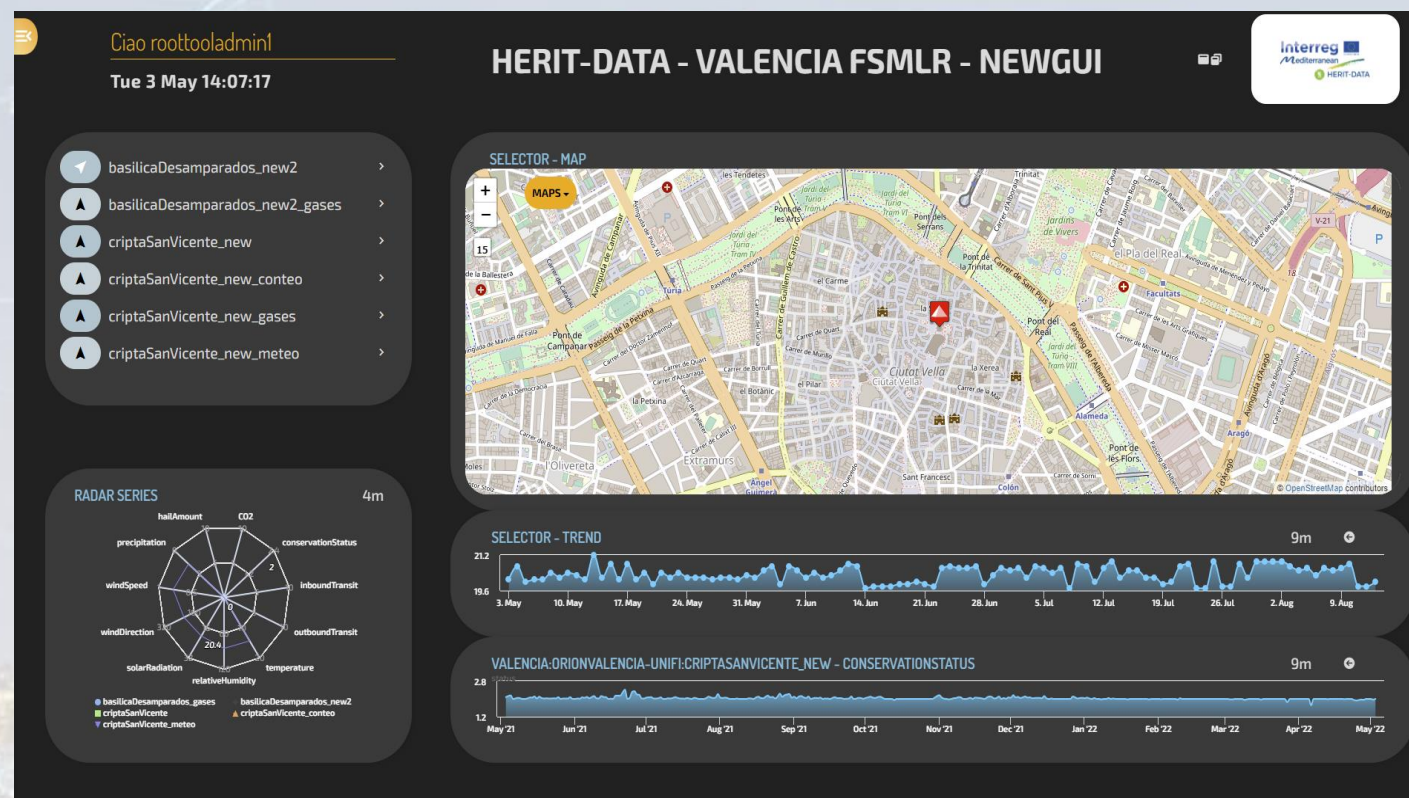
- Monitoring and real time control
- People flow
- Twitter Vigilance

- **Historical and Real Time data**

- **Services Exploited on:**

- Dashboard

- **Since 2020**



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MzE1MA==>

West Greece

- **Tourism Domain**

- KPIs: ODM, Flows, ...
- Social Media
- People Flows

- **Dashboards**

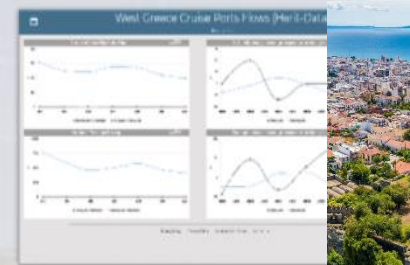
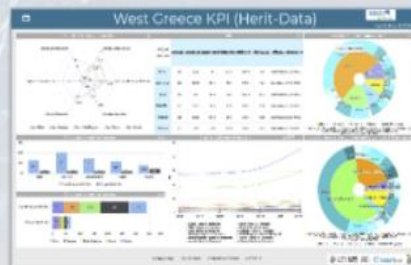
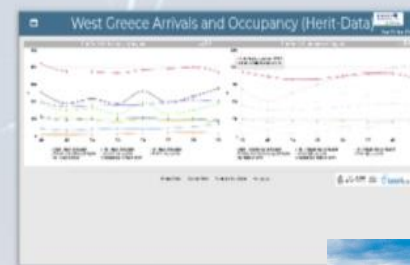
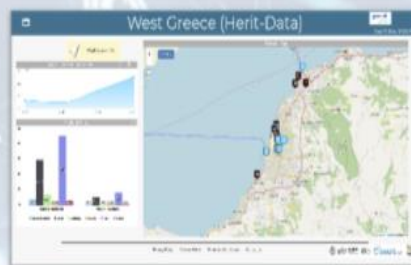
- Monitoring KPI
- People flows
- Twitter Vigilance

- **Historical and updated data**

- **Services Exploited on:**

- Dashboard

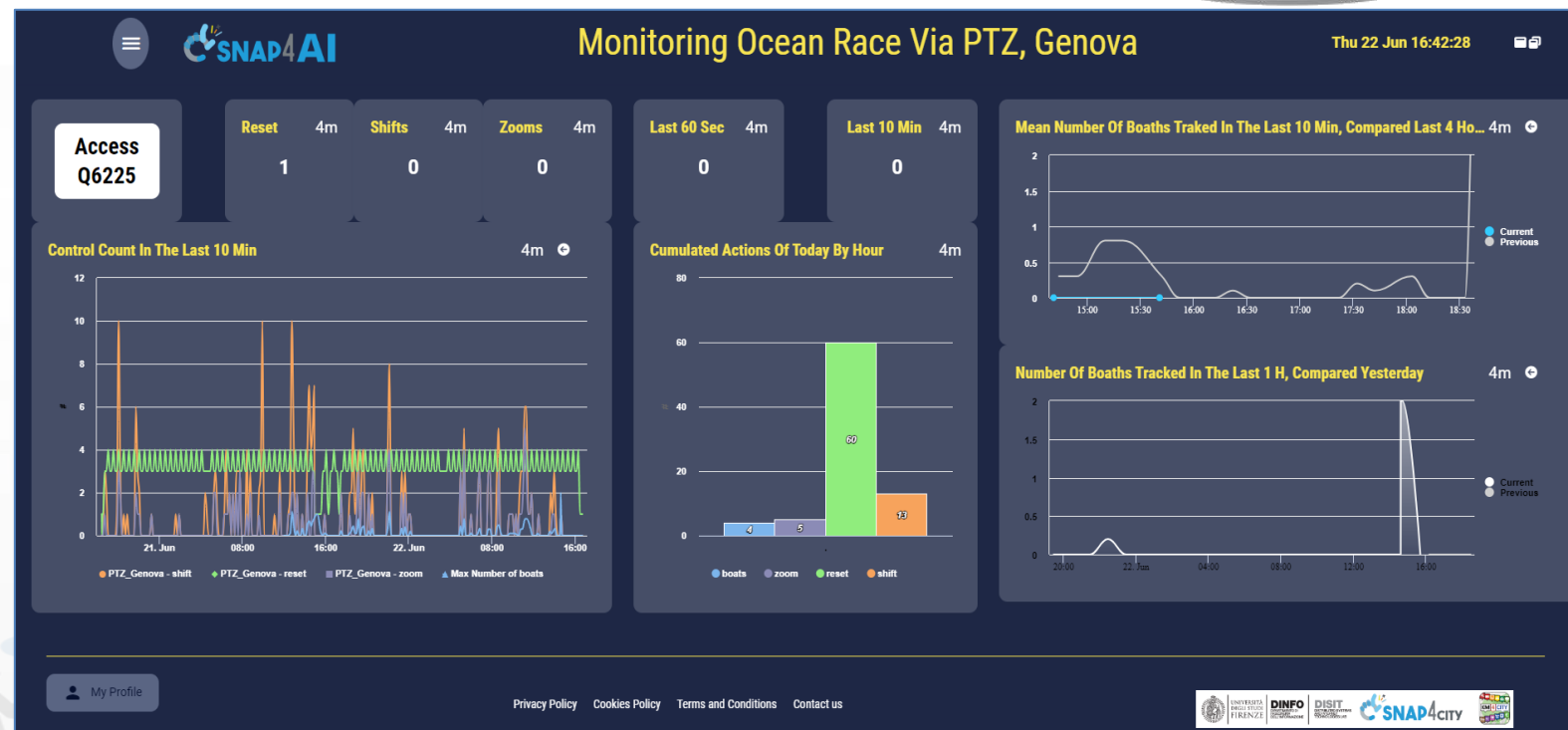
- **Since 2020**



Monitoring Boats AXIS Q6225



- Genova: Ocean Race, 2023



11 SUSTAINABLE CITIES AND COMMUNITIES





Monitoring Ocean Race Via PTZ, Genova

Mon 26 Jun 23:57:01



Access
Q6225

Reset 9m Shifts 9m Zooms 9m

2 0 0

Last 60 Sec 9m

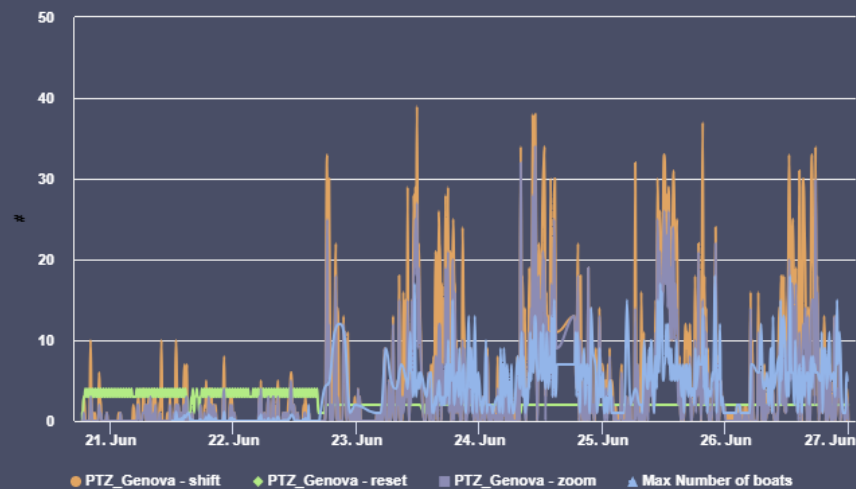
2

Last 10 Min 9m

5

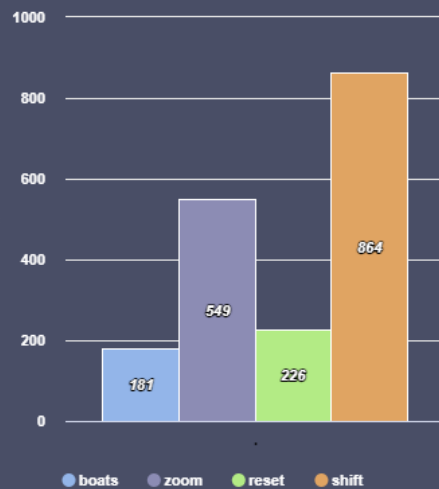
Control Count In The Last 10 Min

4m



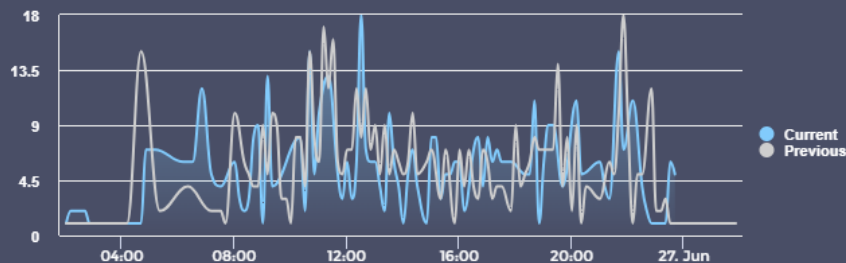
Cumulated Actions Of Today By Hour

4m



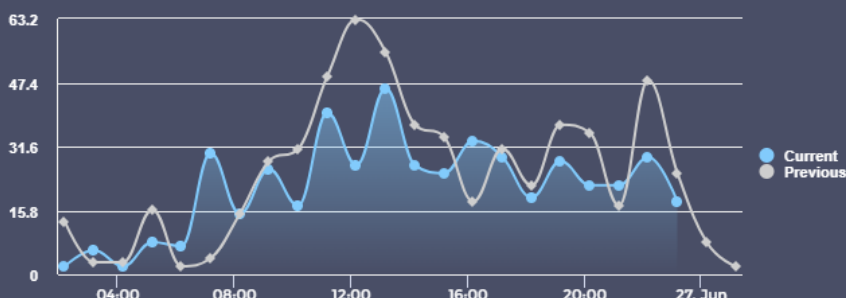
Mean Number Of Boaths Traked In The Last 10 Min, Compared Last 24 H...

9m



Number Of Boaths Tracked In The Last 1 H, Compared Last 24 Hours

9m



TOP

Predicting Service's Load *via NLP, LLM on Social Media*



Dubrovnik

- **Tourism Domain**

- Counting People
- TV Cameras and WiFi
- Social Media

- **Dashboards**

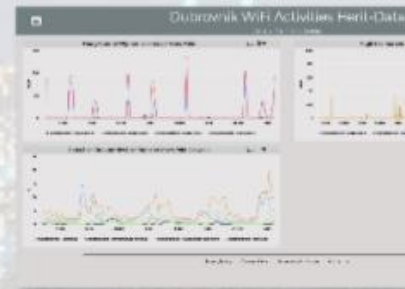
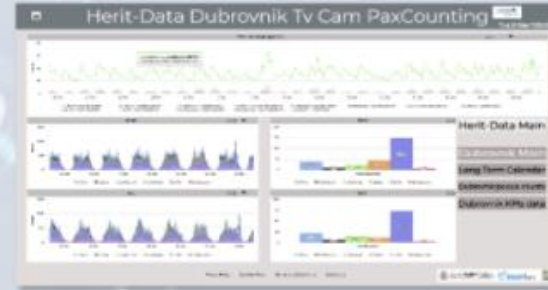
- Monitoring and real time control
- People flow
- Twitter Vigilance

- **Historical and Real Time data**

- **Services Exploited on:**

- Dashboard

- **Since 2020**



Pont du Gard

- **Tourism Domain**

- KPIs
- Social Media
- People Flows
- Bike Flows

- **Dashboards**

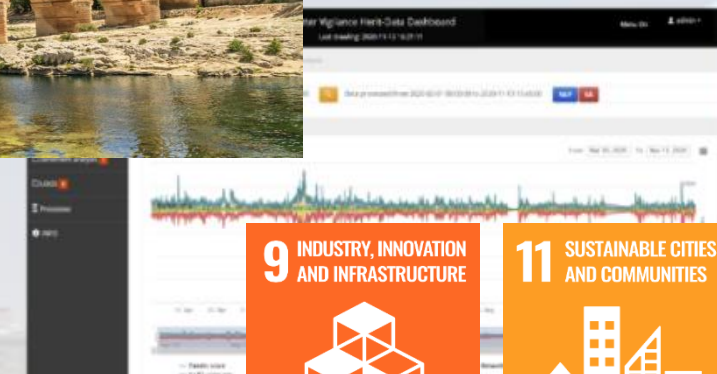
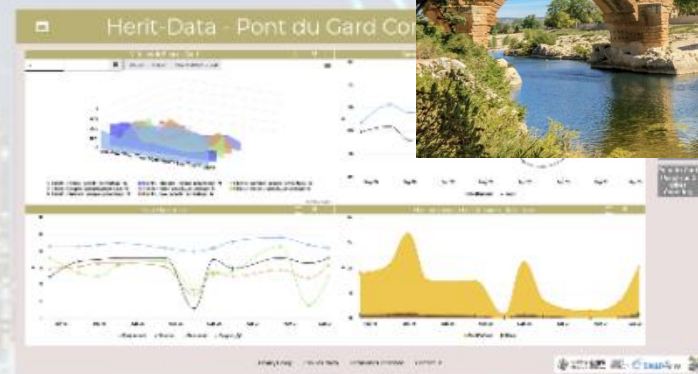
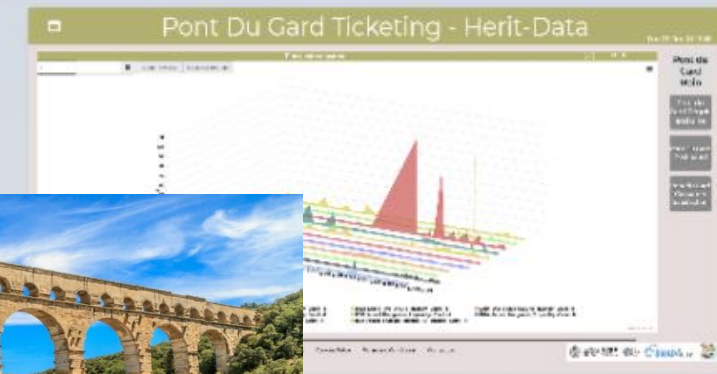
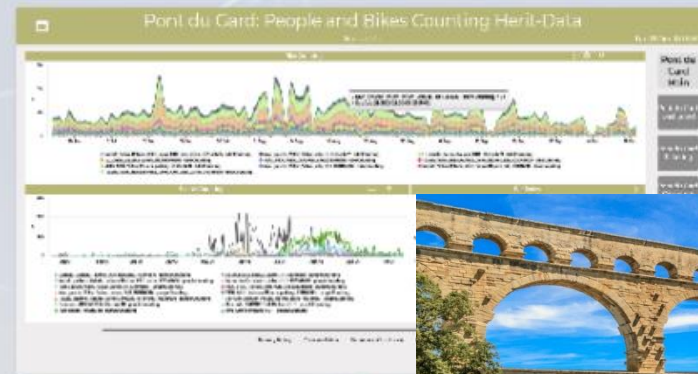
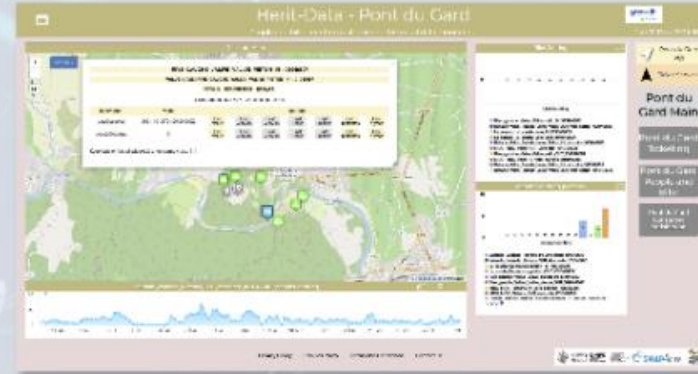
- Monitoring KPI
- People and bikes flows
- Twitter Vigilance

