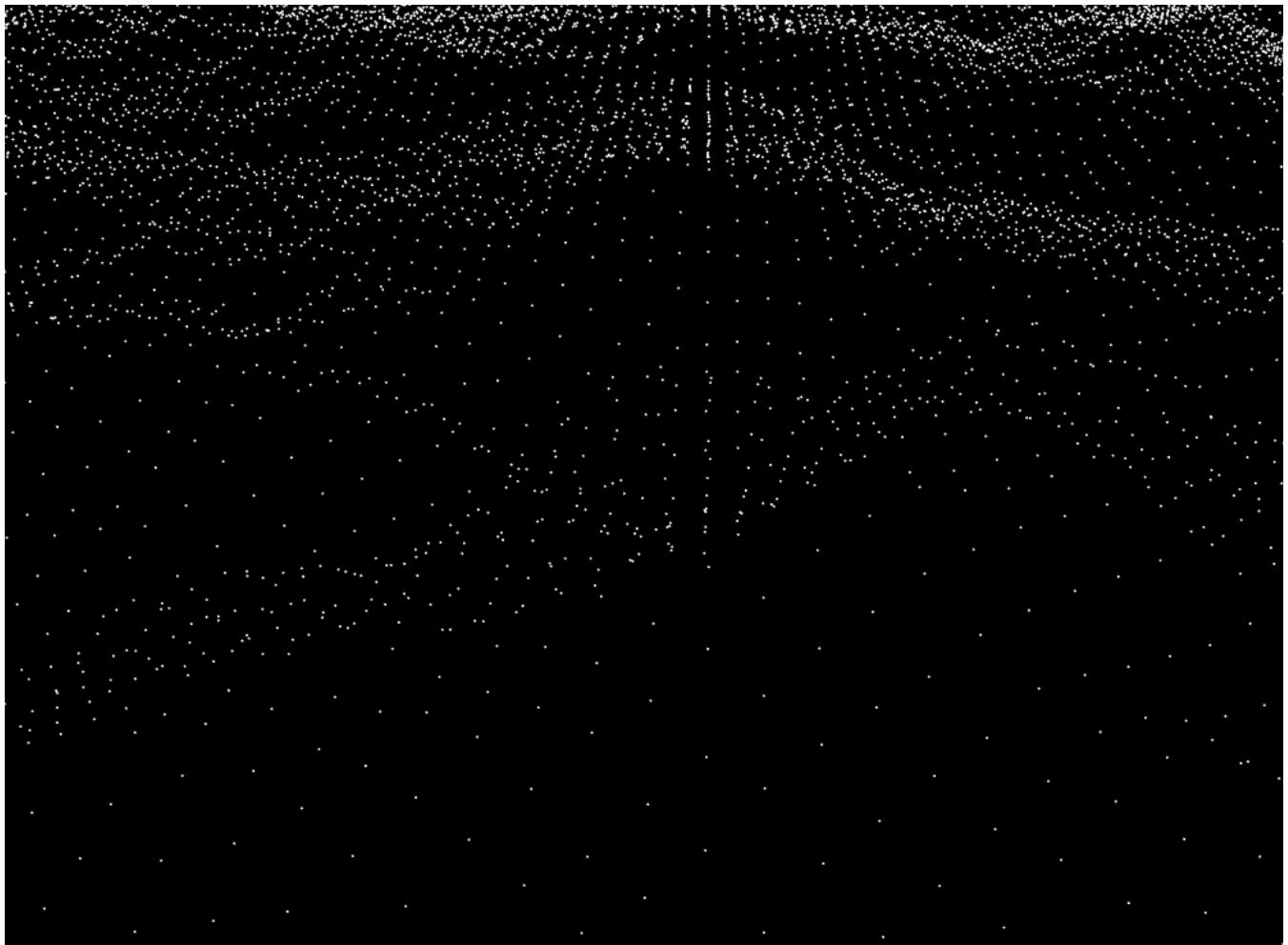


SUPSI

Adventures in Data visualization 2015

A summer workshop on open data, computational design and web tecnologies for creative people



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SUPSI
University of Applied Sciences and Arts
of Southern Switzerland

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Foreword

OASI, the Environmental lab of the Italian-speaking part of Switzerland, has the goal of monitoring, validating and releasing the environmental data of Canton Ticino.

In January 2014, OASI released the new version of OASI web, a cross-platform application that enables the visualization of data concerning the environmental conditions in Canton Ticino and the access and download of datasets in CSV format.

Since 2014, the Laboratory of visual culture at SUPSI offers a summer school on data visualization (Adventures in Data Visualization), based on the use of web technologies and computational design techniques.

The summer school is a hands-on course where Swiss and international participants design and develop collaboratively a concept and a functioning prototype of digital or physical artifacts that visualize numerical data through the use of easy and open source programming frameworks.

Considering the opportunities opened by the encounter between computational design and the release of open data, the Laboratory of visual culture devoted the 2015 edition of the summer school to the development of experimental data visualization solutions of OASI's open datasets. The objective of the workshop was:

- to visualize the datasets in an unconventional and simple way in order to communicate to citizens the information about the environment with a creative and experimental approach;
- to validate the design opportunities generated by the use of open data in educational contexts;
- to highlight the activities and the datasets offered by OASI, which represents one of the few organizations in canton Ticino promoting the release of open data.

This report documents the results of the workshop Adventures in data visualization 2015, which took place in July, 19th to 23rd, at the atelier of the Master of Advanced Studies in Interaction Design / FabLab SUPSI located in the Building A of Campus Trevano, Canobbio.

1. Adventures in data visualization

Workshop

ADVENTURES
IN DATA
VISUALIZATION
WORKSHOP

19 - 23
JULY 2015

SUPSI
CAMPUS TREVANO
LUGANO SWITZERLAND

[HTTP://WWW.MAIND.SUPSI.CH/
WORKSHOPS](http://WWW.MAIND.SUPSI.CH/WORKSHOPS)

ADVENTURES
IN DATA
VISUALIZATION
WORKSHOP

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WORKSHOPS](http://WWW.MAIND.SUPSI.CH/WORKSHOPS)

Poster of the workshop Adventures in data visualization. Graphic design: Leonardo Angelucci (Laboratory of visual culture)

1. Description

Adventures in data visualization is a summer workshop dedicated to explorations into the field of data visualization by means of computational technologies and design approaches. By accessing and manipulating open datasets, the participants design and develop projects that make raw data perceivable through digital or physical matters, transforming them in interactive experiences or in narrative flows. The projects can be built upon the use of storytelling, experimental or artistic approaches, and information design techniques: many can be the adventures in data visualization in the span of a five-day hands-on workshop.