- **Historical and updated data**

- **Services Exploited on:**

- Dashboard

- **Since 2020**

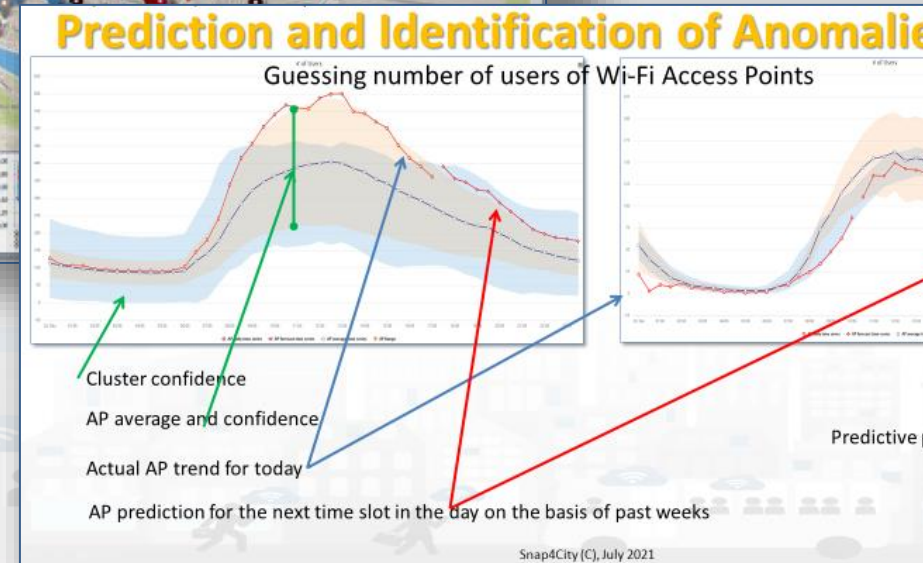
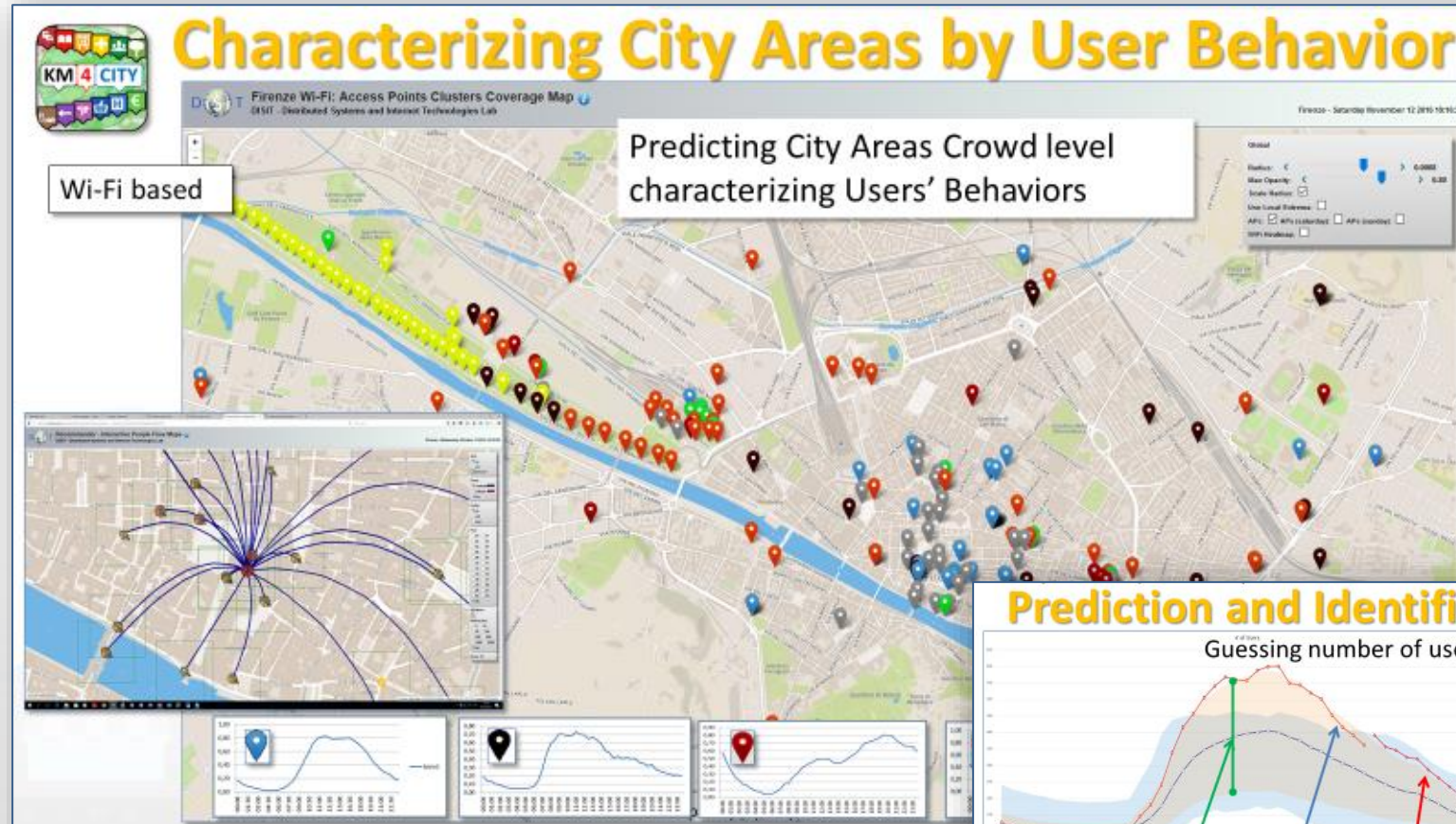


TOP

Critical Conditions Monitoring/Detection



- Prediction of people flows on the basis of Wi-Fi data
- Anomaly detection
- Resolute H2020
- Classification of city areas





Ispra Site, Buildings And Services

Mon 23 Oct 12:42:28



Building / Floor / Parking:

Building

All / Single Building:

All

Variable:

occupancy

Popup on Shape Click



Add To Map



Ispra - Occupancy 8m

883

Ispra - Occupancy

8m



ISPRA Site



- Date Observed: 10/23/2023, 12:30:01 PM
- Capacity: 2936 #
- Allocation: 1995 #
- Occupancy: 883 #
 - DAC: -941 #
 - DOA: -1112 #
 - DOC: -2053 #
 - PAC: 67.95 %
 - POA: 44.26 %
 - POC: 30.07 %
- Energy Hot: 4473978 kWh
- Energy Cold: 916361 kWh
- Power Hot: 36 kW
- Power Cold: 0 kW
- Outdoor Temperature: 14.07 °C
- Total Number of Buildings: 76 of 304 #
- Total Number of Floors: 104 #
- Total Number of Zones: 139 #
- Total Number of Parking Areas: 4 #

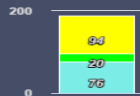
See Trends

Parking Overview

person My Profile

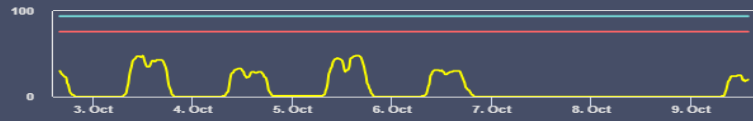


Actual 4m



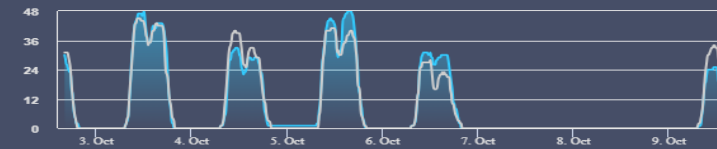
● Capacity
● Occupancy
● Allocation

Capacity - Allocation - Occupancy 4m



● capacity ● occupancy ● allocation

Occupancy Weekly Time Trend Compare 9m



● Current
● Previous

Office Mq 9m

803.9 m²

Temp. 9m

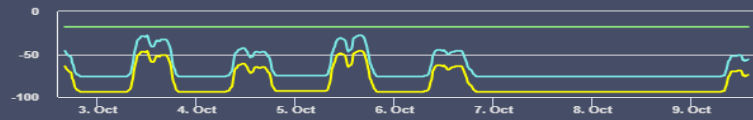
20.6 °C

Difference 4m



● DOA
● DOC
● DAC

DOA - DOC - DAC 4m



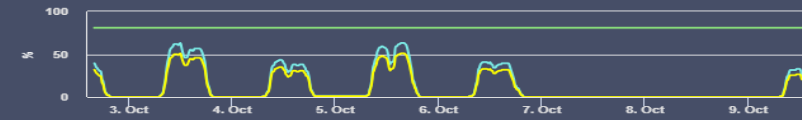
● DOA ● DOC ● DAC

Percentage 4m



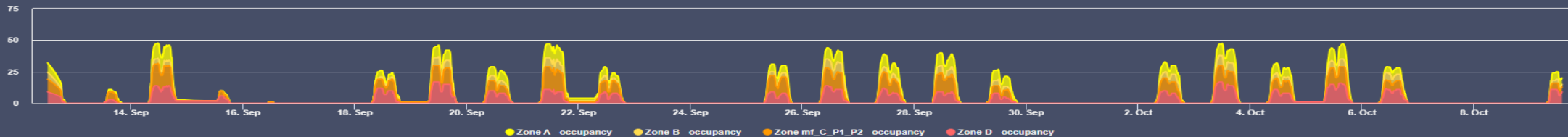
● POA
● POC
● PAC

POA - POC - PAC 4m



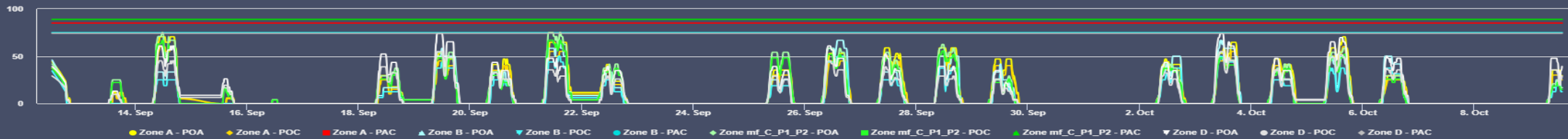
● POA ● POC ● PAC

Occupancy Per Zones - Monthly Time Trend Comparison Stacked 4m



● Zone A - occupancy ● Zone B - occupancy ● Zone mf_C_P1_P2 - occupancy ● Zone D - occupancy

Percentage Per Zones - Monthly Time Trend Comparison 4m



● Zone A - POA ● Zone A - POC ● Zone A - PAC ● Zone B - POA ● Zone B - POC ● Zone B - PAC ● Zone mf_C_P1_P2 - POA ● Zone mf_C_P1_P2 - POC ● Zone mf_C_P1_P2 - PAC ● Zone D - POA ● Zone D - POC ● Zone D - PAC

Heat Power 9m

0 kW

Heat Energy 9m

1931279 kWh

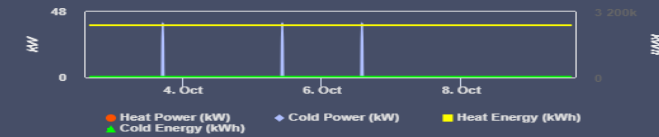
Cold Power 9m

0 kW

Cold Energy 9m

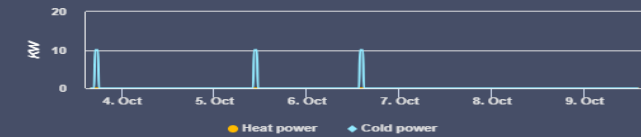
888311 kWh

Energy Trends 4m



● Heat Power (kW) ● Cold Power (kW) ● Heat Energy (kWh)

Average Hourly Power 4m



● Heat power ● Cold power

En./Mq 9m

0 kWh

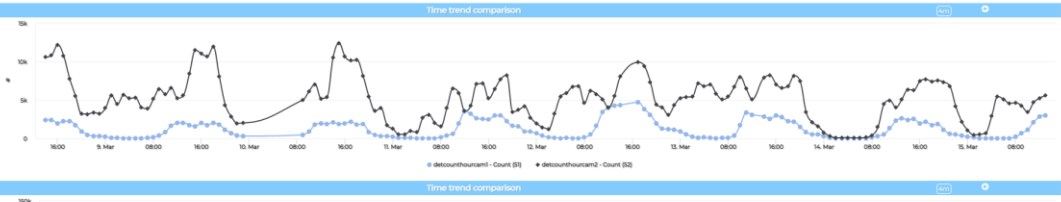
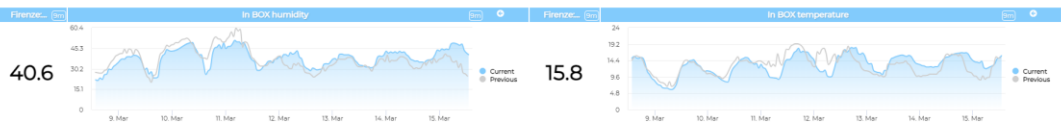
En./Pax 9m

0 kWh

A view and data from the Thermal Camera



Detection BOX Snap4Thermal PV Firenze Tue 15 Mar 13:30:41





<https://www.snap4city.org/dashboardSmartCity/view/Gea.php?iddashboard=MzM3Ng==>



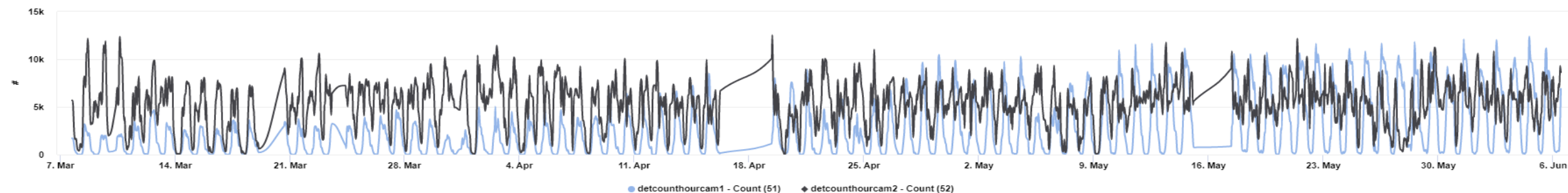
Detection BOX Snap4Thermal PV Firenze

Thu 30 Mar 23:55:16



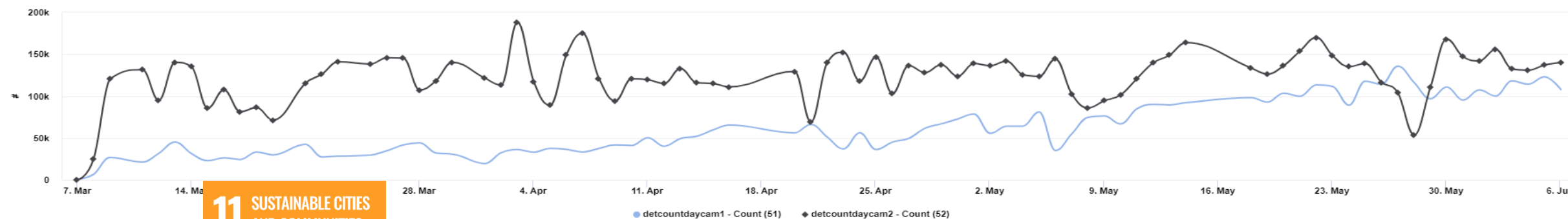
Time Trend Comparison

4m



Time Trend Comparison

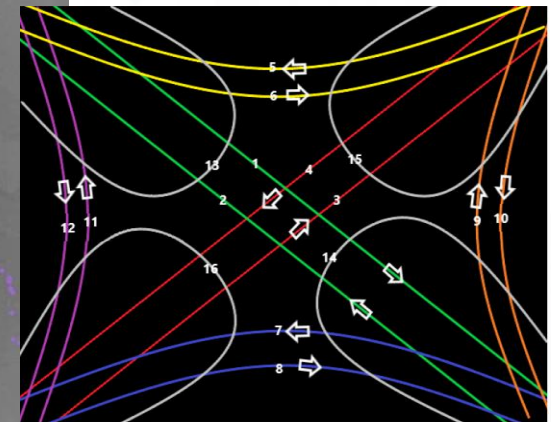
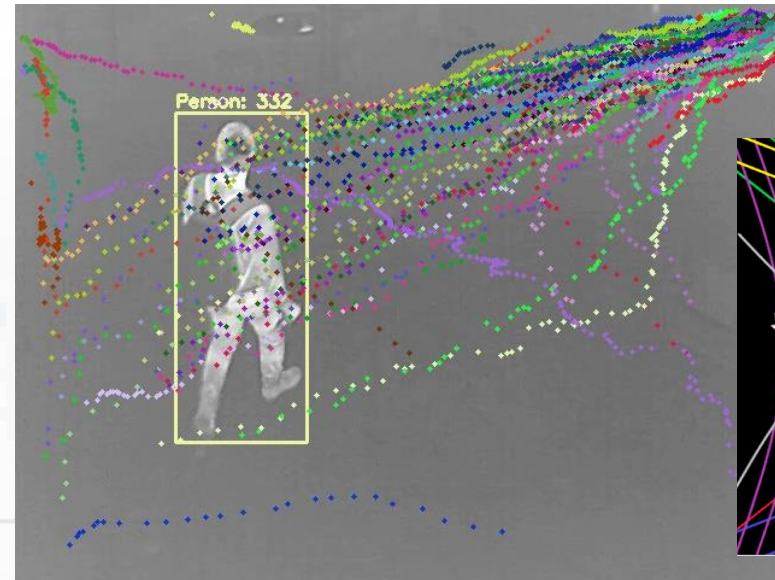
4m