The workshop activities are based on design, coding, and making sessions where participants develop a project individually or in teams. There are no design briefs or media constraints: the output can be a screen-based work, a projection based installation or a site-specific installation, a 3D printed or laser-cut structure.

The projects can be realized with an experimental or artistic approach or based on information design techniques.

1.2 Methodology

The workshop methodology is based on three main activities: ideation, prototyping and design. The workshop ingredients are the application of creative coding approaches and the use of the Web as platform for prototyping quickly applications, interfaces, and interactive systems. Moreover, the participants have the chance to translate their ideas into physical artifacts through the use of digital fabrication machines available at SUPSI Fablab.

The selection of the participants is based on the concept to put together different profiles in order to facilitate the process of peer-to-peer learning.

The last component is the use of open datasets that work as raw material enabling the generation of multiple projects.

1.3 Technology

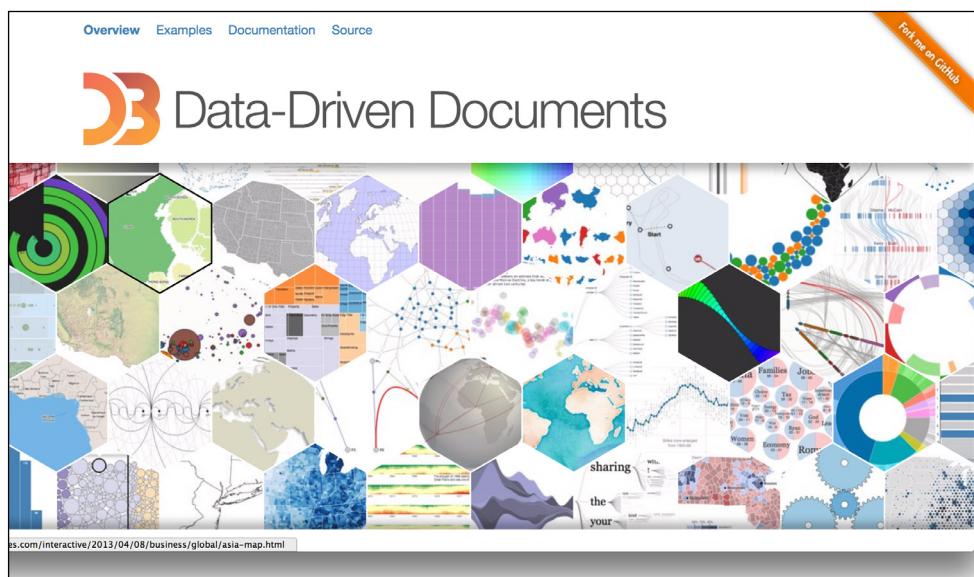
The main technology of the workshop is D3.js, a JavaScript library for manipulating documents based on data. D3 helps to bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards gives the full capabilities of modern browsers combining powerful visualization components and a data-driven approach to DOM manipulation.

During the workshop, participants had access to the digital fabrication equipment of SUPSI Fablab consisting of:

- a 3D printer uPrint Dimension (printing area 203x152x152 mm, layer thickness: 0.254 mm,

material: ABS, ivory colored);

- a 3D printer Ultimaker (210x210x205 mm, layer thickness: from 0.3 mm to 0.1 mm, material: PLA);
- a CNC shopbot machine (model 48", cutting area: 610x1219x127mm, materials: all except metals);
- a laser cutter and engraver (cutting area: 900x600 m, CO₂ laser tube, 60w);
- hardware such as one Kinect, 4 projectors, 2 HD webcams, sensors and actuators, etc. mm, material: ABS in ivory).
- a 3D printer Ultimaker (210 x210x205 mm, layer thickness: from 0.3 mm to 0.1 mm, material: PLA)
- a CNC shopbot machine (model 48", cutting area: 610 x 1219 x 127mm, materials: no metals)
- a laser cutter and engraver (cutting area: 900 x 600 m, CO₂ laser tube, 60w)
- hardware such as one kinect, 4 projectors, 2 HD webcams, sensors and actuators, etc.



Website of open source library D3.js, www.d3js.org



FabLab SUPSI
Lugano. Laboratory
of digital fabrication
www.fablab.supsi.ch

1.4 Datasets

The raw datasets are provided by OASI, the Environmental Data Laboratory of Southern Switzerland, which supported the organization of the workshop. OASI releases open data about several environmental conditions, from air pollution, weather, light pollution, to noise and traffic in different areas and cities in Ticino. The datasets are open under the following conditions: data can be freely downloaded and used, shared and published under the attribution of the owner. The exception is the data of MeteoSwiss – Federal office of Meteorology and Climatology that cannot be published on the internet or other media in a raw format or for commercial purposes.

1.5 Schedule

Day 1. Sunday 19 July

Presentation of the data visualization field and of OASI datasets; workshop for the concepts generation; presentation of participants' research topics and interests.

Day 2. Monday 20 July

Introduction to D3.js library and the Web Platform; definition of concepts.

Day 3. Tuesday 21 July

Beginning of project development.

Day 4. Wednesday 22 July

Development and making of the functioning prototypes.

Day 5. Thursday 23 July

Refinement of the prototypes and presentation of results in a public exhibition.

Osservatorio ambientale della Svizzera italiana
www.ti.ch/oasi

|> Tema |> OASI |> Dati |> Basi legali |> Per saperne di più |

Selezione avanzata e scaricamento dati

Scelta dei dati da visualizzare o scaricare.

Aria
 Balneabilità
 Frane
 Idrologia
 Luce notturna
 Mappatura solare
 Meteo
 Radiazioni non ionizzanti
 Rumore
 Siti inquinati
 Suolo
 Traffico

Selezione avanzata e scaricamento dati
 Stazioni di rilevamento

Aggiungi grafico | Scarica i dati

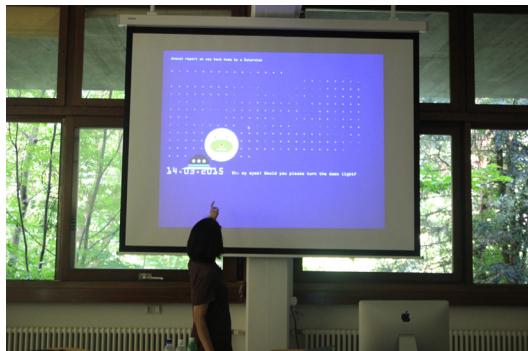
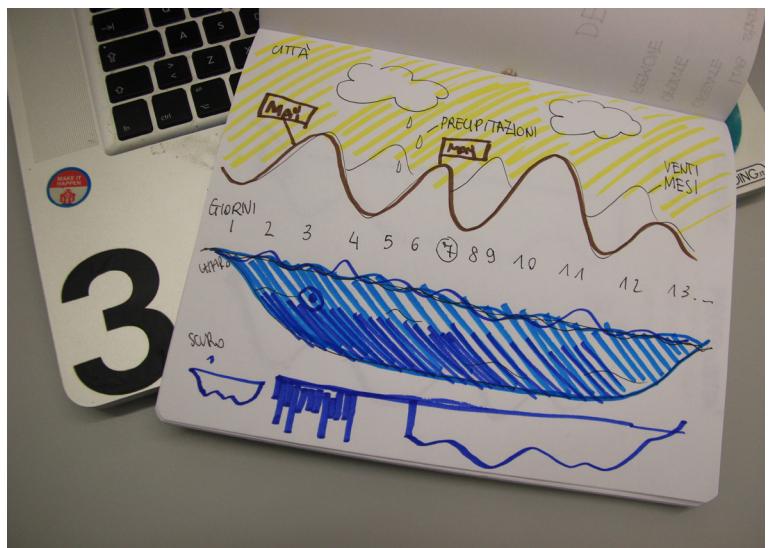
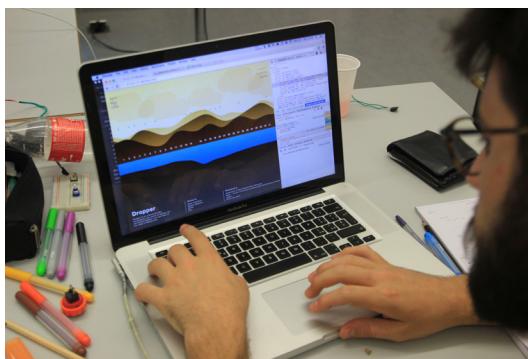
< 11.09.2015 - 18.09.2015 > Valori semiorari

NO2 [µg/m³]
 Locarno
 11.09.2015-18.09.2015

Avvertenze

Scaricando i dati si accettano le seguenti condizioni d'uso:
 in generale i dati scaricati possono essere liberamente usati, condivisi e pubblicati a condizione che venga citato adeguatamente il proprietario dei dati indicato nel file.
 Fanno eccezione i dati dell'Ufficio federale di meteorologia e climatologia ([MeteoSvizzera](#)) che non possono essere né pubblicati su internet o altri mass-media né trasmessi a terzi nella loro forma grezza né usati a scopo commerciale.

Download and advanced search section of OASI web, www.oasi.ti.ch/web/dati/selezione-avanzata.html



Workshop activities: introduction, brainstorming and concept generation, sketching and prototyping, presentation and exhibition

2. Projects

During the five days workshop, seven projects prototypes were developed through the use of D3.js library. The projects are digital applications accessible via browser and, in some cases, translated into physical prototypes made through the use of 3D printing and laser cutting technologies.

The projects are the following:

- *Dropper* by Claudia Ciarpella and Amedeo Spagnolo
- *FF-MM* by Fabian Frei and Massimiliano Mauro
- *Light pollution report by Saturnian* by Myoungun Kim
- *Sound of commuting* by Samantha Lim
- *Summer in the city* by Carola Bartsch
- *SupermAIRo* by Giorgio Olivero
- *User Perceptions of Online Sharing Services* by Greta Castellana and Anton Fedosov