11 SUSTAINABLE CITIES
AND COMMUNITIES



People Counting and Tracking



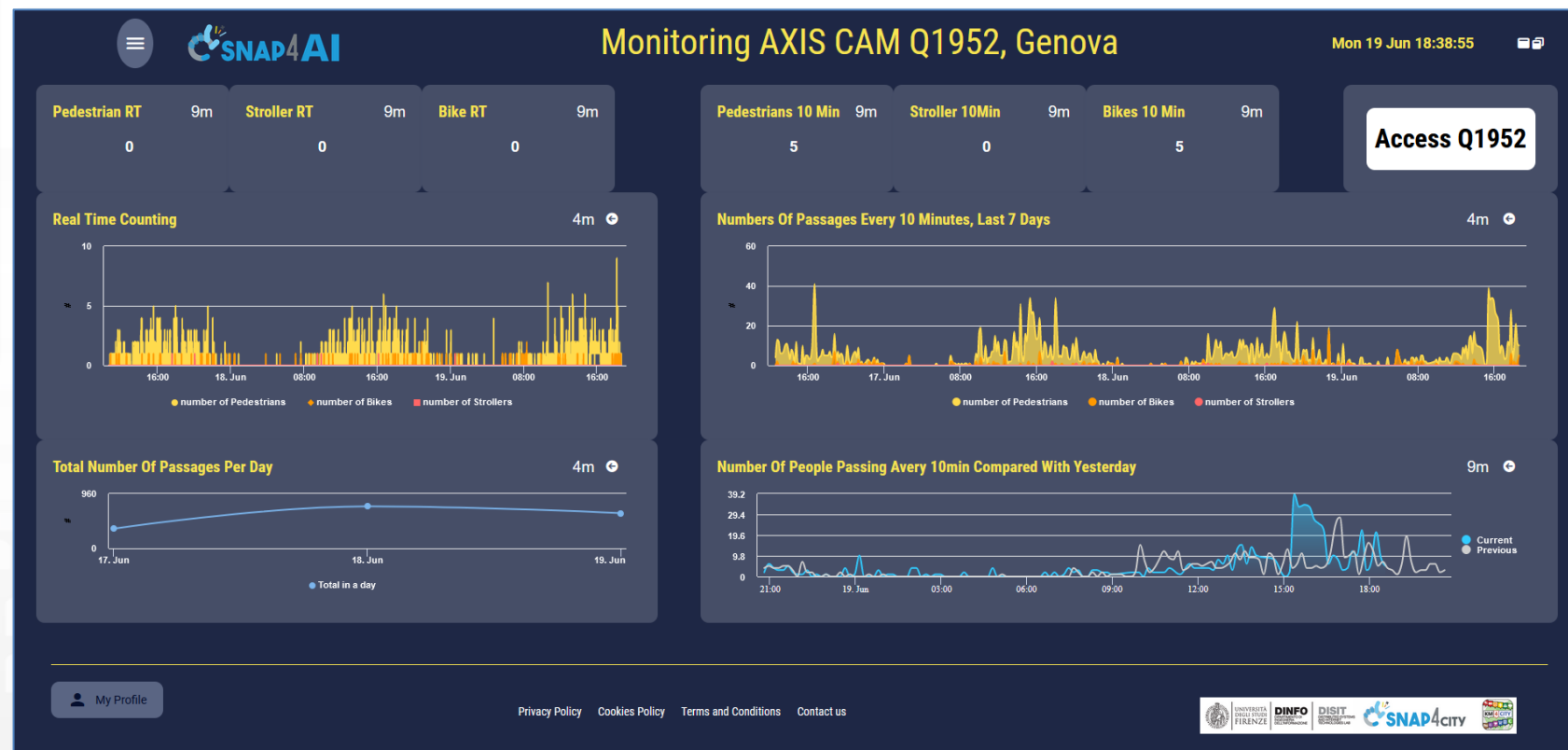
11 SUSTAINABLE CITIES
AND COMMUNITIES

3X



Monitoring Passages AXIS Q1952

- Genova: Ocean Race, 2023



11 SUSTAINABLE CITIES
AND COMMUNITIES



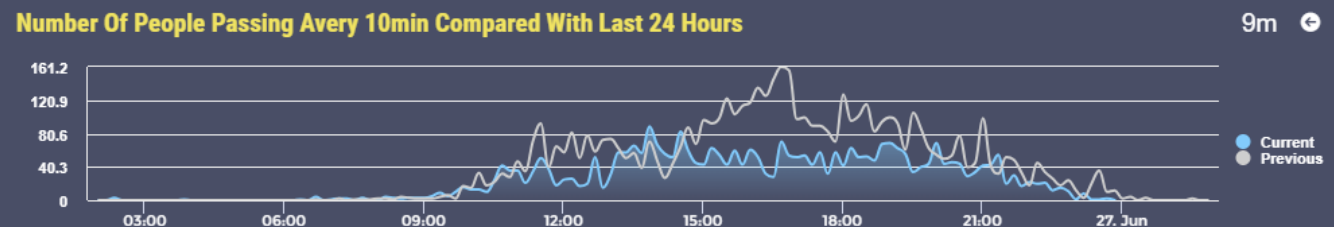
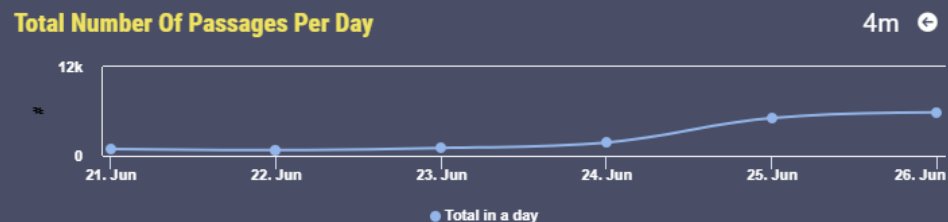
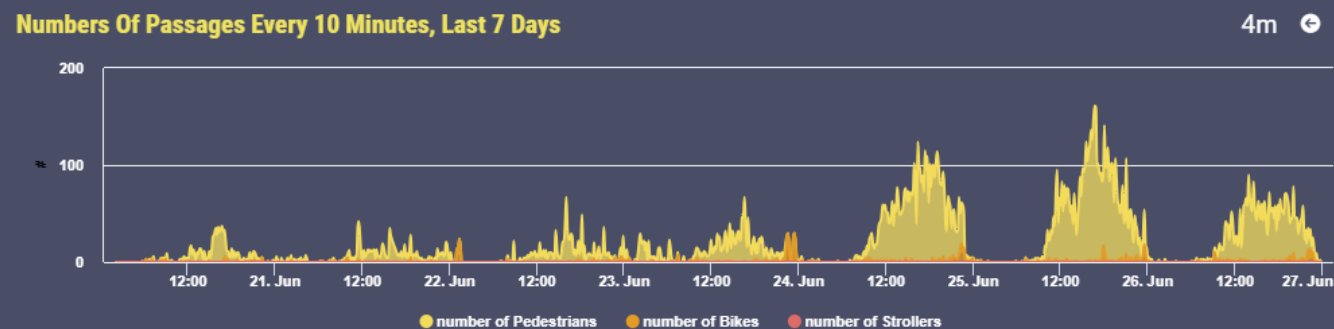
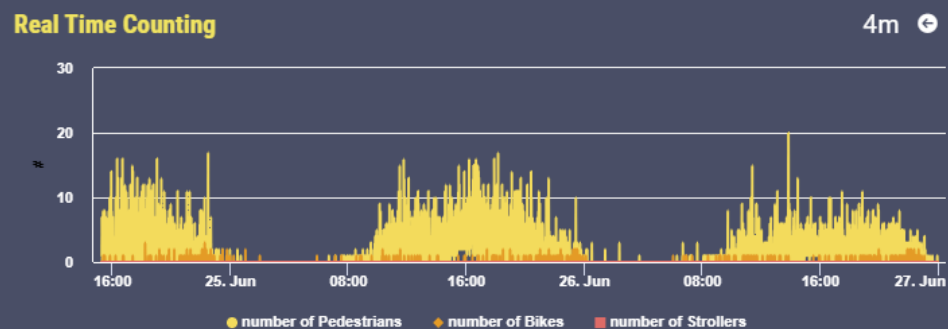
Pedestrian RT 9m **Stroller RT** 9m **Bike RT** 9m

0 0 0

Pedestrians 10 Min 9m **Stroller 10Min** 9m **Bikes 10 Min** 9m

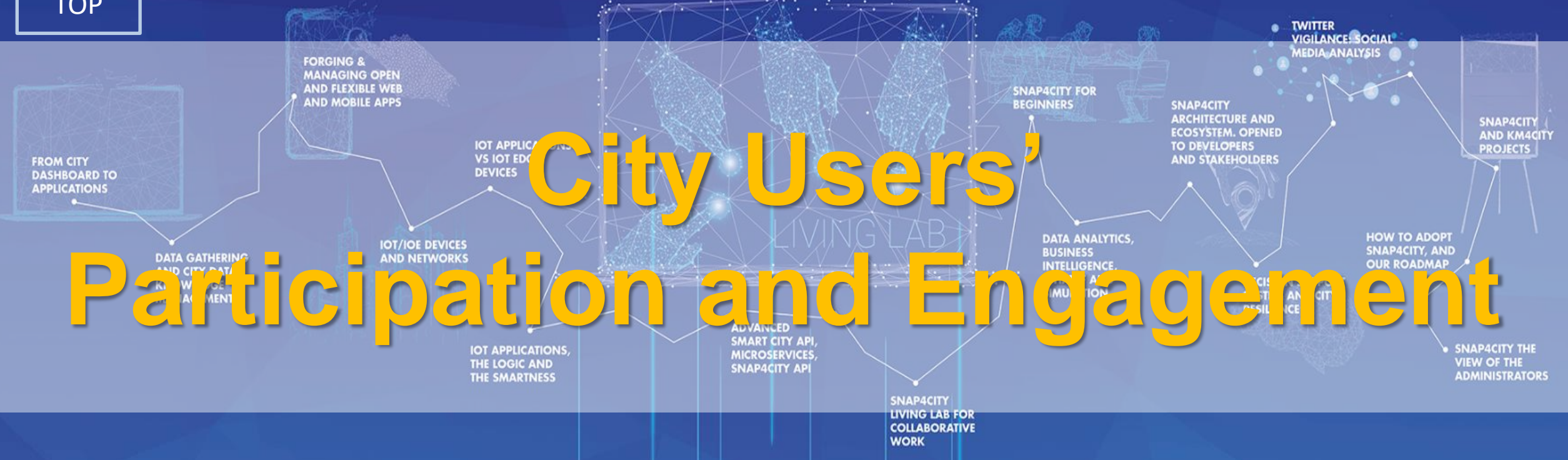
0 0 0

Access Q1952



TOP

City Users' Participation and Engagement



Participation and Engagement

- **City users:** residents, students, commuters, tourists, visitors, business visitors, etc.
- **Participation**
 - Collect complaints about city services
 - Multichannel: mobile Apps, open call numbers, web pages and blogs, social media, help desk, info points, white boxes in the city, telegrams, SMS, etc.
 - Data integration, usage of LLM, AI deep learning
- **Engagement**
 - Involving city users to perform actions: take photo, provide a suggestion a rank, etc.
- **Commonalities:** data collection, workflow management, operators, etc.

Operator Interface to manage complains

The screenshot displays the 'Participation App Dashboard INITtoACK' for Wednesday, 14 Aug 17:31:43. It features a 'Complain Location' map of Florence and an 'INIT Complains List' table with 499 items. The table includes columns for Device, DateObserved, Description, Motivation, and Actions. Below the table, there is a 'Media Attached' section with 'No Data Available' and an 'Update Complain' form with a description field and 'Update' and 'Hide' buttons.

| Device | DateObserved | Description | Motivation | Actions |
|----------------------|--------------------------|----------------------|-----------------------------|---------|
| 1715027648476_device | 2024-08-12T13:54:06.676Z | graffi/buchi/scr. | Damage in Municipality park | [Icons] |
| 1717852813654_device | 2024-08-04T13:30:13.852Z | graffiti on my house | Graffiti | [Icons] |
| 1717851541954_device | 2024-08-04T13:39:01.953Z | graffiti on my house | Graffiti | [Icons] |
| 1717910286458_device | 2024-08-04T14:31:28.457Z | | Diagnostica | [Icons] |
| 1717507900604_device | 2024-08-04T13:31:40.604Z | | Apple | [Icons] |

- mobile app Toscana in a Snap: <https://www.snap4city.org/541>
- User Engagement: <https://www.snap4city.org/486>
- MultiPurpose user engagement: <https://www.snap4city.org/548>
- User Engagement admin: <https://www.snap4city.org/472>

<https://www.snap4city.org/1018>

Engaging via Mobile Apps

FROM CITY
DASHBOARD TO
APPLICATIONS

DATA
AND KNOW
MAN

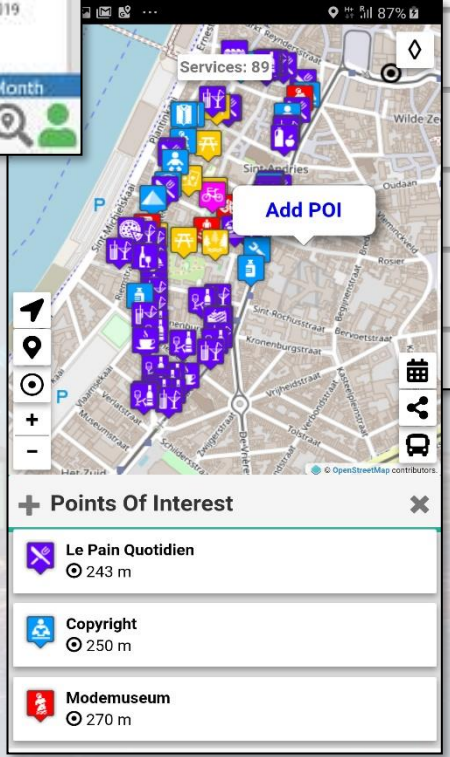
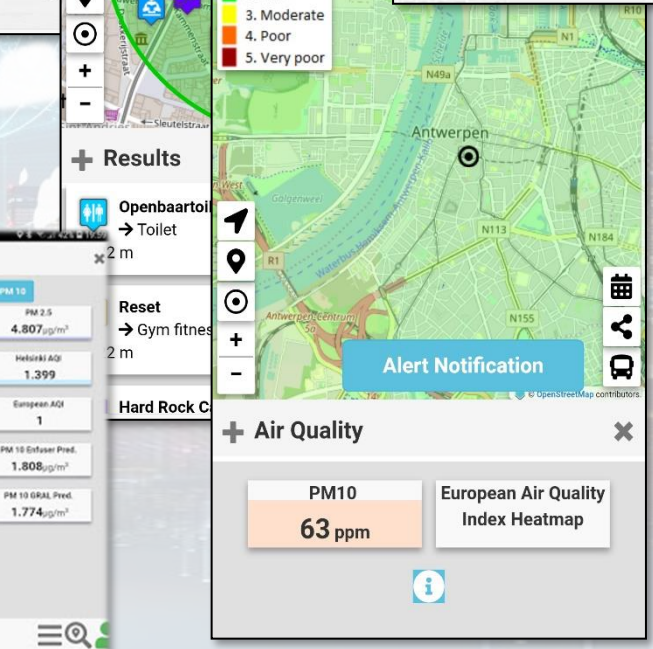
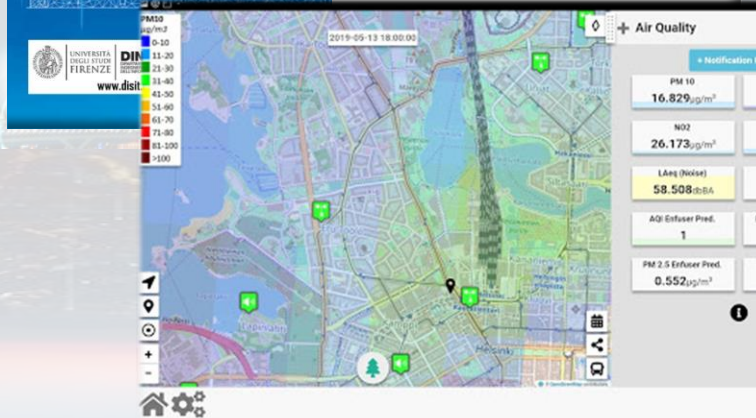
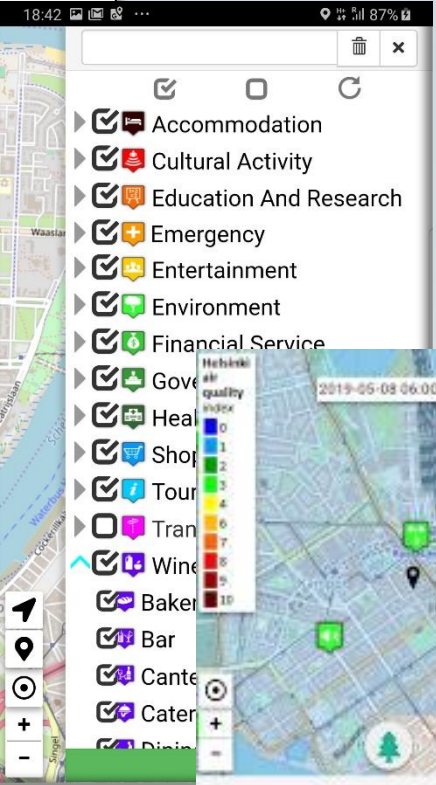
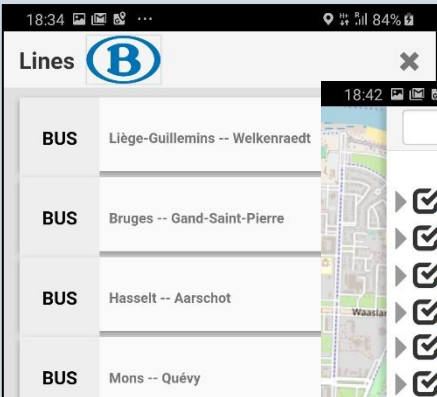
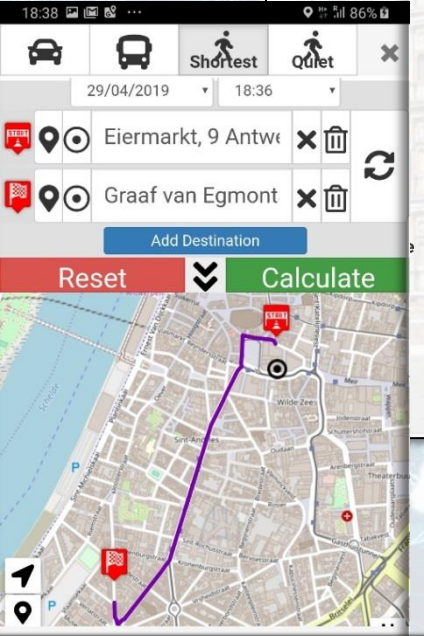
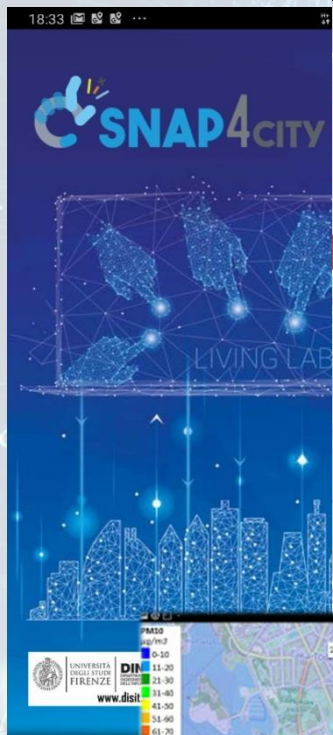
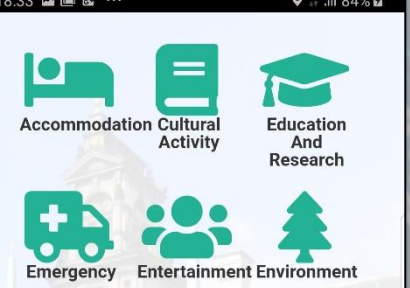


SNAP4CITY
AND KM4CITY
PROJECTS

TO ADOPT
SNAP4CITY, AND
ROADMAP

SNAP4CITY THE
VIEW OF THE
ADMINISTRATORS







Citizen Engagement/Participation via Mobile Apps

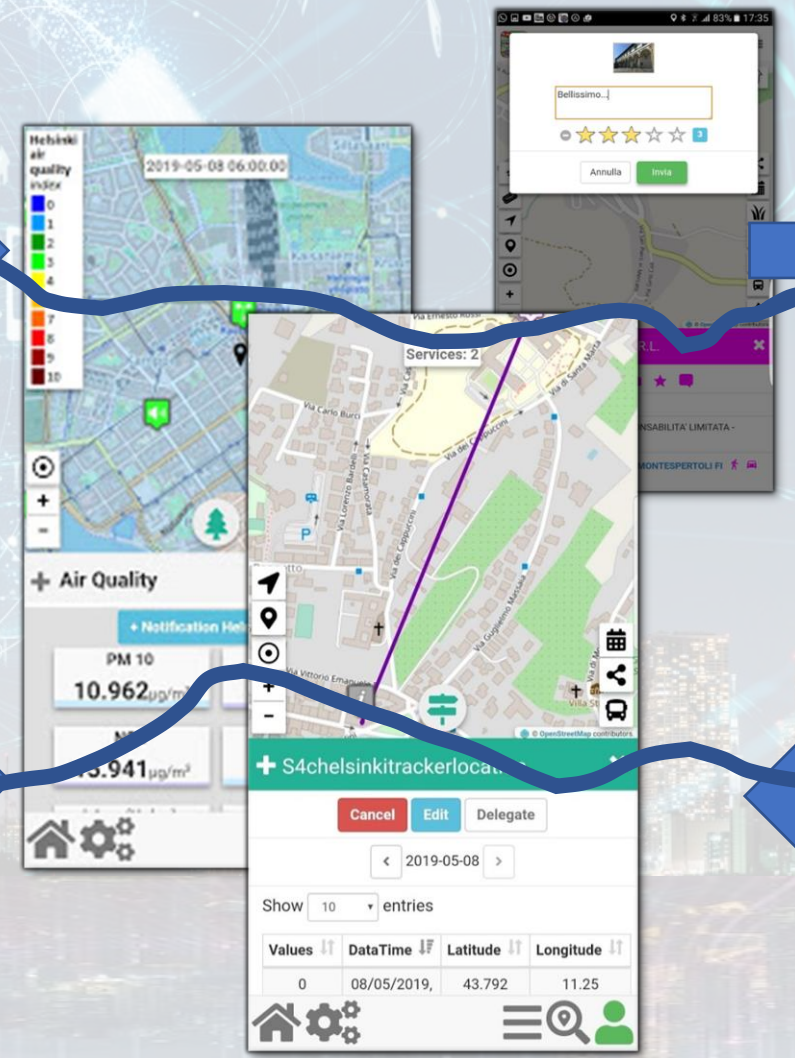
- GPS Positions
- Selections on menus
- Views of POI
- Access to Dashboards
- searched information
- Routing
- Ranks, votes
- Comments
- Images
- Subscriptions to notifications
-

Produced information

- Viewed ?
- Accepted ?
- Performed ?
- ...

Users

Snap4City (C), Sept. 2024



Derived information

- Trajectories
- Hot Places by click and by move
- Origin destination matrices
- Most interested topics
- Most interested POI
- Delegation and relationships
- Accesses to Dashboards
- **Cumulated Scores from Actions**
- Requested information
- Routing performed
-

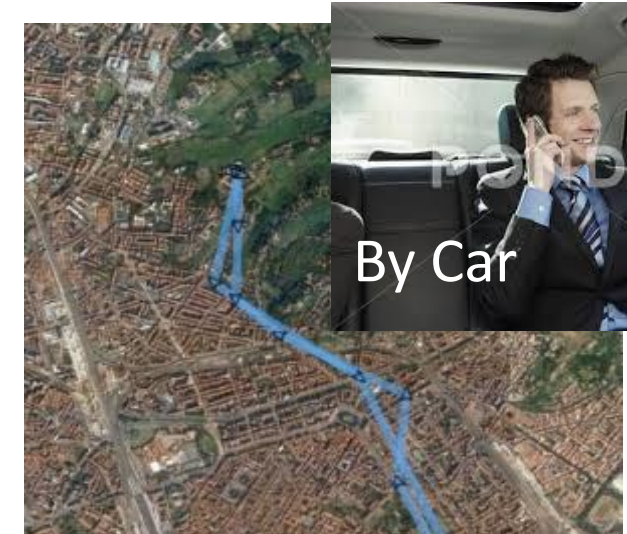


Produced information

- Suggestions
- Engagements
- Notifications
- ...