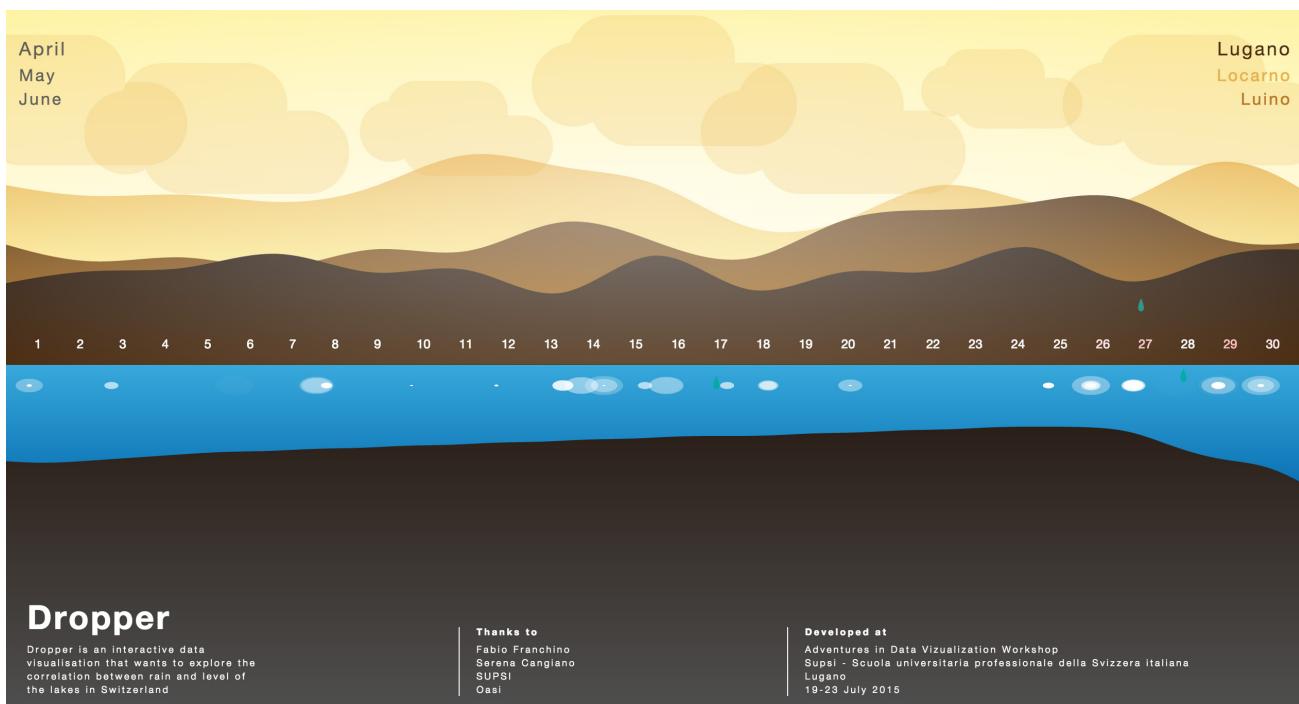
2.1 Dropper

Claudia Ciarpella, Amedeo Spagnolo

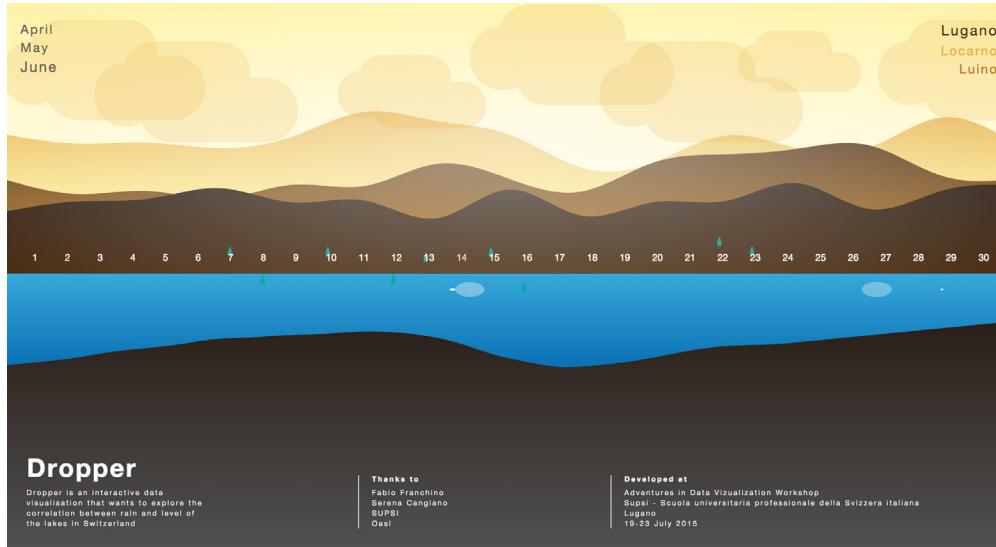
Dropper is the interactive visualization that explores the relation between the rain and the levels of the lakes in three cities: Lugano, Locarno, Luino.

The datasets' periods are the months of April, May and June 2015. By selecting the city and the data the interactive animation shows how the levels of the lakes change.

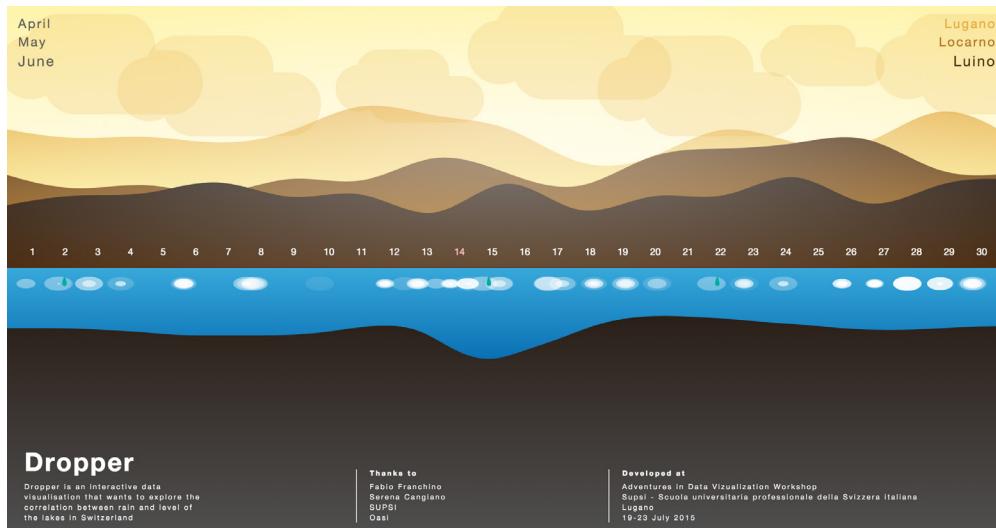
Link: <http://bit.ly/adv15-dropper>



Data visualization about the quantity of rain and the level of the lake of Lugano in Aprile 2015



Data visualization
about the rain and
the level of the lake
of Lugano in June
2015



Data visualization
about the rain and
the level of the lake
of Lugano in Luino
in June 2015

2.2 FF-MM

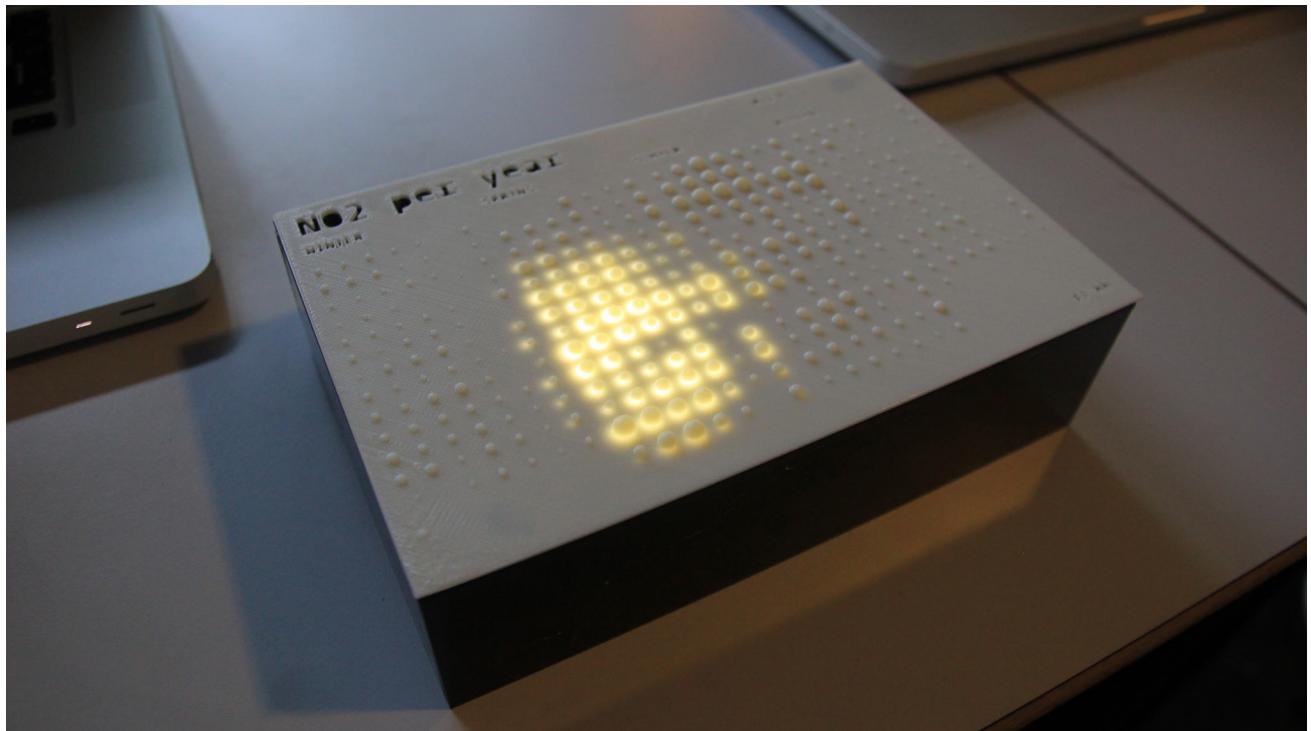
Fabian Frei, Massimiliano Mauro

FF-MM is the visualization of the data about the air pollutants in the area of Pregassona, Lugano. The data are referred to 2014 and arranged according to seasons.

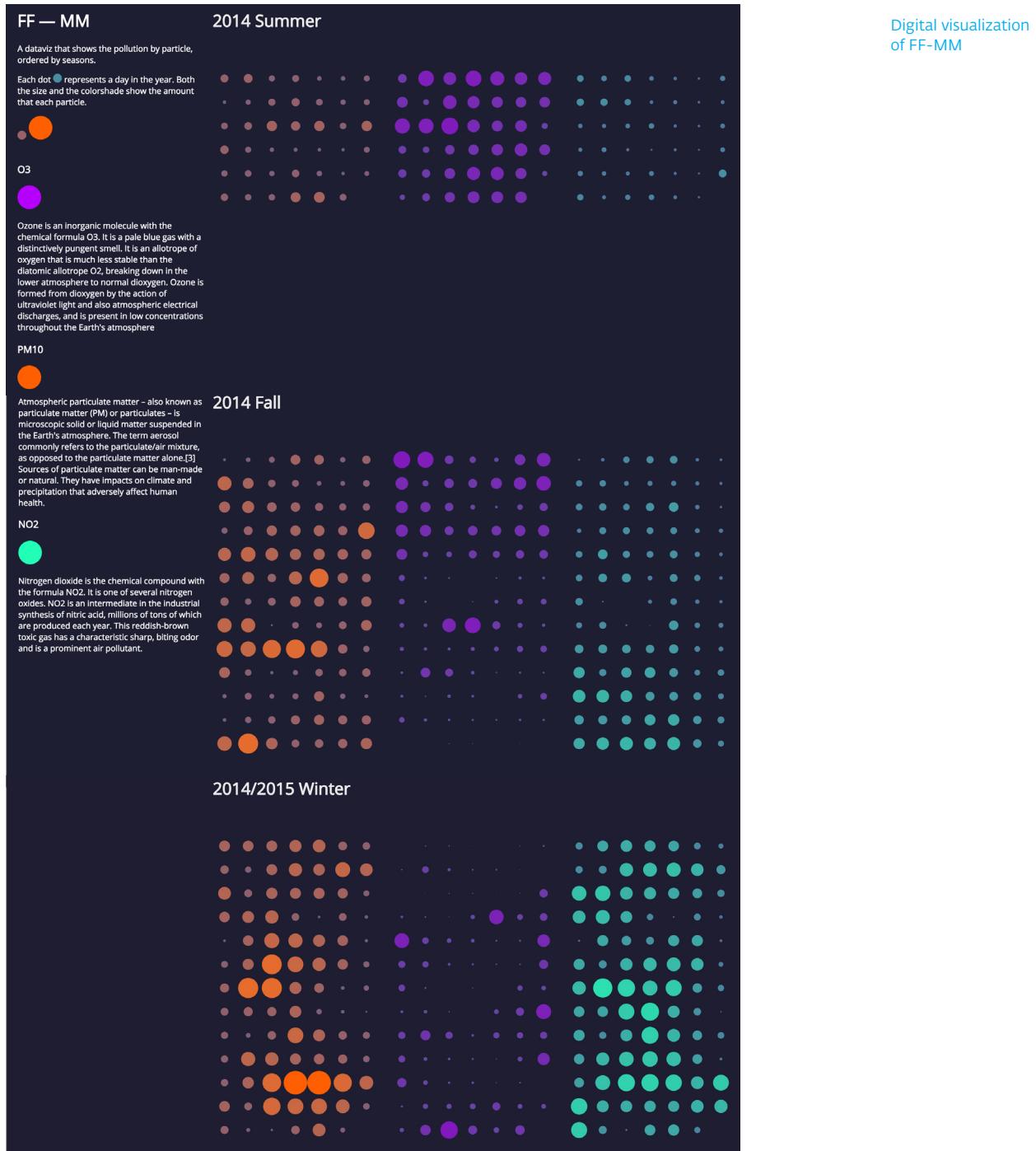
Each pollutant is represented by colored circles: O₃ is purple, PM10 is orange, NO₂ is green. Every circle is a day of the year. The size and the opacity show the quantity of the pollutant in the air in a specific day.

FF-MM is also a physical data visualization: through the extrusion of bi-dimensional graphics generated with D3.js and the use of a 3D printer, the data were visualized with the shape of a plate where the circles array creates a tangible and lit surface.

Link: <http://bit.ly/adv15-ffmm>



Physical visualization of annual data of NO₂ in Pregassona (Lugano, CH)