System

To propose suggestions and Engage city user we need to know how they are moving



By Car



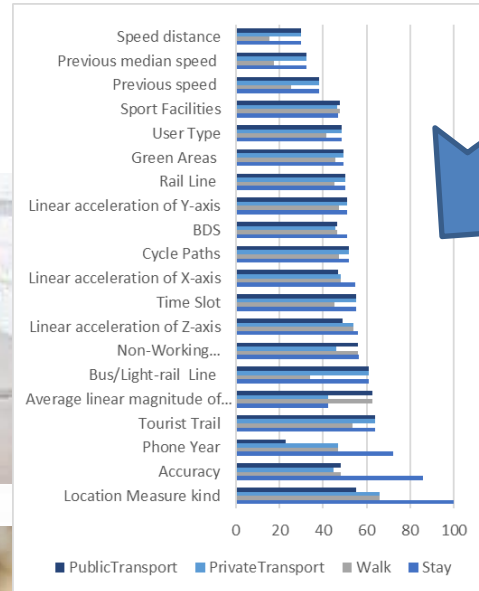
Walk



By BUS

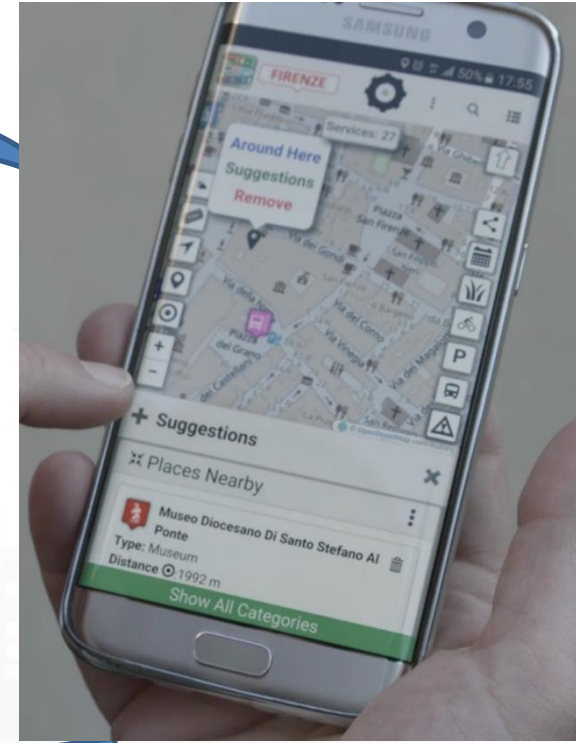


Run

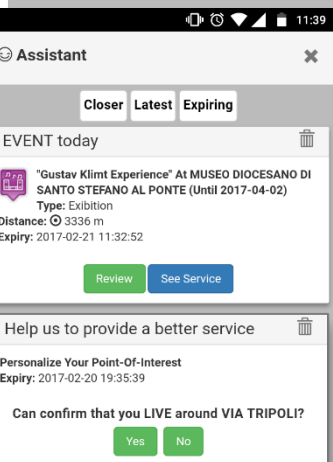
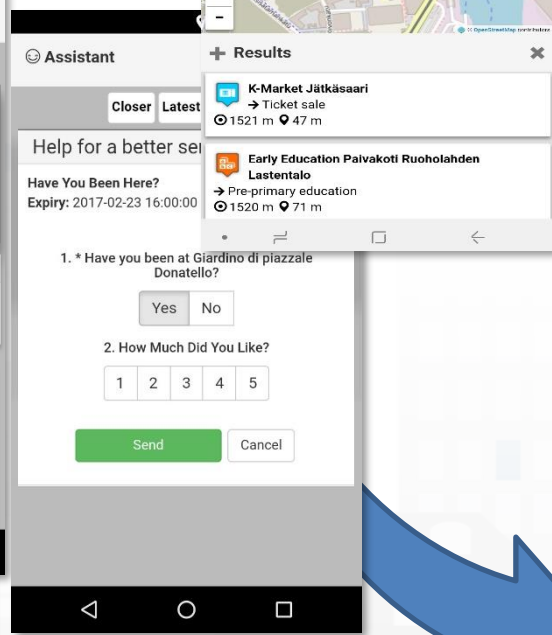
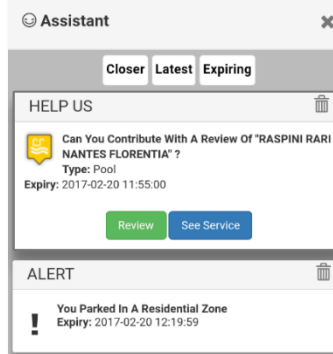
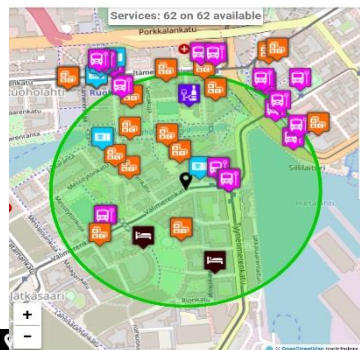
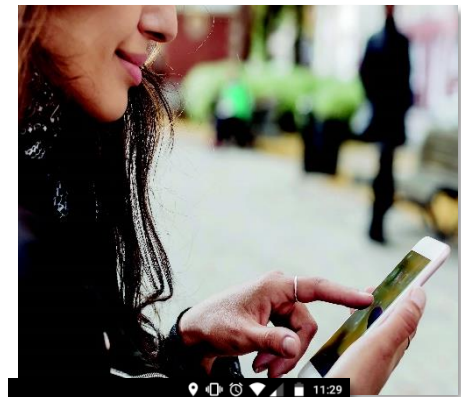


Artificial Intelligence
Classification

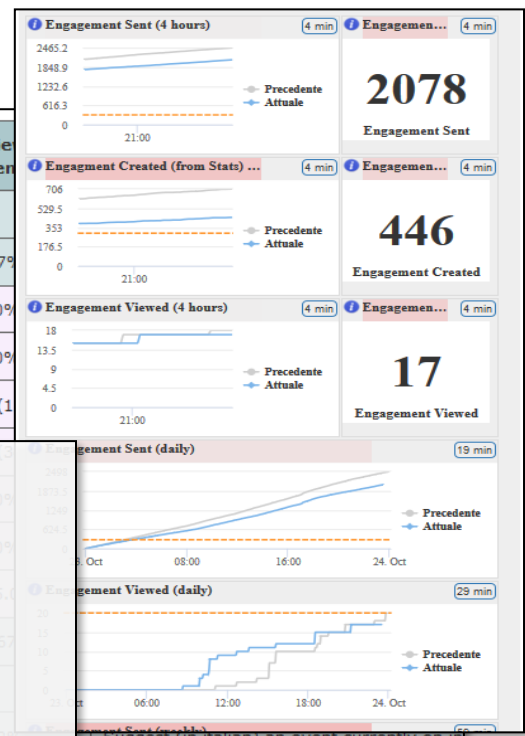
Suggestions



Users' Engagement



| Rule name | Type | #sent | #viewed | #viewed / #sent |
|----------------|------------|--------------|-------------|-----------------|
| daily_event_de | ENGAGEMENT | 1 (0%) | 0 (0%) | 0% |
| daily_event_en | ENGAGEMENT | 1720 (2.12%) | 70 (7.1%) | 4.07% |
| - commuter | | 5 (0.29%) | 0 (0%) | 0 (0%) |
| - student | | 14 (0.81%) | 0 (0%) | 0 (0%) |
| - tourist | | 1462 (85%) | 25 (35.71%) | 25 (17.1%) |



Inform
Air Quality forecast is not very nice
You have parked out of your residential parking zone
The Road cleaning is this night
The waste in S.Andreas Road is full

Engage
Provide a comment, a score, etc.

Stimulate / recommend
Events in the city, services you may be interested, etc..

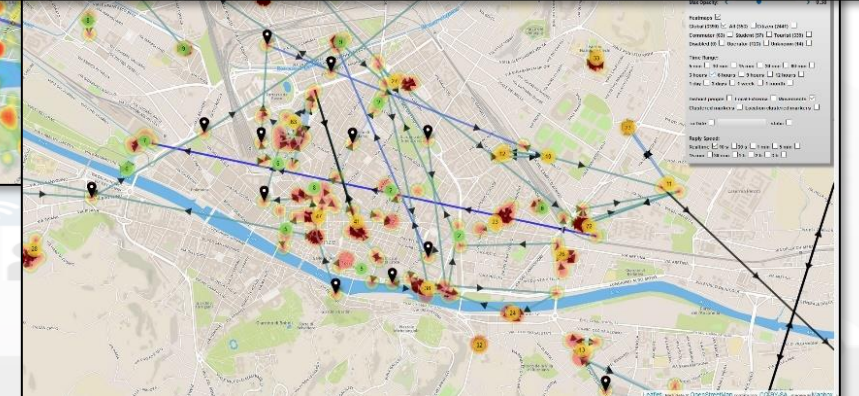
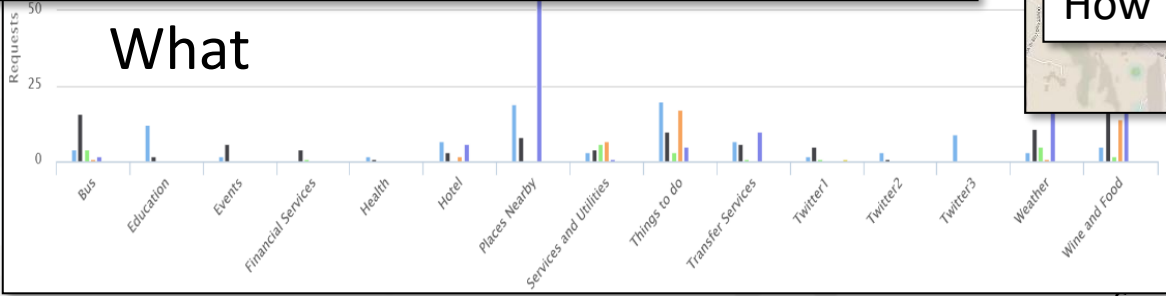
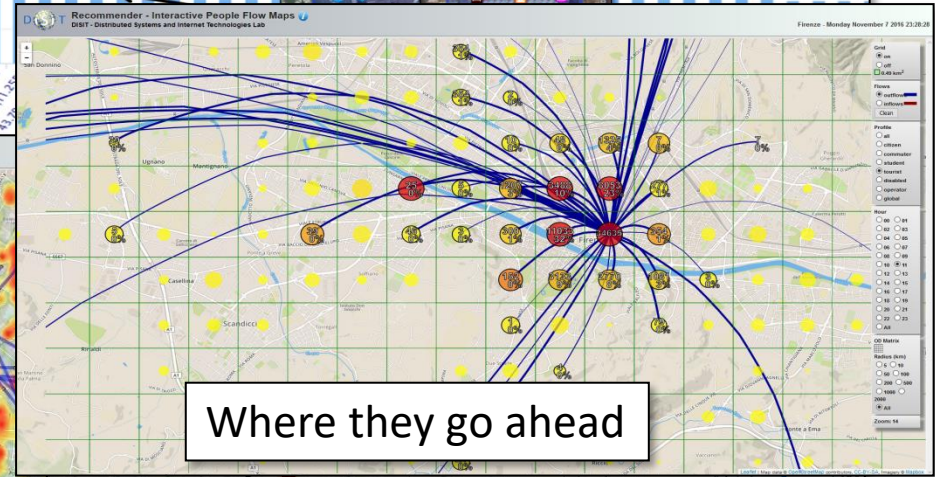
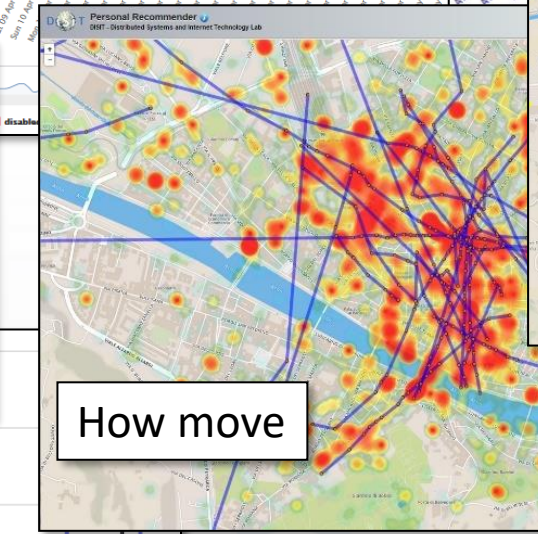
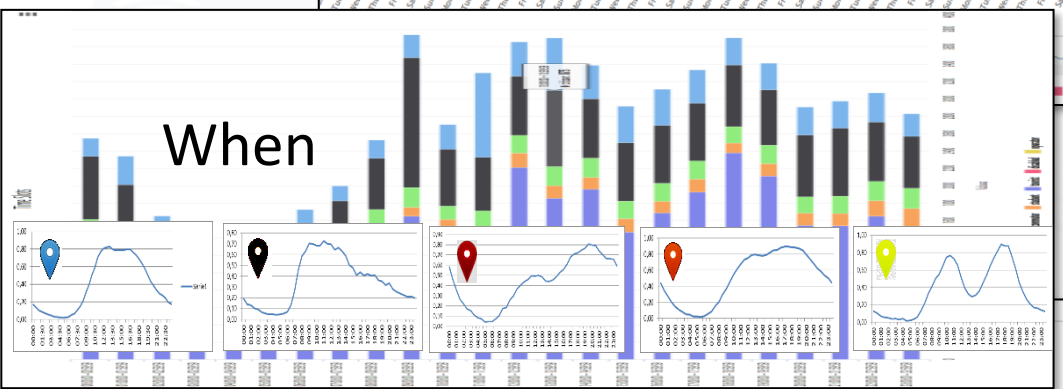
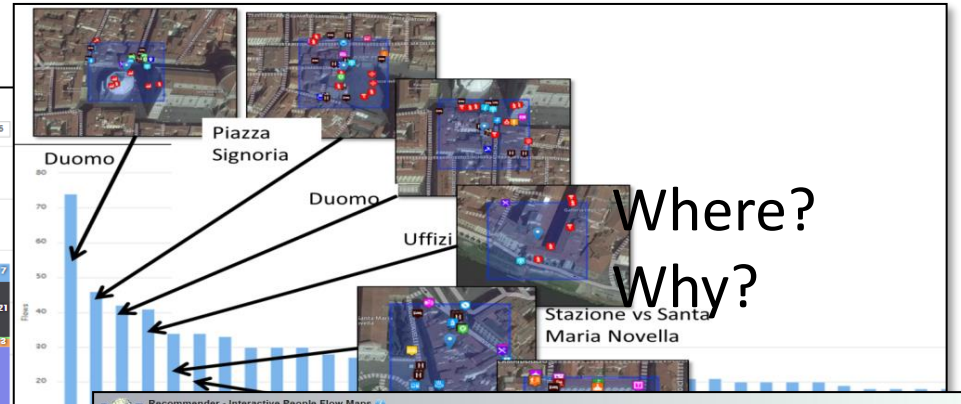
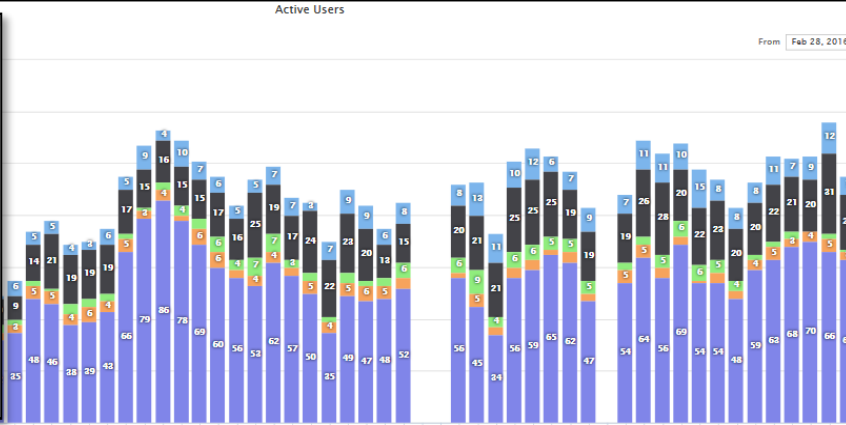
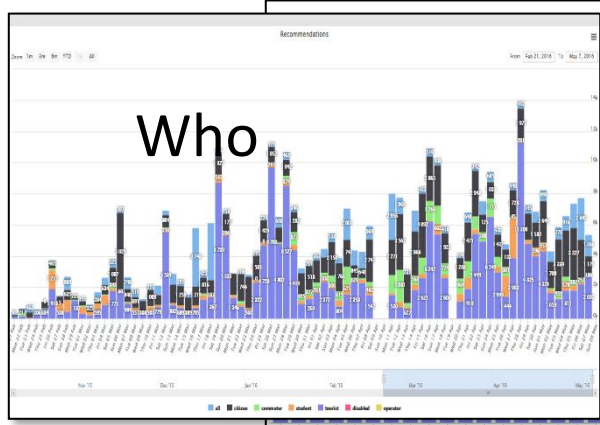
Provide Bonus, rewards if needed
you get a bonus since you parked here
We suggest: leave the car out of the city, this bonus can be used to buy a bus ticket

User context

City context

Rules

User Behavior Analyser for Collective Profiling



TOP

Safety Control Integration with Video Management Systems

FORGING & MANAGING OPEN AND FLEXIBLE WEB AND MOBILE APPS

FROM DASHBOARD APPLICATION

IOT APPLICATIONS FOR STREET DEVICES

SNAP4CITY FOR BEGINNERS

SNAP4CITY ARCHITECTURE AND ECOSYSTEM. OPENED TO DEVELOPERS AND PARTNERS

TWITTER VIGILANCE: SOCIAL MEDIA ANALYSIS

SNAP4CITY AND KM4CITY PROJECTS

COLLECTING AND CATEGORIZING AND CITY DATA INTO A USER FRIENDLY MANAGEMENT

IOT/IOE DEVICES AND NETWORKS

LIVING LAB

DATA ANALYTICS, BUSINESS INTELLIGENCE, WORKFLOW AND SIMULATION

HOW TO ADOPT SNAP4CITY, AND OUR ROADMAP

IOT APPLICATIONS, THE LOGIC AND THE SMARTNESS

ADVANCED SMART CITY API, MICROSERVICES, SNAP4CITY API

SNAP4CITY THE VIEW OF THE ADMINISTRATORS

SNAP4CITY LIVING LAB FOR COLLABORATIVE WORK

Integration with MILESTONE XProtect Video Management



Event Management

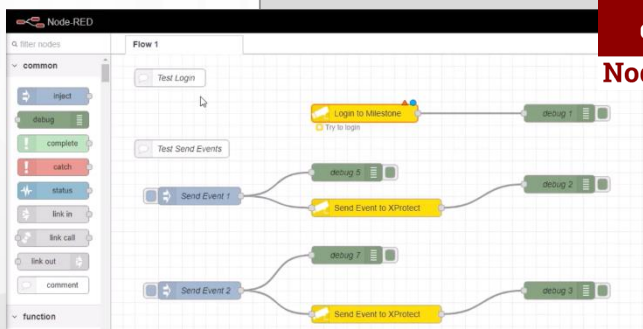
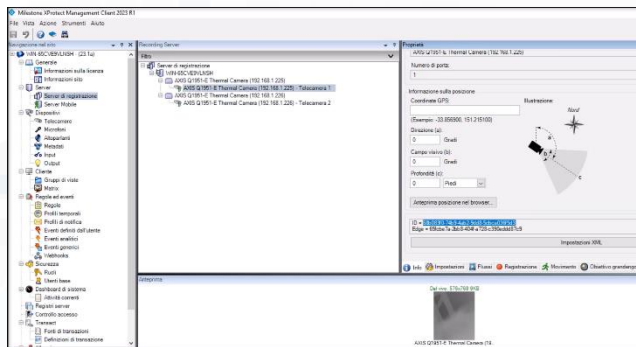
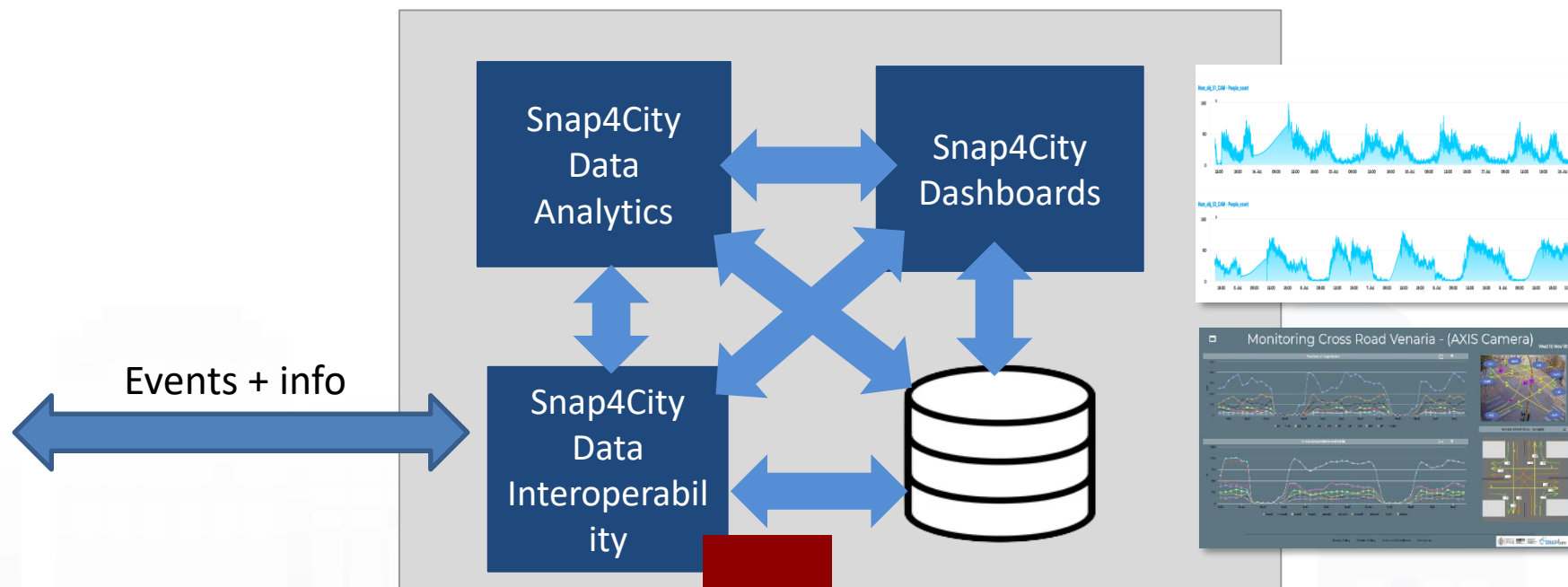
The screenshot shows the SNAP4CITY Event Registration web application. The interface is dark-themed and includes a top navigation bar with various utility links. The main content area is divided into several sections:

- Left Sidebar:** Contains filters for Severity and Status, and a list of categories: Cameras, Hospital, Traffic Flow, and Weather. At the bottom is an 'EventWebCam' button.
- Map:** A central map of Florence, Italy, showing the Arno river and various districts like Firenze Statuto and Firenze Campo di Marte.
- Form (Insert Alarm Data):** A form for creating an event with fields for Name, Kind, Severity, People Involved, Impact, and Description. It includes 'Clear', 'Register Event', and 'Refresh' buttons.
- Table (Creating Event):** A table displaying a list of registered events with columns for device, Severity, dateObserved, status, and Actions.

| device | Severity | dateObserved | status | Actions |
|---------------------------------------|----------|--------------------------|--------|---------|
| fireonplazgardon20231031T221304273Z | Yellow | 2023-10-31T22:13:04.273Z | init | |
| Telecamera4_22320231031T14213584Z | Yellow | 2023-10-31T14:21:35.84Z | init | |
| CarCrash20231031T134436250Z | Orange | 2023-10-31T13:44:36.250Z | init | |
| CriticalTrafficJam20231031T132718888Z | Red | 2023-10-31T13:27:18.888Z | init | |
| FloodedRoad20231031T132309212Z | White | 2023-10-31T13:23:09.212Z | init | |

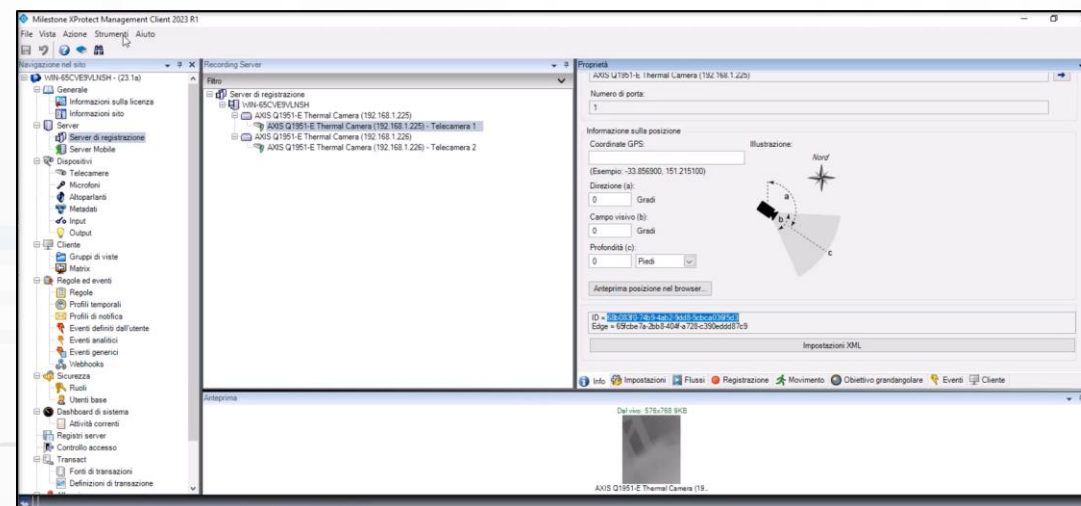
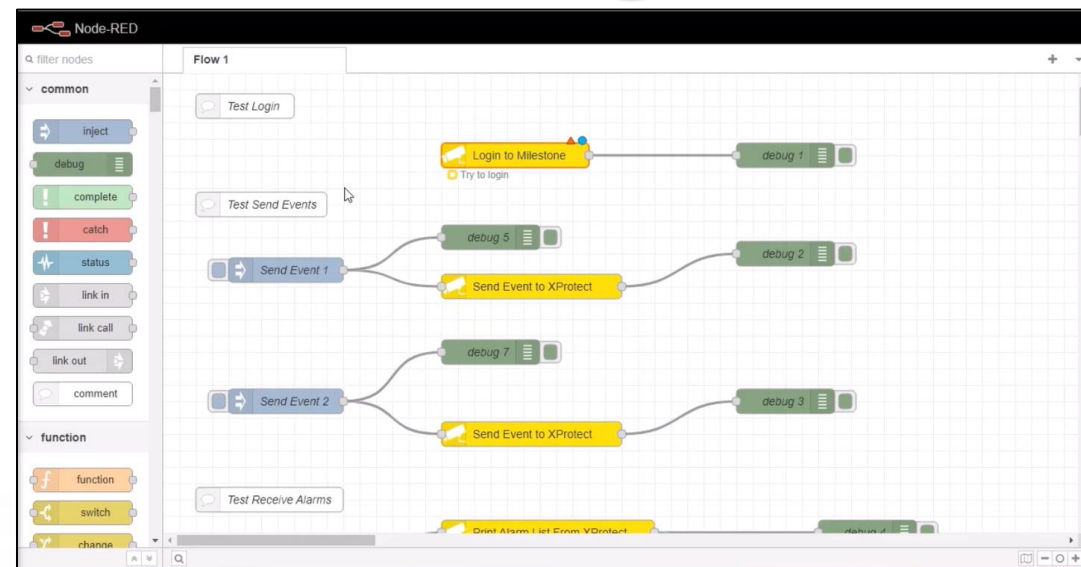
At the bottom of the page, there is a footer with 'My Profile' button, 'Privacy Policy', 'Cookies Policy', 'Terms and Conditions', and 'Contact us' links, along with logos for the University of Florence, DINFO, DISIT, and SNAP4CITY.

VMS vs Snap4City: sending and getting events, AI solutions



Snap4City ↔ Milestone Integration

- Snap4City VMS Library on Node-RED
- Functionalities:
 - Registering IoT App/Proc.Logic on VMS Milestone
 - Receiving event of VMS into Snap4City platform via Node-RED, on cloud or on premise
 - Sending Snap4City Events into VMS Milestone



Cuneo Assets' Monitoring, Safety



☰ SNAP4
Monitoraggio Generale
Thu 4 Jan 18:13:19

- ▶ CameraModelP1448-LE
- ▶ UpsModelRiello
- ▶ UpsModelSeltec
- ▶ SwitchModelMicrosense
- ▶ SwitchModelNetonix

Legenda

| Valore | Significato | Simbolo |
|--------|-------------------------------------|---------|
| 0 | Buono stato | ● |
| 1 | Non raggiungibile | ● |
| 2 | Raggiungibile, dati non disponibili | ● |
| 3 | Identificata anomalia | ● |

▲ TempValu... 9m

49

▲ TempValue1 - 7 Days

My Profile
Privacy Policy Cookies Policy Terms and Conditions

☰ SNAP4
Monitoraggio Dettagliato
Thu 4 Jan 18:05:15

Tabella Device

Cerca per Indirizzo, ID o device... Camera UPS Switch

| ID | Stato | Tipo device | Indirizzo | IP | Azioni |
|-----------|-------|-------------|---|---------------|--------|
| TC010182 | ● | Camera | Cuneo Sud Palo Angolo Parco Giochi | 172.16.12.185 | 📍 |
| TC010178 | ● | Camera | Cuneo Sud Palo Alto verso Asilo | 172.16.12.181 | 📍 |
| TC010181 | ● | Camera | Cuneo Sud Palo davanti Biblioteca | 172.16.12.184 | 📍 |
| TC010179 | ● | Camera | Biblioteca Cuneo Sud Esterna Sopra Ingresso | 172.16.12.182 | 📍 |
| TC010184 | ● | Camera | Cuneo Sud Angolo verso Parco Giochi | 172.16.12.187 | 📍 |
| TC010185 | ● | Camera | Cuneo Sud Angolo verso Bar | 172.16.12.188 | 📍 |
| TC010183 | ● | Camera | Cuneo Sud Angolo davanti Megafresco | 172.16.12.186 | 📍 |
| TC010203 | ● | Camera | Rotonda Corso Francia Croce Rossa | 172.16.12.203 | 📍 |
| TC010204 | ● | Camera | Rotonda Corso Francia Distributore | 172.16.12.204 | 📍 |
| SWITCH041 | ● | Switch | Rotonda Corso Francia Croce Rossa | 172.16.15.222 | 📍 |
| TC010202 | ● | Camera | Rotonda Corso Francia Tabaccaio | 172.16.12.202 | 📍 |
| SWITCH040 | ● | Switch | Rotonda Corso Francia Croce Rossa | 172.16.15.223 | 📍 |

Tabella Dettaglio

TC010185

| | |
|---------------|-------------------|
| dateObserved | 04/01/2024, 14:34 |
| generalStatus | ● |
| tempStatus1 | 1 |

TEMP STATUS

| Valore | Significato |
|--------|----------------------|
| 1 | Buono stato |
| 2 | Letture dato fallita |

Legenda

| | | | |
|-------------------|------|------|-----|
| ● 115 | ● 13 | ● 22 | ● 4 |
| Non raggiungibile | | | |

My Profile
Privacy Policy Cookies Policy Terms and Conditions



Monitoraggio Generale

Fri 2 Feb 17:08:24

- CameraModelP1448-LE
- UpsModelRiello
- UpsModelSeltec
- SwitchModelMicrosense
- SwitchModelNetonix

SWITCH027
VALUE NAME: 1721615236

DETAILS DESCRIPTION RT DATA

Last update: 2024-02-02 14:05:50 176Z

| Description | Value | Buttons |
|---------------|-----------------------|---------------------------------|
| dateObserved | 02/02/24, 03:05:50 PM | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| fanSpeed | 6165 | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| generalStatus | 0 | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| poeValue1 | 48 | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| poeValue2 | 48 | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| poeValue3 | 0 | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| poeValue4 | 0 | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| poeValue5 | 0 | Last 4h 24h 7d 30d 6m 1y 2y 10y |
| poeValue6 | 0 | Last 4h 24h 7d 30d 6m 1y 2y 10y |

Legenda

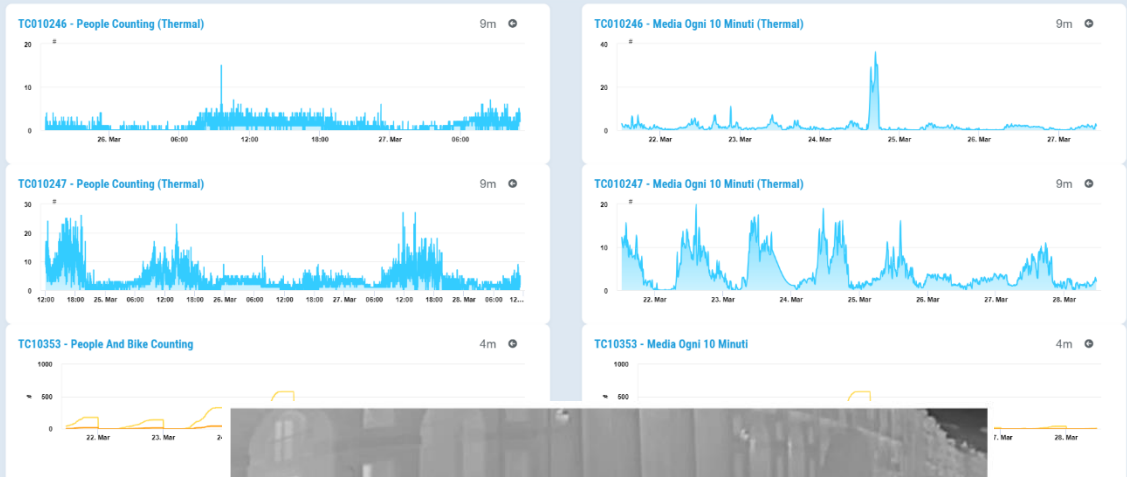
| Valore | Significato | Simbolo |
|--------|-------------------------------------|---------|
| 0 | Buono stato | ● |
| 1 | Non raggiungibile | ● |
| 2 | Raggiungibile, dati non disponibili | ● |
| 3 | Identificata anomalia | ● |

Stato Attuale 9m

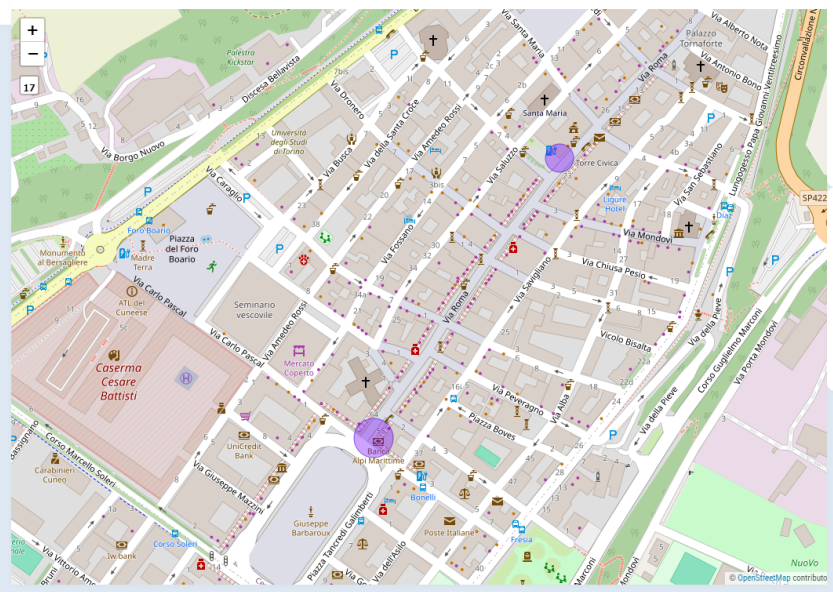
1721612145 - GeneralStatus - Andamento Settimanale

Telecamere Cuneo

Thu 28 Mar 11:18:02



Conteggi Telecamere



Powered by SNAP4Tech

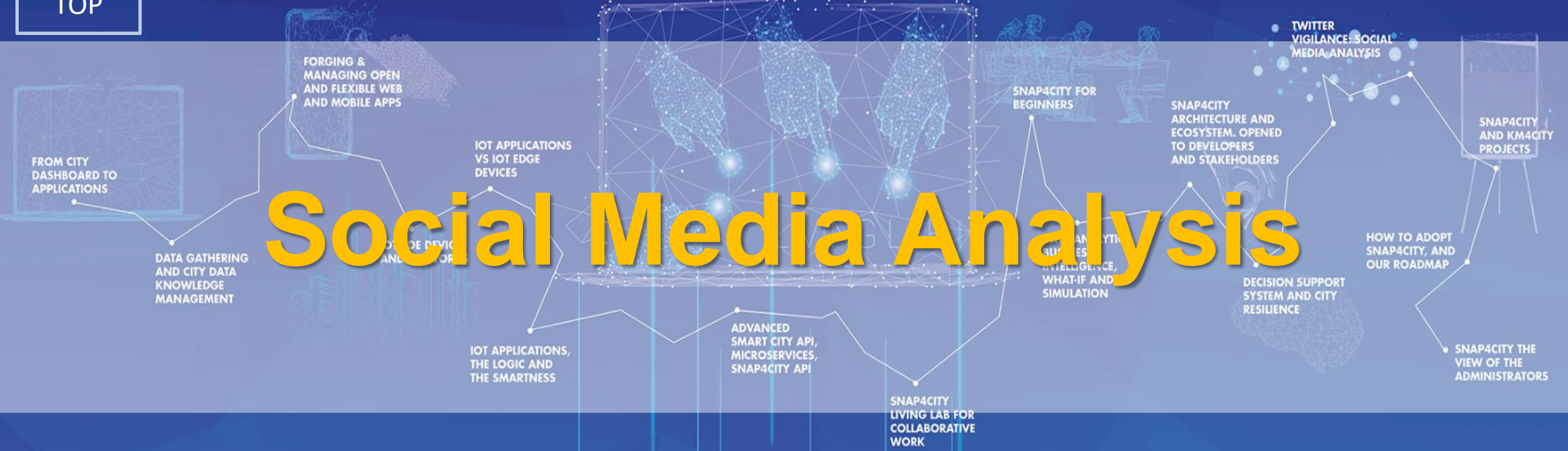
My Profile

Privacy Policy Cookies Policy Terms and Conditions

Powered by SNAP4Tech

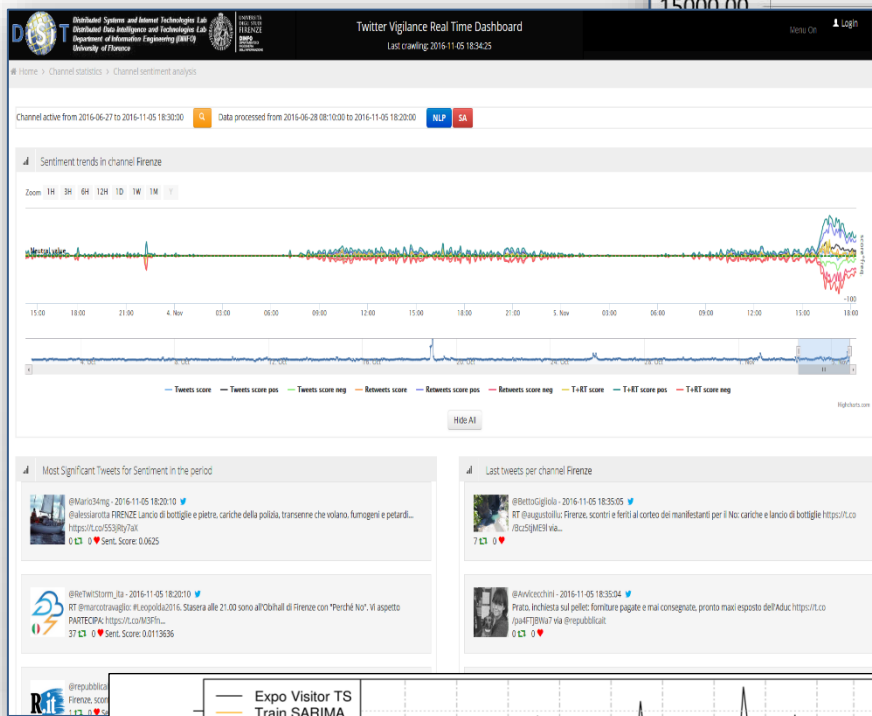
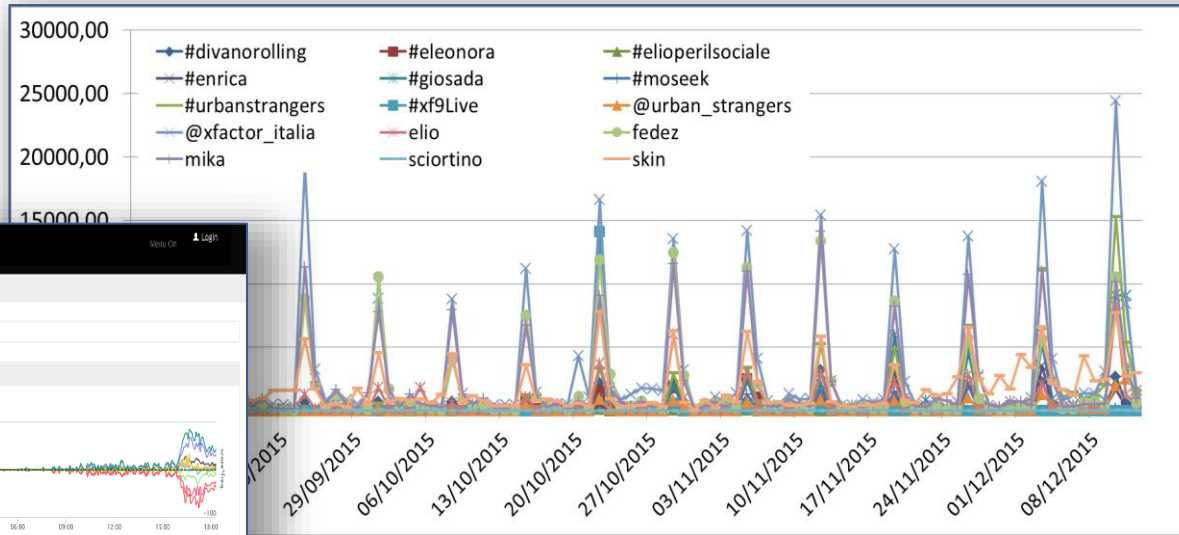
TOP