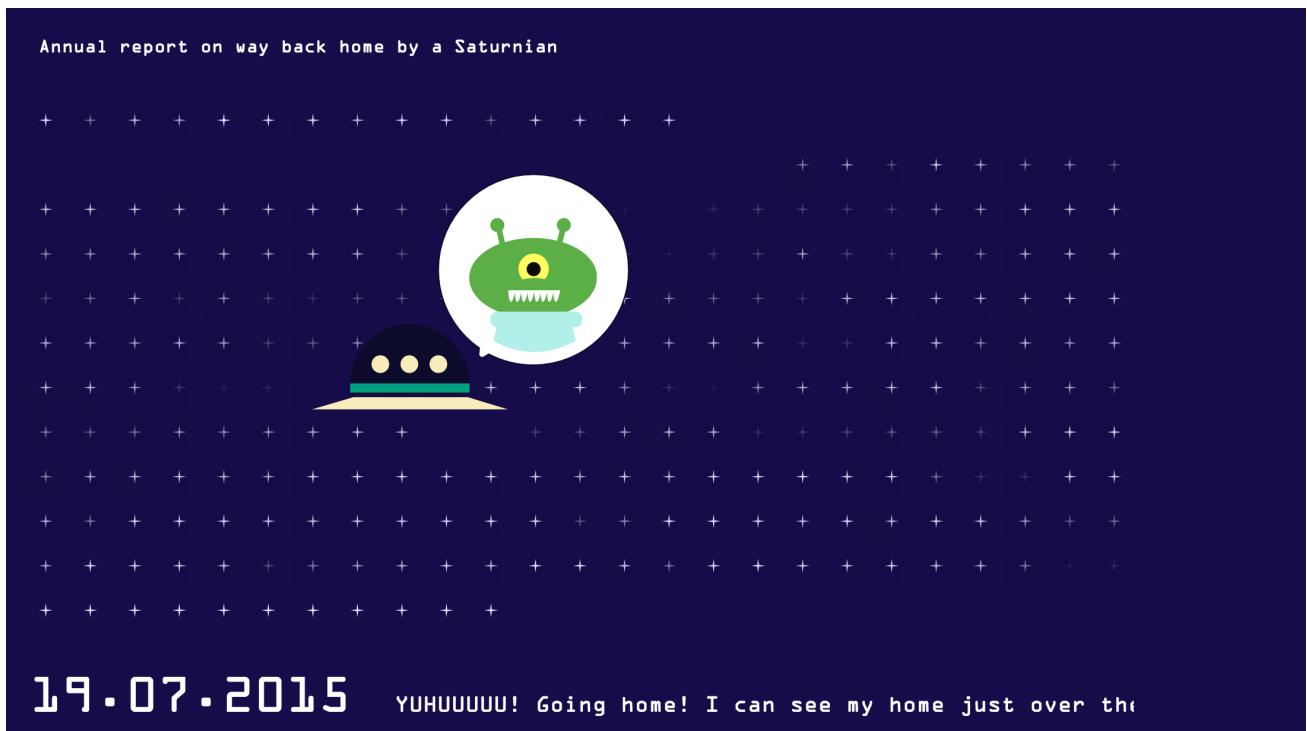


2.3 Light pollution report by a Saturnian

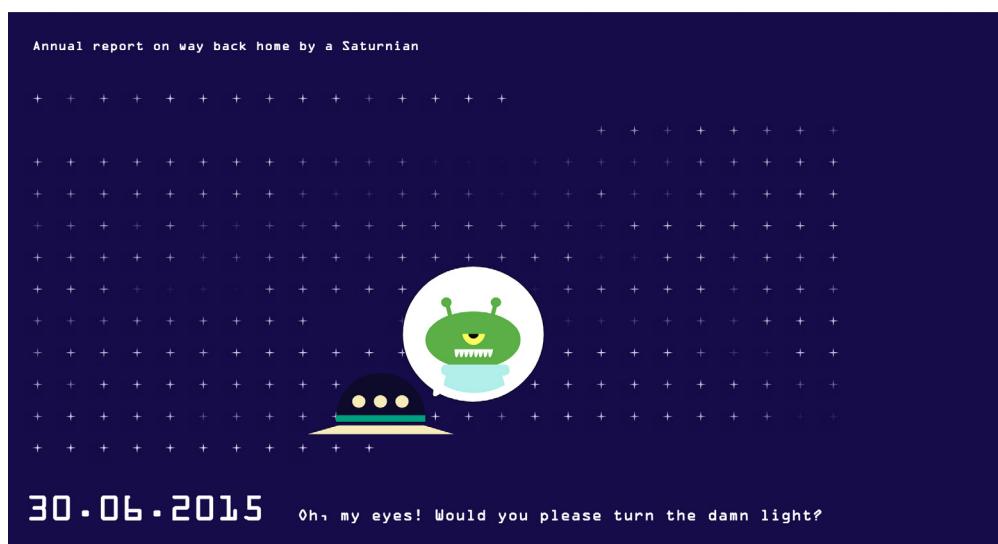
Myoungeun Kim

Light pollution report by a Saturnian visualizes the annual data about the level of light pollution in Lugano. Each star represents the daily datum of light pollution in 2014. By placing the mouse on a star it is possible to visualize the numeric value and the status of the Saturnian alien. If the pollution is low, the star does not shines and the alien shows a sad facial expression because he cannot find the way back home. If the level of light pollution is high, the stars shines and the alien is happy.