Social Media Analysis

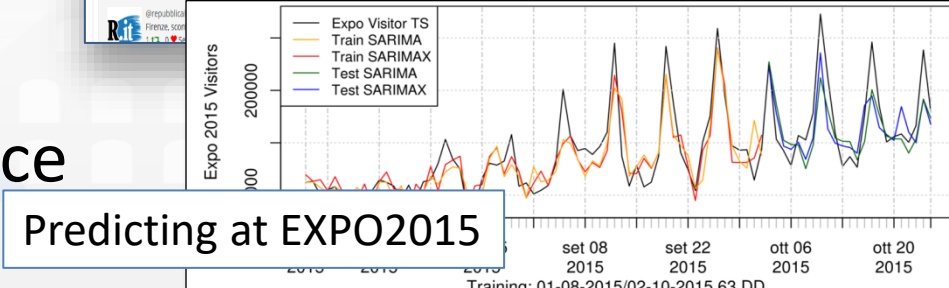
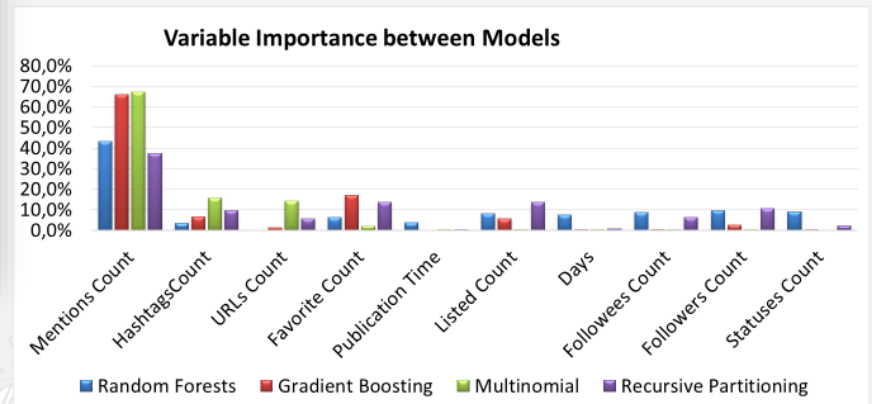


Twitter Vigilance

- Prediction of Audience on TV programme
- Prediction of retweet proneness: RF, GBM, ..
- Project
 - TwitterVigilance
 - +NLP, SA



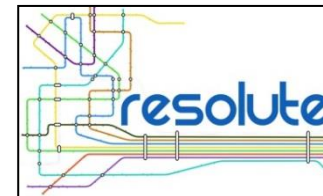
Predictive models VS metrics relevance



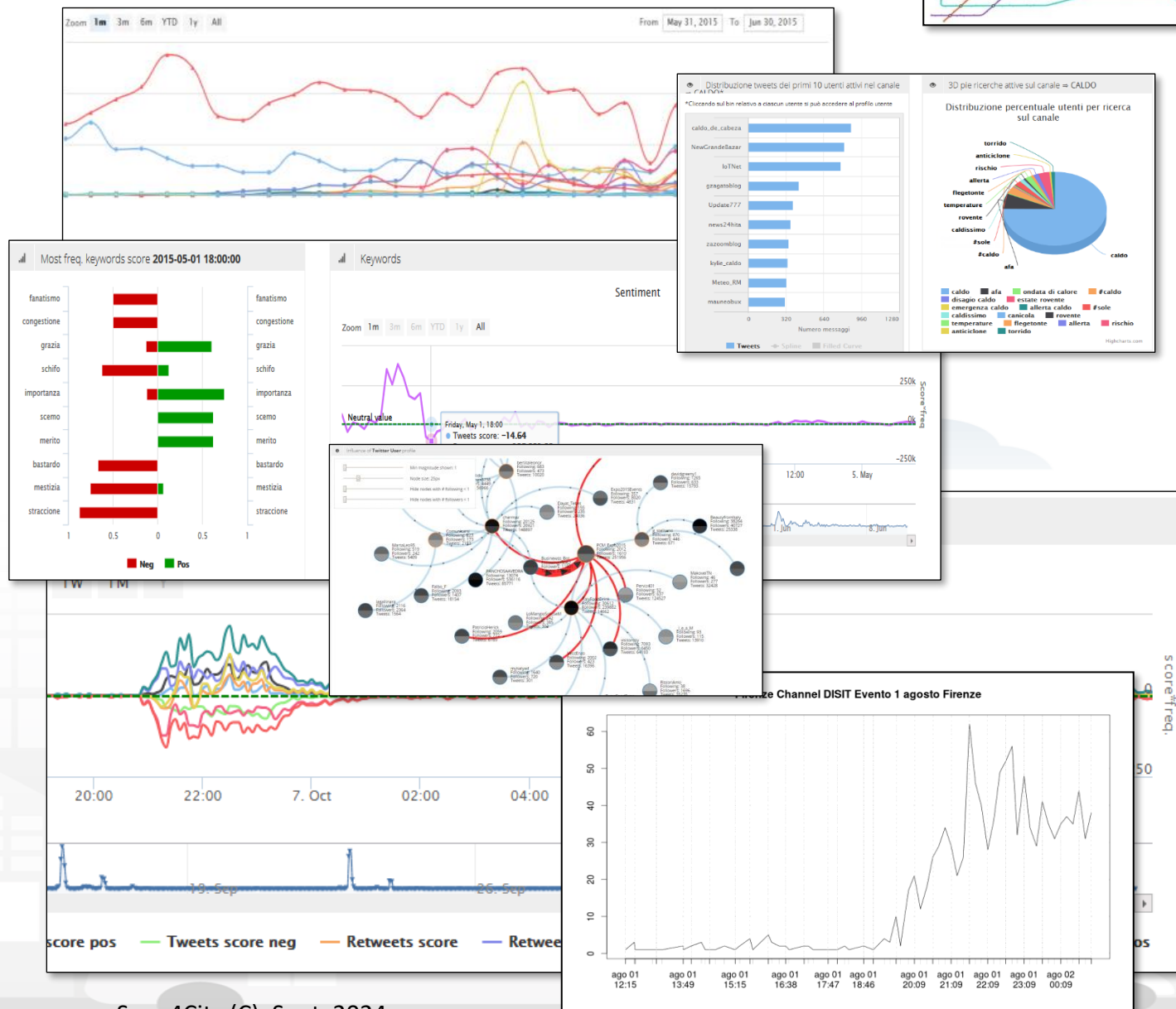
Predicting at EXPO2015

Figure 5: Comparison among the selected predictive models discussed and presented in Tables 2 and 3 with respect to the real number of visitors. Both training and validation

Twitter Vigilance



- <http://www.disit.org/tv>
- <http://www.disit.org/rttv>
- Citizens as sensors to
 - Assess sentiment on services, events, ...
 - Response of consumers wrt, ...
 - Early detection of critical conditions
 - Information channel
 - Opinion leaders
 - Communities
 - Formation
 - Predicting volume of visitors for tuning the services



Several Channels



Twitter Vigilance Dashboard

Login

Last crawling: 2015-12-11 01:20:20

Search parameters

Data analysis 4

Channel statistics

Search statistics

Retweet statistics

Twitter Users statistics

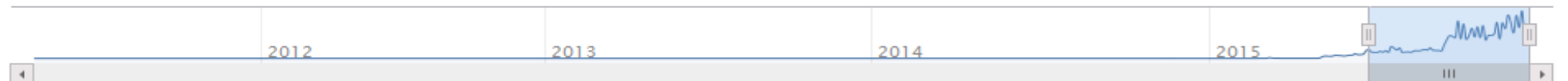
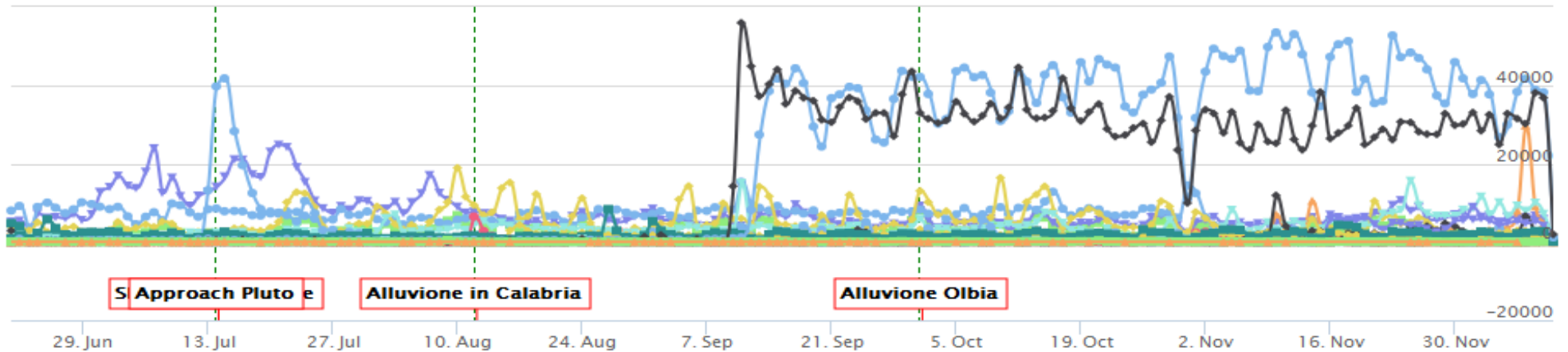
INFO

Home > Channel statistics

Global view of user channels

Zoom 1m 3m 6m YTD 1y All

From Jun 20, 2015 To Dec 11, 2015



- ads
- aeroporto firenze
- Allertameteo TOSCANA
- apretoscana
- CALDO
- cambiamenti climatici
- Codified Hashtags Allerta
- ConsumoSuolo
- Emergenza_acqua
- Europea
- EXPO2015
- Firenze
- FirenzeICT
- Giubileo
- iononrischio
- LaMMA
- Maltempo
- maturità 2015
- MeteoUSER
- mymeteo
- NASA New Horizons
- papafrancesco
- PA_social_PA
- protezione civile toscana
- resilienza
- rossano
- siena
- smartcity
- smartcitybigdata2015
- SOLO allertameteoTOSCANA
- tech
- uber
- Univ-Firenze
- zanzara
- Events



A Channel



Channel active from 2009-10-23 to today



Data processed from 2015-05-15 to 2015-09-15

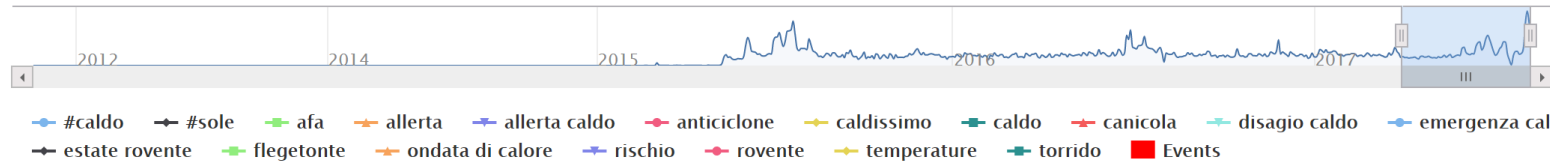
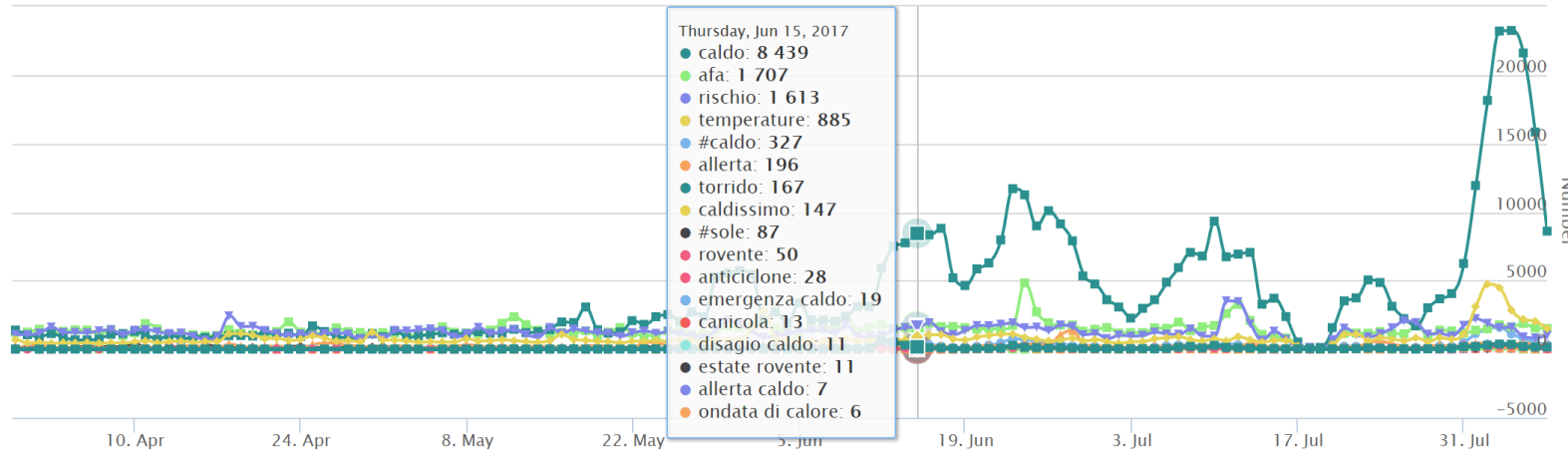
NLP

SA

Search related to channel **CALDO**

Zoom 1m 3m 6m YTD 1y All

From Mar 30, 2017 To Aug 7, 2017



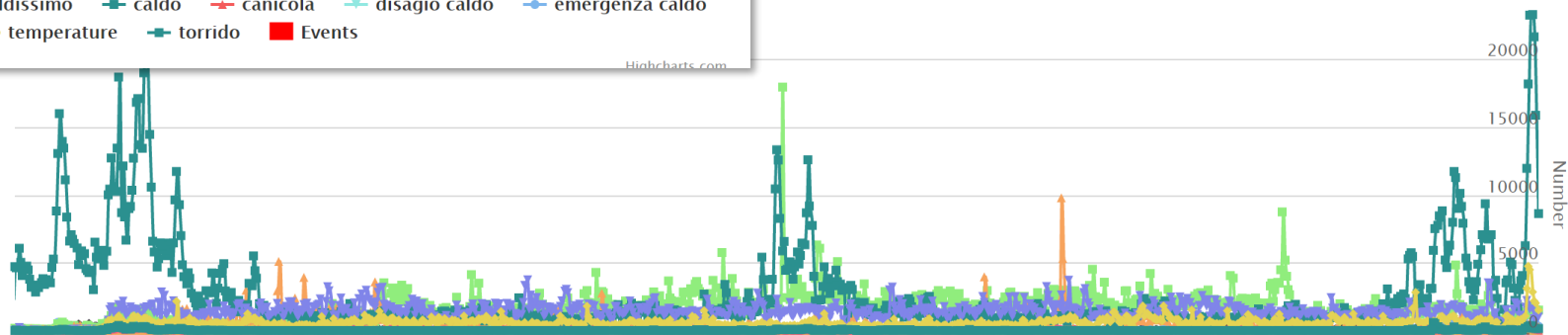
#caldo #sole afa allerta allerta caldo anticiclone caldissimo caldo canicola disagio caldo emergenza caldo
 estate rovente flegetonte ondata di calore rischio rovente temperature torrido Events

05-15 to 2015-09-15

NLP

SA

From May 11, 2015 To Aug 7, 2017



Its searches

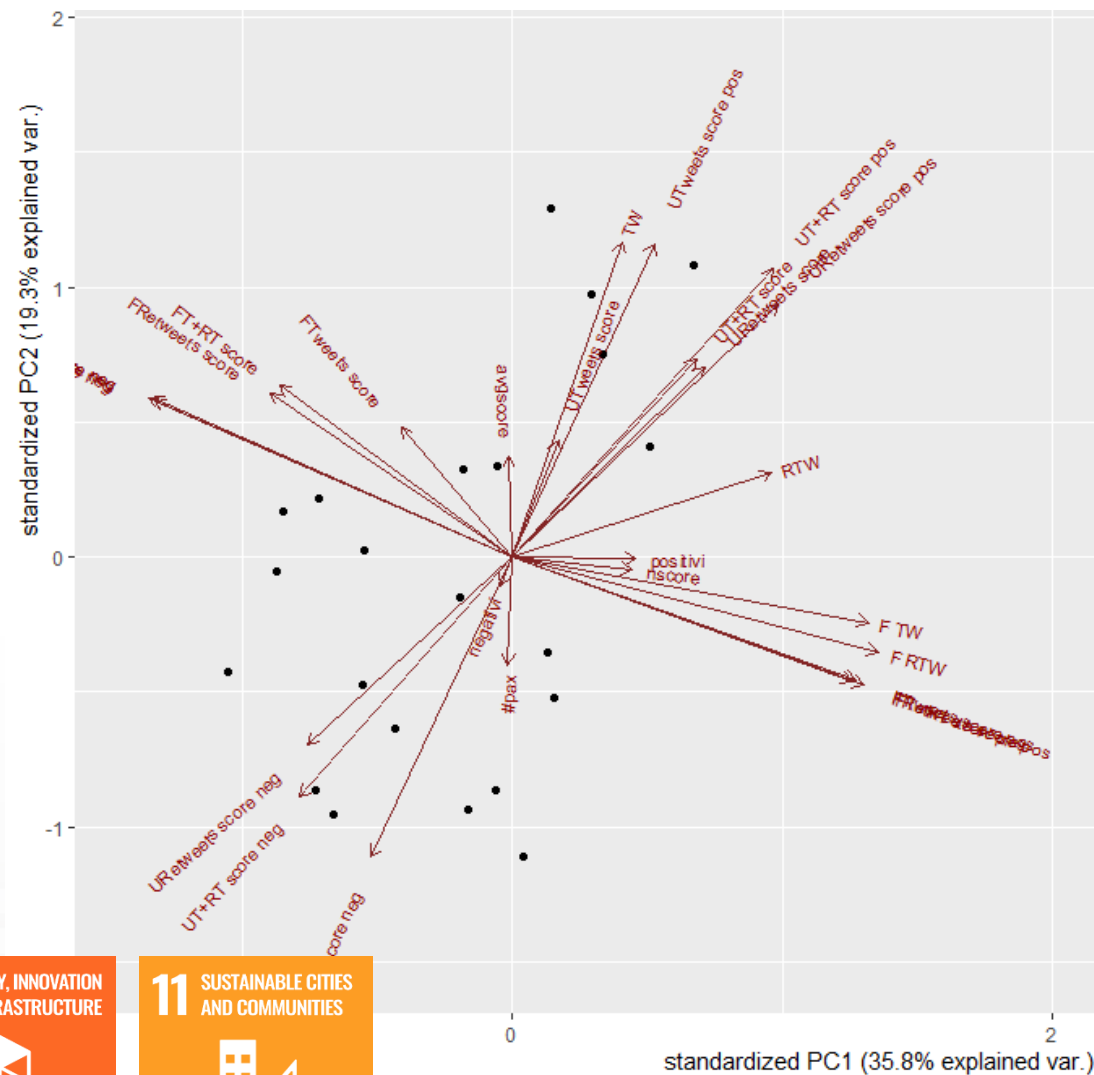


Twitter Vigilance

Snap4City (C), Sept. 2024

Reputation

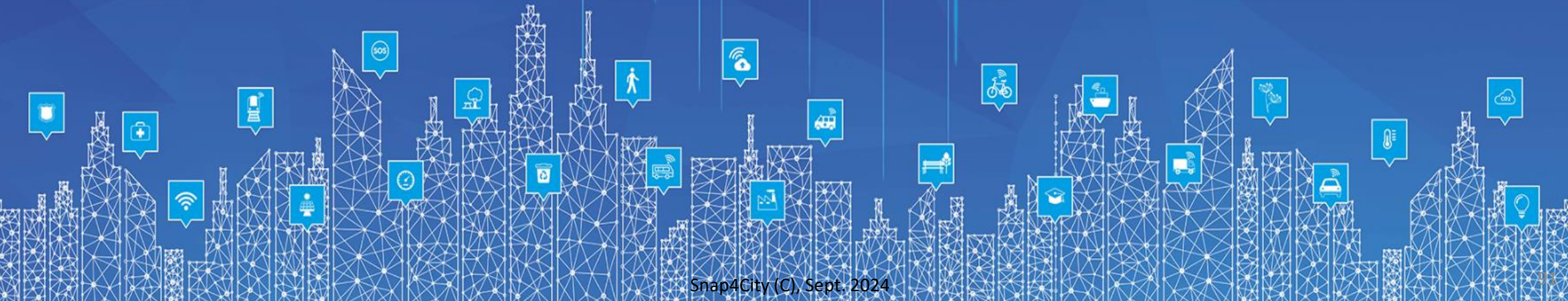
- Prediction/estimation of **Average Score of Trip Advisor** as a function of *Twitter Vigilance Metrics + other information*
- Prediction/estimation of **Negative Scores on specific Museum or service** as a function of *Twitter Vigilance Metrics + other information*



Twitter Vigilance

TOP

Indoor People Analysis and Suggestions for Smart Retail



- **Feedback Project:**

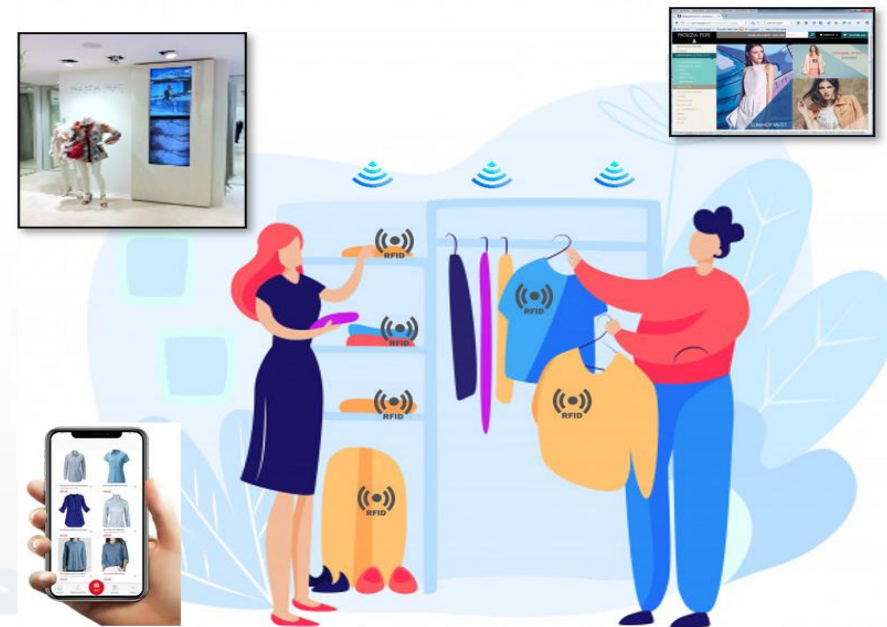
- Flexible Advanced Engagement Exploiting User Profiles and Product/Production Knowledge
- VAR, PatriziaPepe (Tessiform), DISIT, Effective Knowledge, SICE
- Keywords: retail, GDO, ...

- **Goals and drivers:**

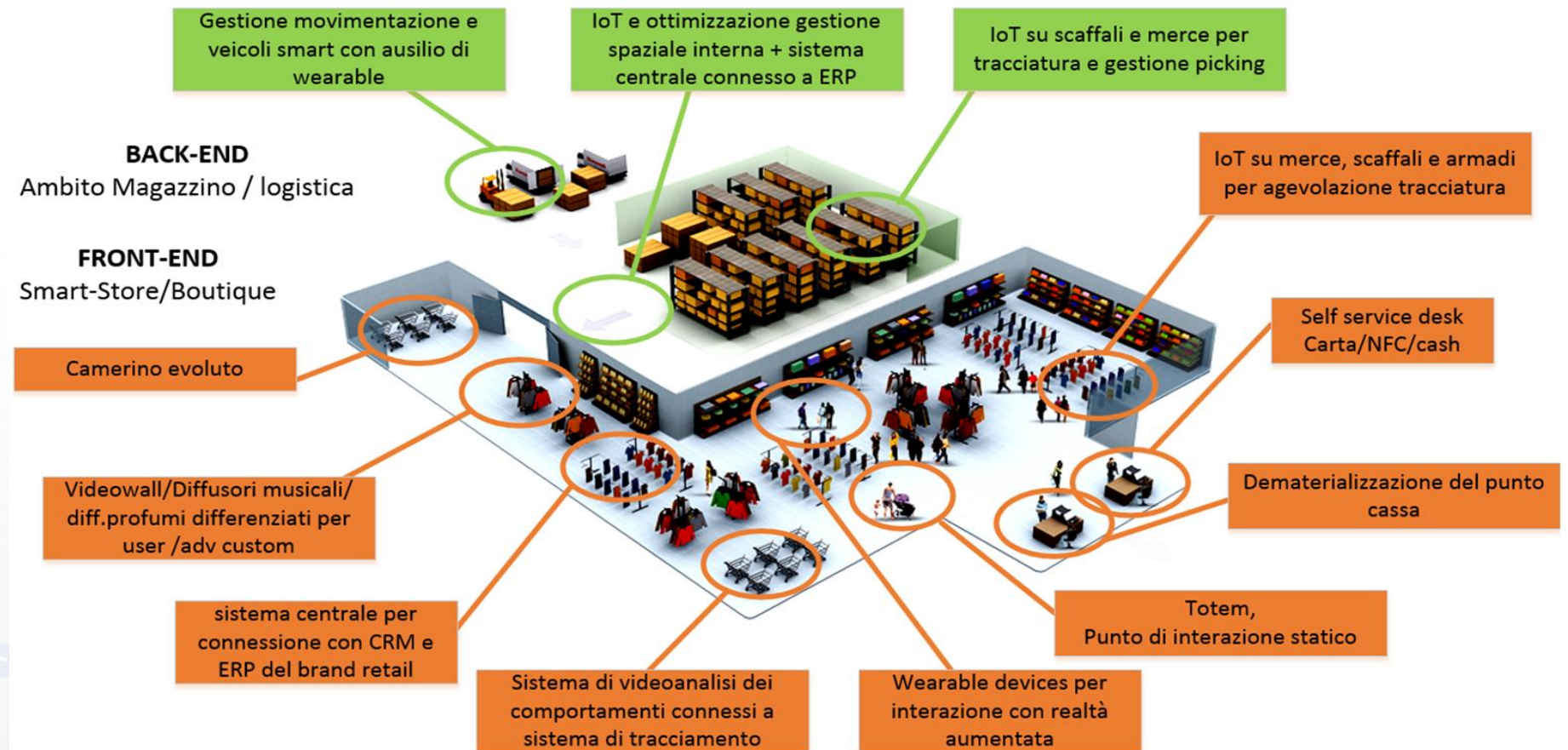
- adaptive user engagement, customer experience
- Advanced user profiling, user behaviour analysis
- IOT and instrumentation
- Predictive models for engagement
- Integrated in city customer experience

- **Aiming to solve current State of the Art issues:**

- Cold start problems in generating recommendations for new users, also addressing seasonality of products and items
- GDPR compliance



- Using the stimulus of the recommendation system, we have increased the customers' attention of the 3.48%
- The solution is also functional in presence of a low number of customers and items
- The solution solved the cold start problems
- GDPR compliant



FeedBack Admin Tools

FeedBack Engagement Tools

Intranet

Tool Admin

Tool Engager

Recommender

Totem

Surfaces

Web site - App

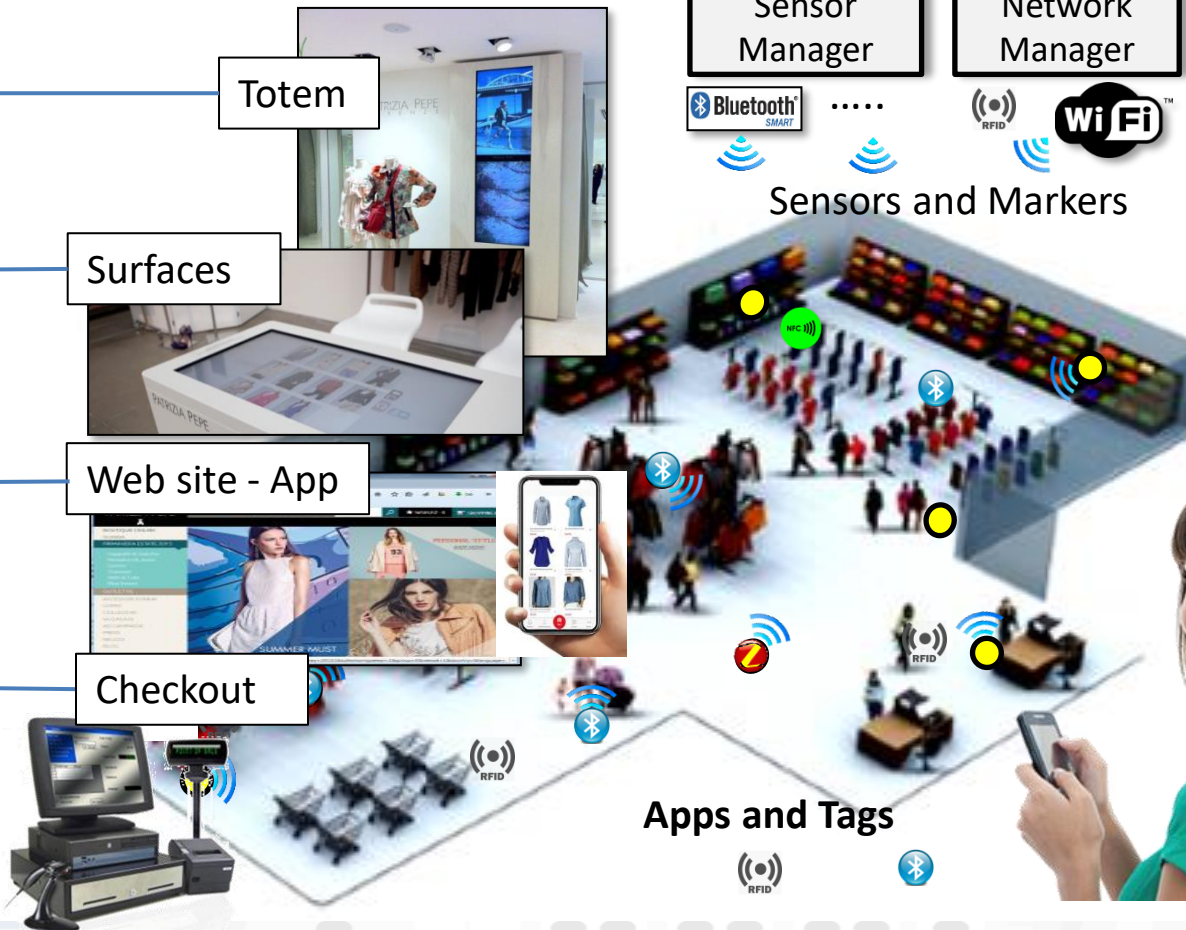
Checkout

Sensor
Manager

Network
Manager



Sensors and Markers



Apps and Tags

Suggestions

customer similarity for each customer cluster the most representative items are suggested;

item similarity: considering the last items purchased by the customer according to the information contained into its profile, and randomly selecting items in the same item clusters;

item complementary: considering items that may complement the last items that have been bought by the customer according to a table of complementary items;

item associated: in order to improve a customer's purchase frequency, we generated suggestions for customers who purchased an item in the last three months;

suggestions for serendipity: randomly selecting items to be suggested from the whole present collection, taking also into account what is available in the physical shop;

Item selection

1. Item previously not purchased
2. Confidence recommended item. Confidence established with Market Basket Analysis

- 20% of suggestions produced have been issued
- 9.84% of suggestions have led to transaction and/or trial
- 3.48% of increment of interest with respect of the previous period without recommendation

TOP

References



2023 booklets



- Smart City



https://www.snap4city.org/download/video/DPL_SNAP4CITY.pdf

- Industry

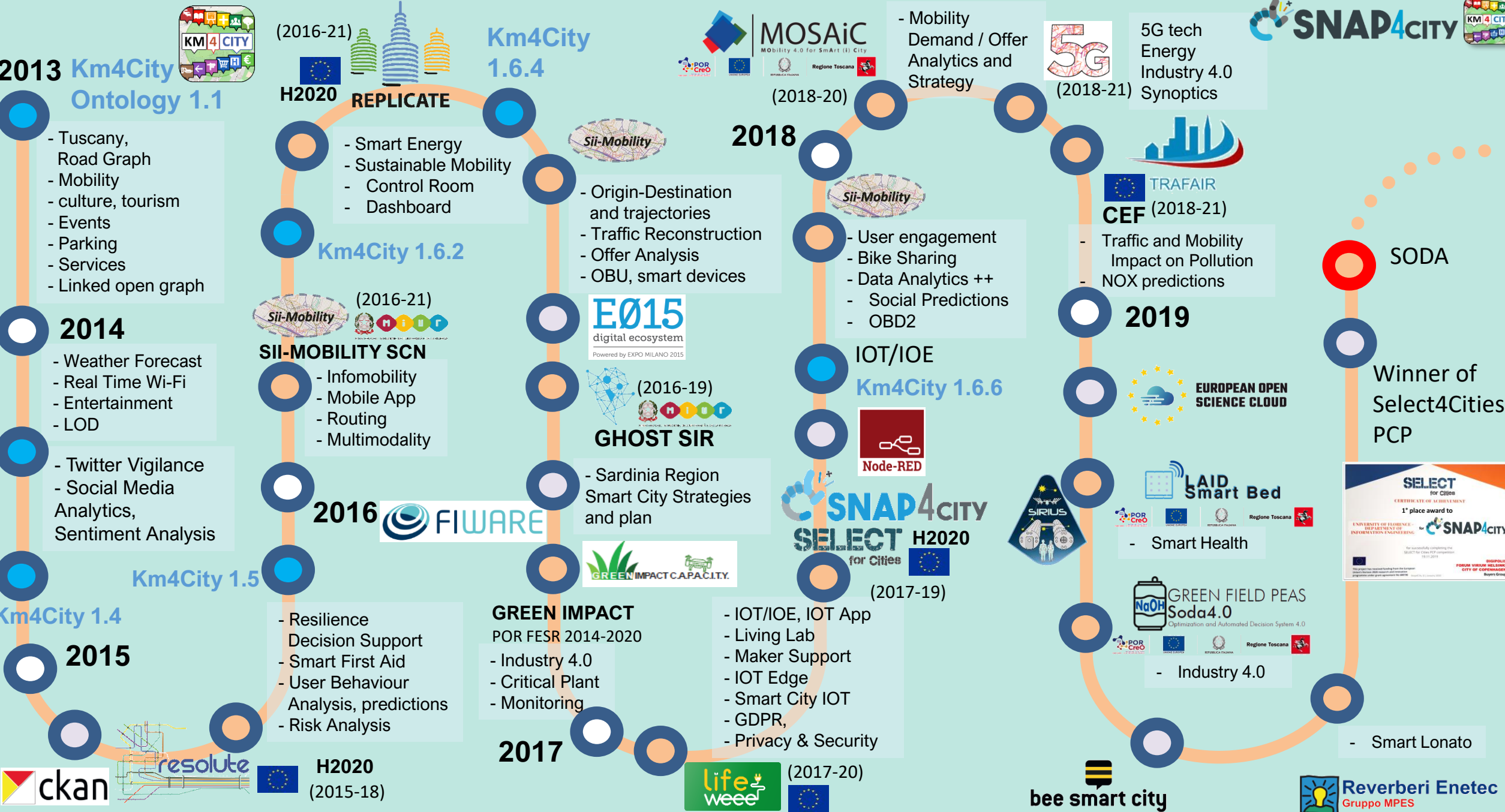


https://www.snap4city.org/download/video/DPL_SNAP4INDUSTRY.pdf

- Artificial Intelligence



https://www.snap4city.org/download/video/DPL_SNAP4SOLU.pdf



2013 Km4City Ontology 1.1

- Tuscany, Road Graph
- Mobility
- culture, tourism
- Events
- Parking
- Services
- Linked open graph

2014

- Weather Forecast
- Real Time Wi-Fi
- Entertainment
- LOD

- Twitter Vigilance
- Social Media Analytics, Sentiment Analysis

Km4City 1.4

2015

- Resilience Decision Support
- Smart First Aid
- User Behaviour Analysis, predictions
- Risk Analysis



(2016-21) H2020 REPLICATE

- Smart Energy
- Sustainable Mobility
- Control Room
- Dashboard

Km4City 1.6.2



- Infomobility
- Mobile App
- Routing
- Multimodality

2016 FIWARE

Km4City 1.5

- Resilience Decision Support
- Smart First Aid
- User Behaviour Analysis, predictions
- Risk Analysis

Km4City 1.6.4



- Origin-Destination and trajectories
- Traffic Reconstruction
- Offer Analysis
- OBU, smart devices



- Sardinia Region Smart City Strategies and plan



- IOT/IOE, IOT App
- Living Lab
- Maker Support
- IOT Edge
- Smart City IOT
- GDPR, Privacy & Security

2017



- Smart Waste



- User engagement
- Bike Sharing
- Data Analytics ++
- Social Predictions
- OBD2



- Smart Health



- Smart Lonato



- Traffic and Mobility Impact on Pollution
- NOX predictions

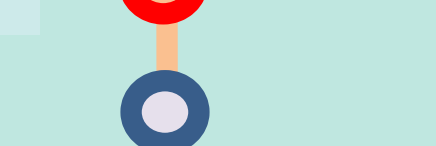


- Industry 4.0

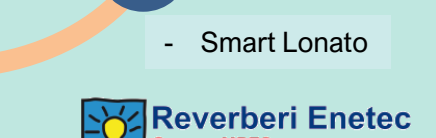


- Smart Lonato

2018



2019



DISIT lab roadmap vs model and tools' usage



2020



- Smart Tourism
- 6 Pilots
- Data Analytics
- Extended platform



- Smart Mobility
- PISA, PUMS
- Living lab



Km4City 1.6.7

Smart Ambulance (2021-22)

Enterprise (2021-22)
Industry 4.0



Contract

2021

PC4City (2020-21)
Monitoring Terrain

Winner of Open Data Challenge of
enel x

CAPĒLON

- Smart Light
- Sweden

Almafluida Industry 4.0 (2021-22)

AMPERE (2021-22)
Industry 4.0

SYN-RG-AI
SmartCity



Industry 4.0

uni.systems

SmartCity, 2021-23



AXIS collab
SmartCity

2022



Asymmetrica
Smart City, 2022-23

Contract, 2022-23



Contract, 2022-23



2022-2023



Security and Risk



Italferr, Smart City

2023



CN MOST, 2022-26



EI THE, 2022-26



G. Agile, 2021-23



2023-26 Finanziato dall'Unione europea NextGenerationEU

Merano, smart light

OceanRace, Genova, AWS

Cuneo, smart city

2024

TOURISMO



Co-funded by the European Union



AMMIRARE

ELLIE IA 2025-2027



Contract, 2024-25



OPTIFaaS MOST



SASUAM MOST



Rhodes, smart city

eShare UNIFI TUSS



PEN Test
Passed



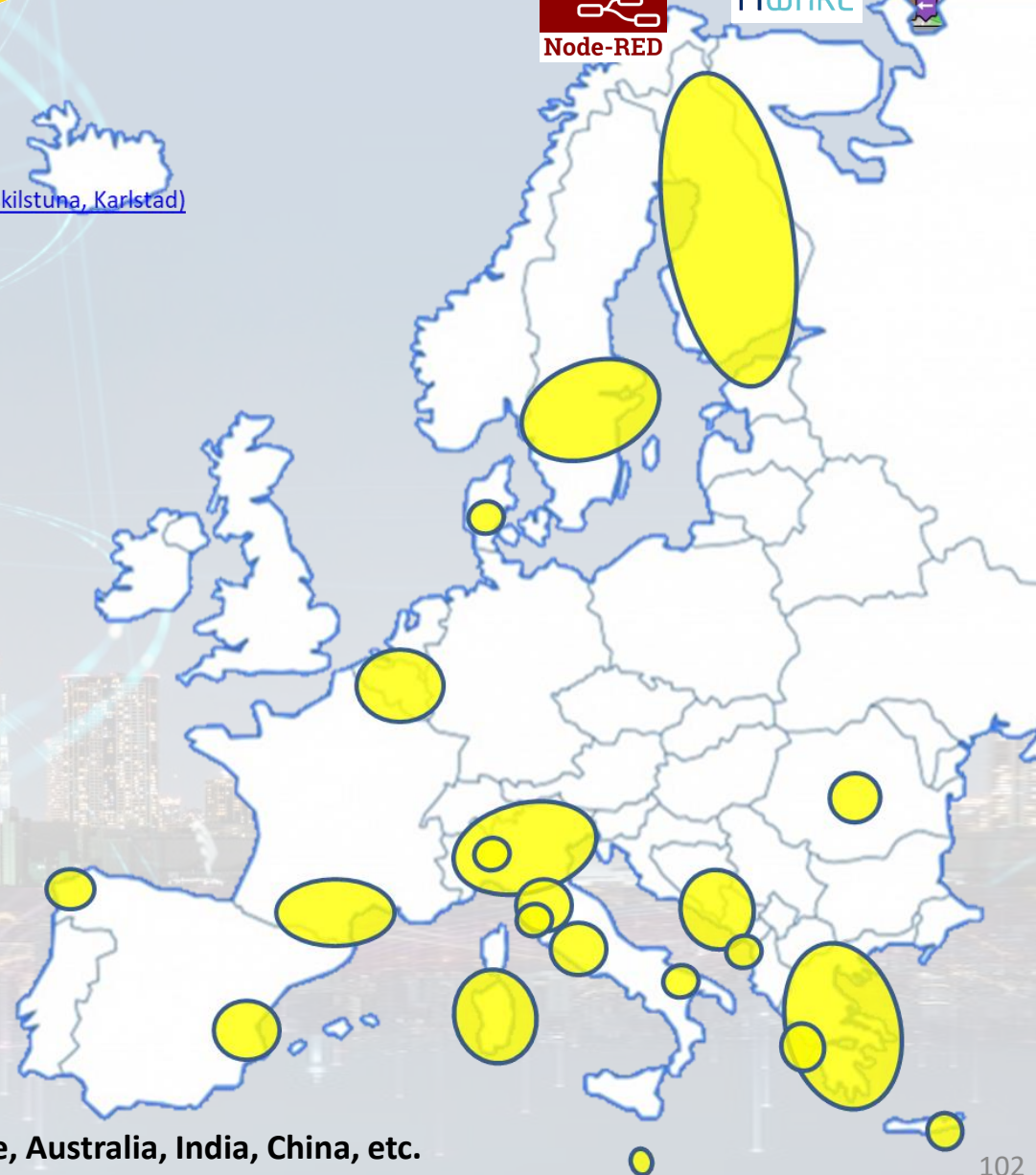
EU GDPR
COMPLIANT



- 11 running installations in Europe
 - Snap4.city.org, Greece, Merano, Cuneo, ...
 - Toscana, Pisa, Sweden, ISPRA, Snap4.eu,
 - Altair, Italmatic, Romania,
- 16 projects, 12 pilots on 10 Countries
 - >40 cities/area
- **Widest MULTI-tenant deploy has**
 - 24 Organizations / tenant
 - > 8850 users on
 - > 1800 Dashboards
 - > 17 mobile Apps
 - > **2.2 Million of structured data per day**
 - > 580 IoT Applications/node-RED
 - > 750 web pages with training
 - > 75 videos, training videos