Link: <http://bit.ly/adv15-lightpollutionsaturnian>



Visualization of the light pollution in Lugano on 19.07.2015

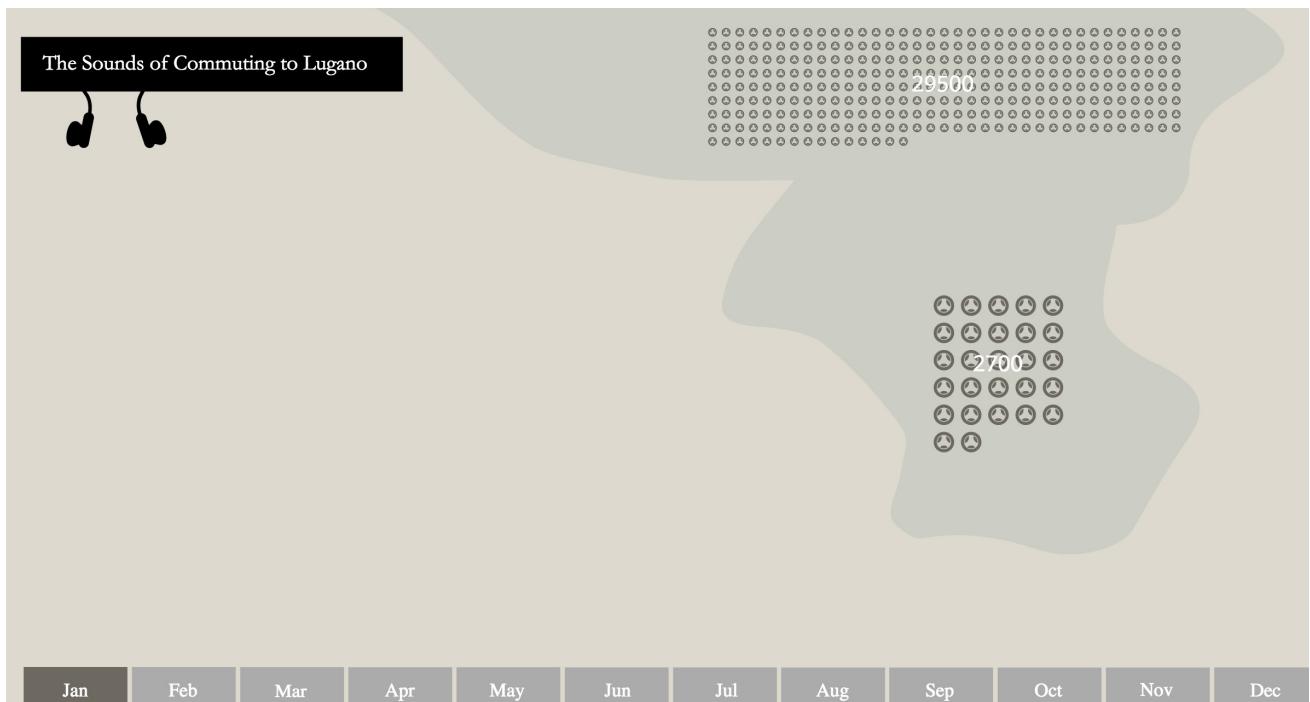


2.4 Sound of commuting

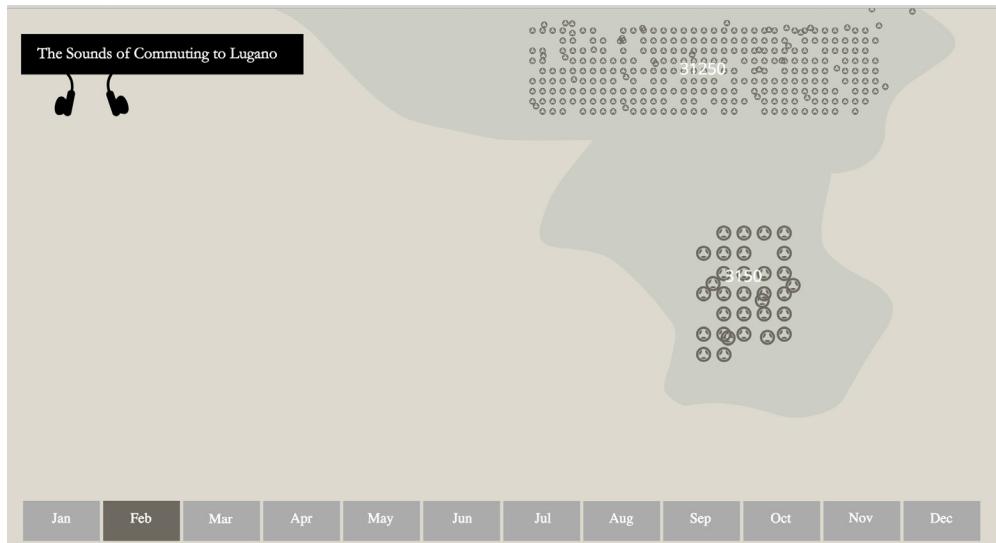
Samantha Lim

As a sonically augmented visualization made in D3.js, the *Sounds of Commuting to Lugano* represents the traffic across Swiss and Italian border in 2014. Open data on the volume of heavy and light vehicles at the border are translated into a number of wheels as well as the volume of traffic sounds (i.e. cars and trucks), allowing the viewer to experience the border traffic across the 12 months last year.

Link: <http://bit.ly/adv15-soundcommuting>



By selecting the month, the application calculates and arranges the numbers of wheels according to the traffic datasets



2.5 Summer in the city

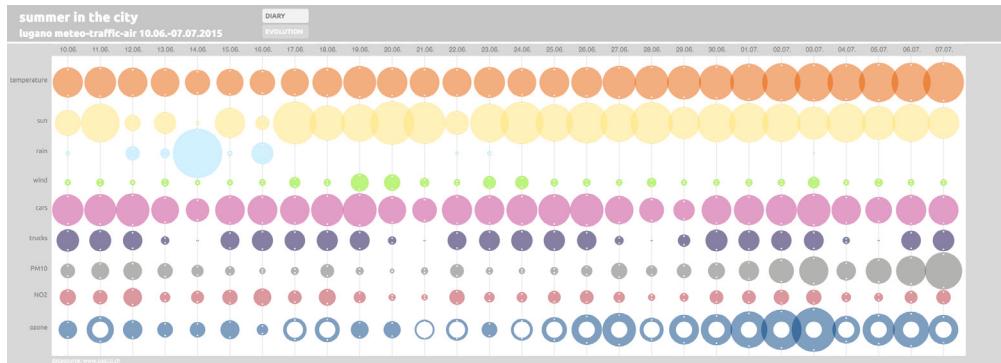
Carola Bartsch

Data visualizations normally do not show the data of air pollution together with those of weather and traffic. The physical data visualization *Summer in the city* shows the daily data of temperature, insolation, rain and velocity of wind together with those of the amount of car and truck traffic on the highway near the town and those of PM10, nitrogen dioxide and ozone concentration in the air, that are published on the website of www.oasi.ti.ch. These data are visualized by colored rounded plates of different sizes, calculated by D3.js according to the data, and strung on a wire. The plates are cut with a laser cutter from semi-transparent plastic sheets, the structure consists of laser-cut acrylic glass panels.

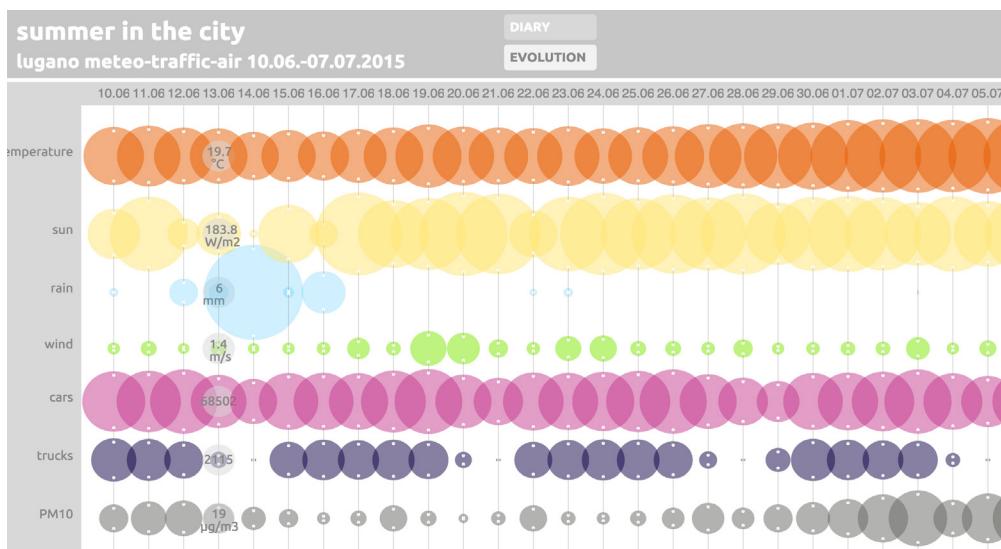
Link: <http://bit.ly/adv15-summerincity>



Plexiglass structure that supports the coloured discs representing three domains: air, traffic and weather