Main Organizations/areas

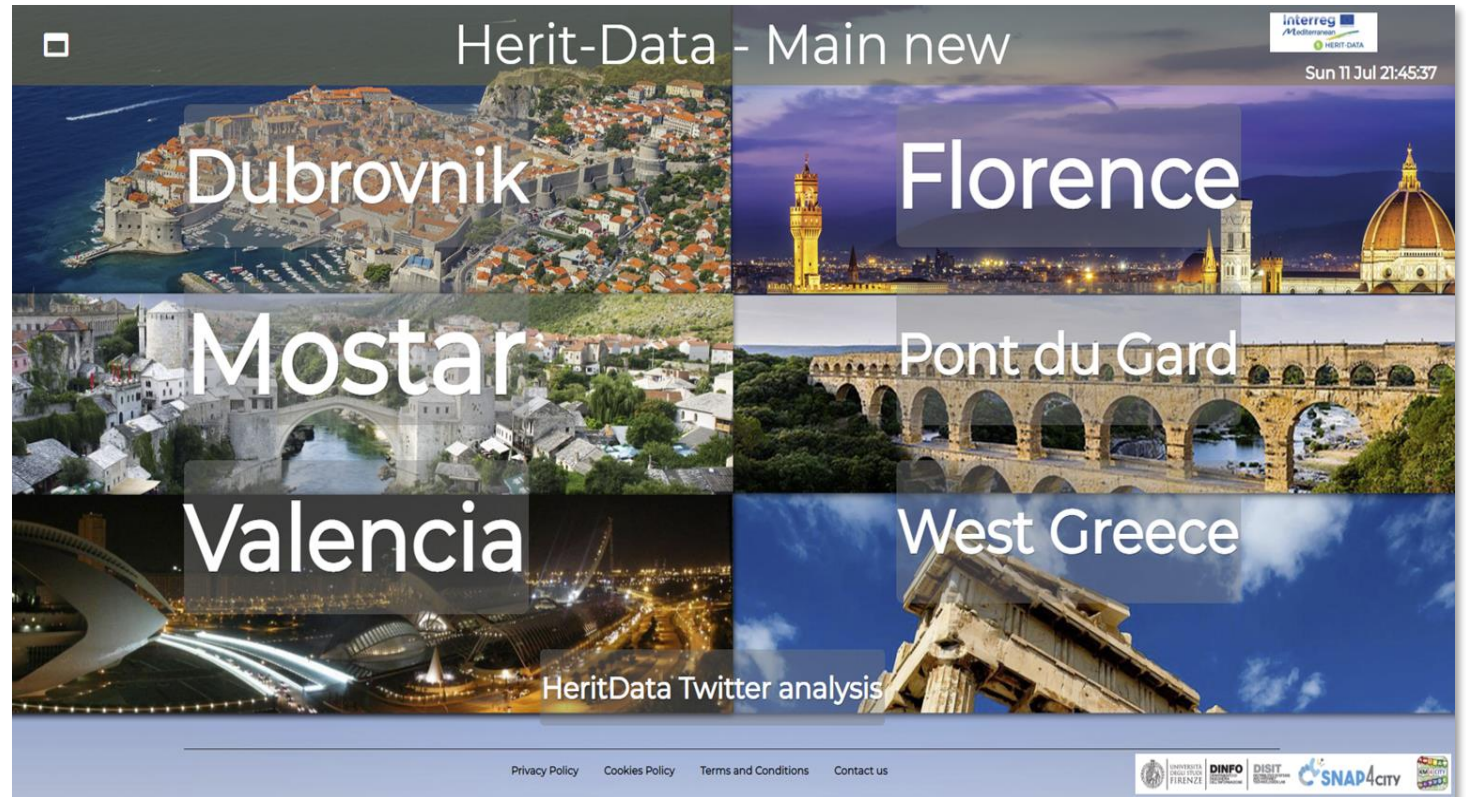
- [Antwerp area \(Be\)](#)
- [Bari \(I\)](#)
- [Bisevo, Croatia](#)
- [Bologna \(I\)](#)
- Brasov (Ro)
- [Capelon \(Sweden: Västerås, Eskilstuna, Karlstad\)](#)
- [Cuneo \(I\)](#)
- [DISIT demo \(multiple\)](#)
- [Dubrovnik, Croatia](#)
- [Firenze area \(I\)](#)
- [Garda Lake area \(I\)](#)
- [Greece \(Gr\)](#)
- [Helsinki area \(Fin\)](#)
- [Limassol \(Cy\)](#)
- [Livorno area \(I\)](#)
- [Lonato del Garda \(I\)](#)
- Malta (Malta)
- Merano (I)
- [Modena \(I\)](#)
- [Mostar, Bosnia-Herzegovina](#)
- [Oslo & Padova \(Impetus\)](#)
- [Pisa area \(I\)](#)
- [Pistoia \(I\)](#)
- [Pont du Gard, Occitanie \(Fr\)](#)
- [Prato \(I\)](#)
- [Rhodes \(Gr\)](#)
- [Roma \(I\)](#)
- [Santiago de Compostela \(S\)](#)
- [Sardegna Region \(I\)](#)
- [Siena \(I\)](#)
- SmartBed (multiple)
- [Toscana Region \(I\), SM](#)
- [Valencia \(S\)](#)
- [Venezia area \(I\)](#)
- [WestGreece area \(Gr\)](#)



- + Israel, Colombia, Brasile, Australia, India, China, etc.

<https://www.snap4city.org>

<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MzExNQ==>



PROGETTO STRATEGICO

TERRITORI



Presidenza del Consiglio dei Ministri
Dipartimento per le politiche di coesione e per il sud
Ufficio V - Servizio XVIII - Coordinamento e Monitoraggio
Programmi CTE



Unione europea



PAC CTE
2014-2020



Fondazione per la ricerca
e l'innovazione



Regione Toscana



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INGEGNERIA
DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB



COMUNE
DI FIRENZE

HERIT-Data Approach



Exploiting existing and new data on Snap4City platform and Digital Twin.

- Big Data, Open Data, pub./priv. data, any format/protocol
- people flow, mobility, pollutant, weather, events, reputation, social media, etc.
- Admin ad service data
- Social, IoT, Satellite, etc.

Assessing conditions via Indicators and Benchmarks

Providing hints and services for decision support to:

- **Citizens:** improve quality of life, distribution of impacts, socio-economic effects.
- **Tourists:** access/selecting services, Focused offers, alternative offers, recommendations, information, diversification.
- **Public administration:** Support in decision-making and planning processes
- **Tourist and Heritage managers:** to develop sustainable tourist products, management recommendations, better management of the human pressure on the heritage

PROGETTO STRATEGICO **TERRITORI**

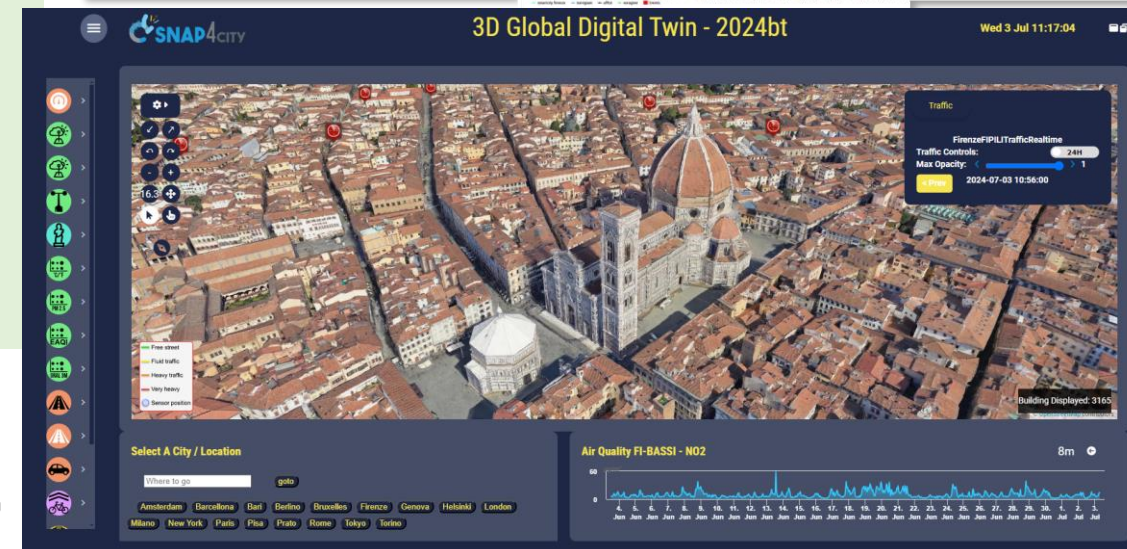
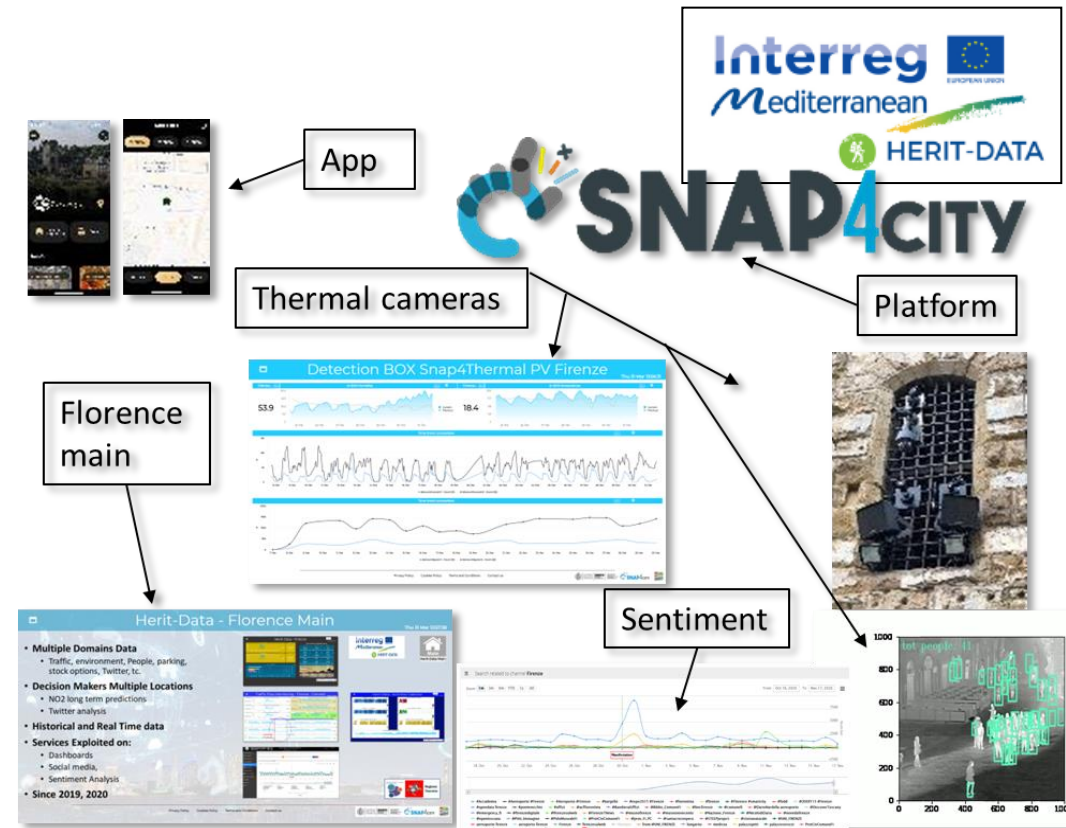
Florence Pilot Example

Objectives:

- Managing Touristic Flow in the UNESCO area
- Benchmark/KPI
- Providing actual TOOLS to decision makers as decision support systems

Digital Twin including (for Tourism)

- Knowledge: POI, context, GIS data
- Monitoring
 - People flow, traffic flow, parking
 - Pollutant, (NO, O₃, NO₂, CO, SO₂),
 - Weather
 - Social Media: Twitter, TA..
- Computing via AI, XAI
 - Predictions on reputation
 - Sentiment analysis
 - Predictions & early warning
 - Presences, critical conditions
 - Suggestions / nudging

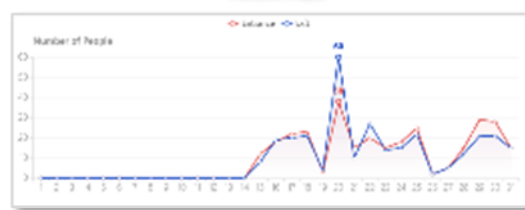
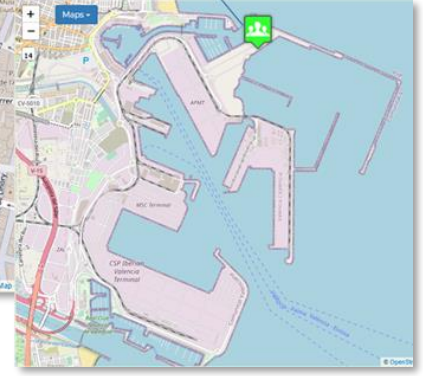
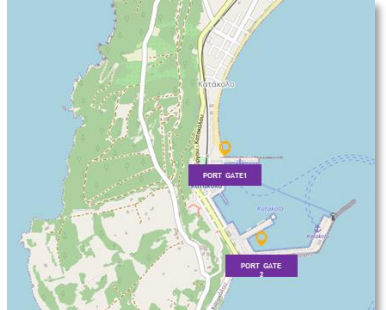
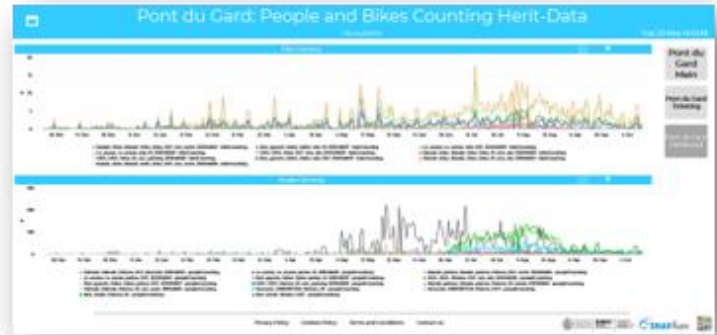


Other Pilots' Examples



Objectives:

- Managing Touristic Flows
- Benchmark/KPI
- Providing TOOLS to decision makers as decision support systems



PROGETTO STRATEGICO **TERRITORI**

Interreg
Euro-MED



Co-funded by
the European Union

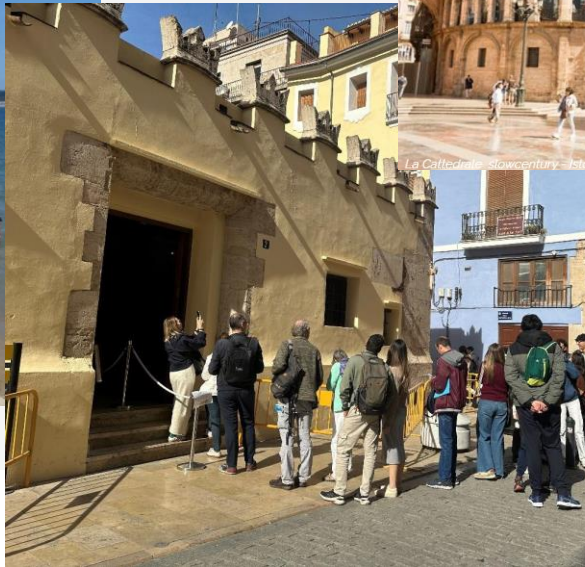
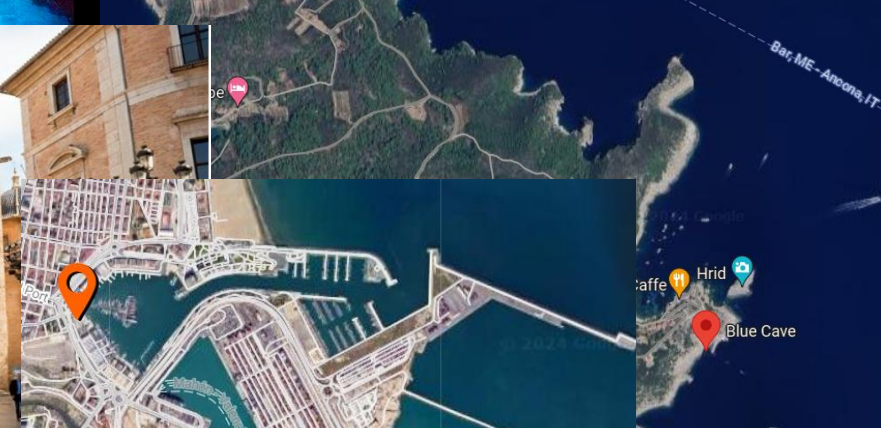
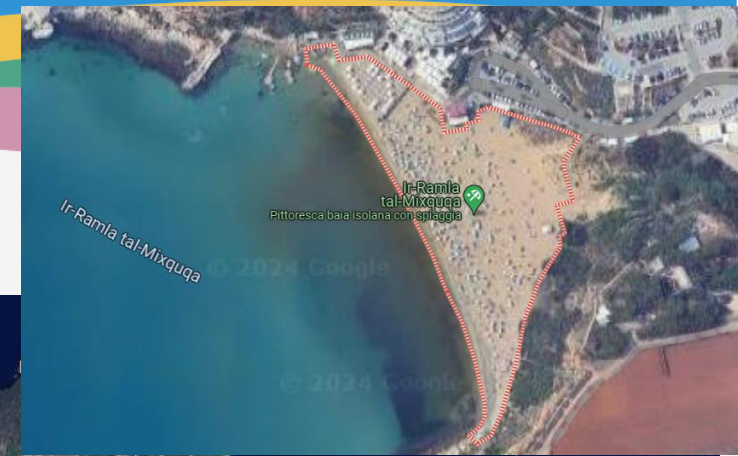
TOURISMO EURO MED

TOURism Innovative and Sustainable Management of fLOws



• Pilots of Snap4City on:

- Greece - READ S.A.: Rodi
- Italy - FRI, UNIFI: Firenze
- Spain - FV, FSMLR: Valencia
- Cyprus - ANELEM: Limassol
- Bulgaria - VEDA: Varna
- Croatia - RERA SD: Splitsko-dalmatinska županija
- Malta - MRDDF: La Valletta



TOP



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EXPO WORLD CONGRESS

7-9 November 2023, Barcelona, Spain

Visit Snap4City in Hall 1

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