Data visualization of each day



Visualization of data evolution

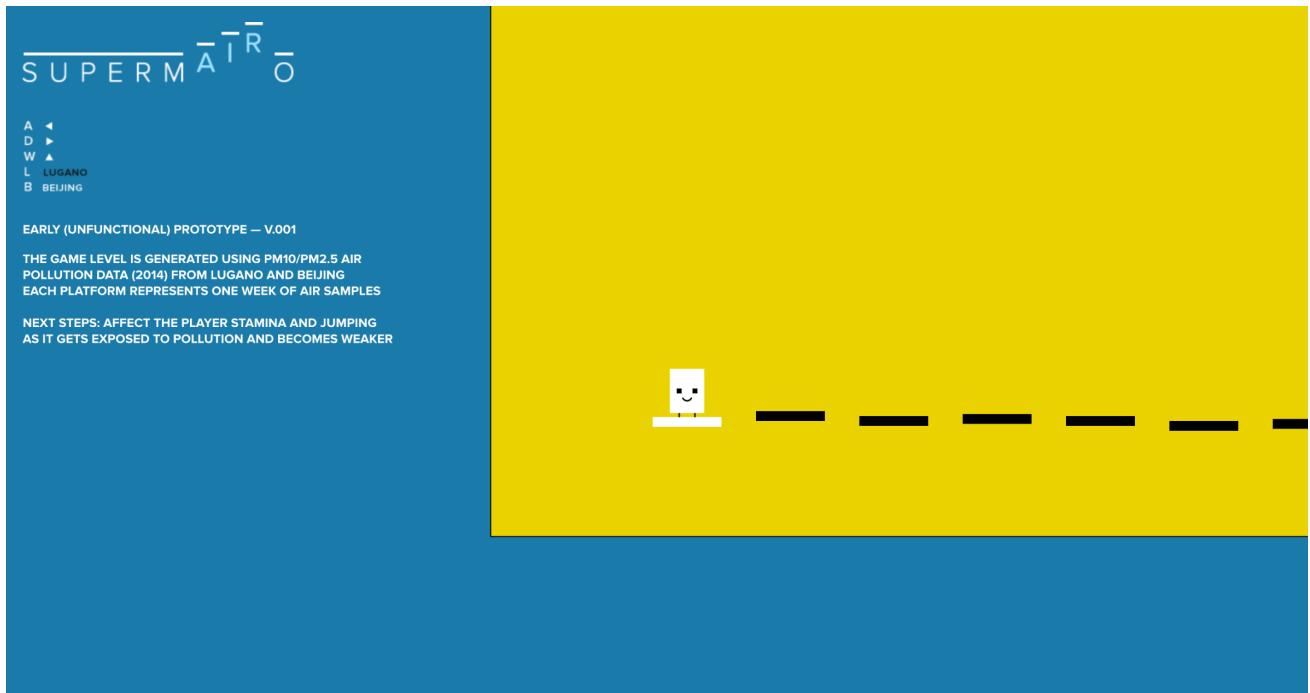
2.6 SupermAIRo

Giorgio Olivero

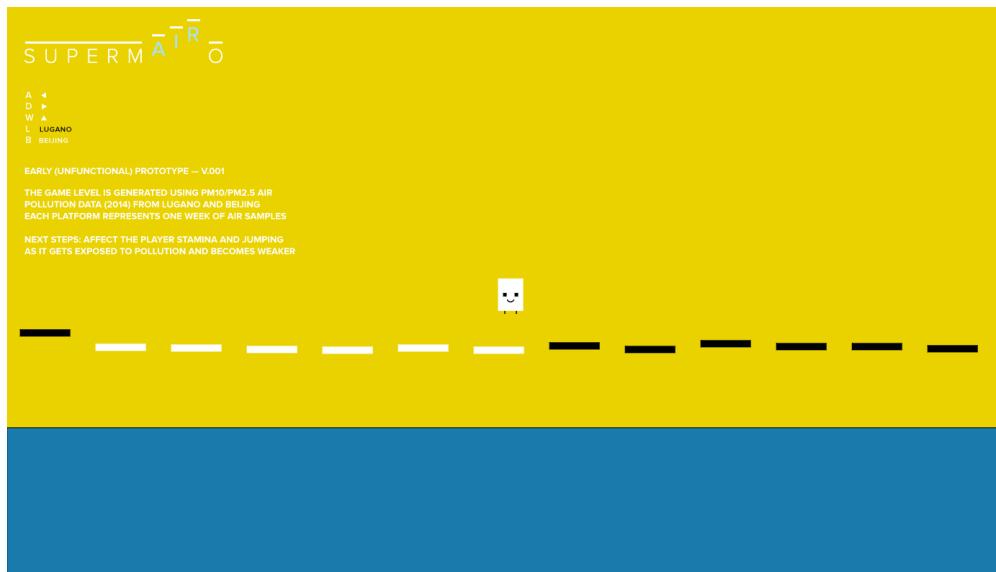
SupermAIRo is a videogame that visualizes the data about air pollution, in particular the quantity of PM10 and PM2.5 in 2014 in Lugano and in the region of Beijing in China. The character jumps on a series of platforms, each of them representing the weekly data about the air pollution.

A second iteration on the prototype would allow to visualize the impact of the pollution on the behavior of the character that becomes weaker according to the variations of pollution.

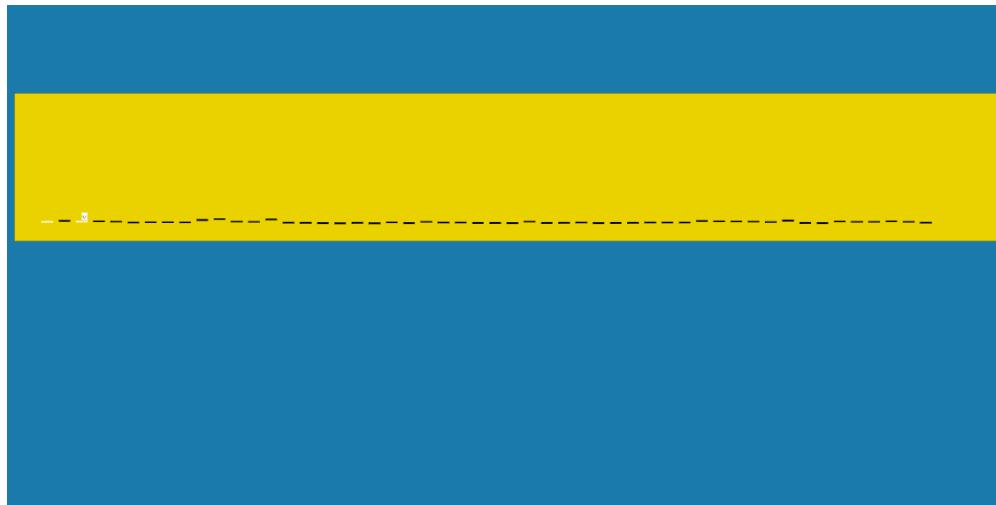
Link: <http://bit.ly/adv15-supermairo>



The game environment of *SupermAIRo* featuring the visualization of the level of pollution in Beijing



The game environment of SupermAIRo featuring the visualization of the level of pollution in Lugano



General view of the game environment of SupermAIRo featuring the visualization of the level of pollution in Beijing

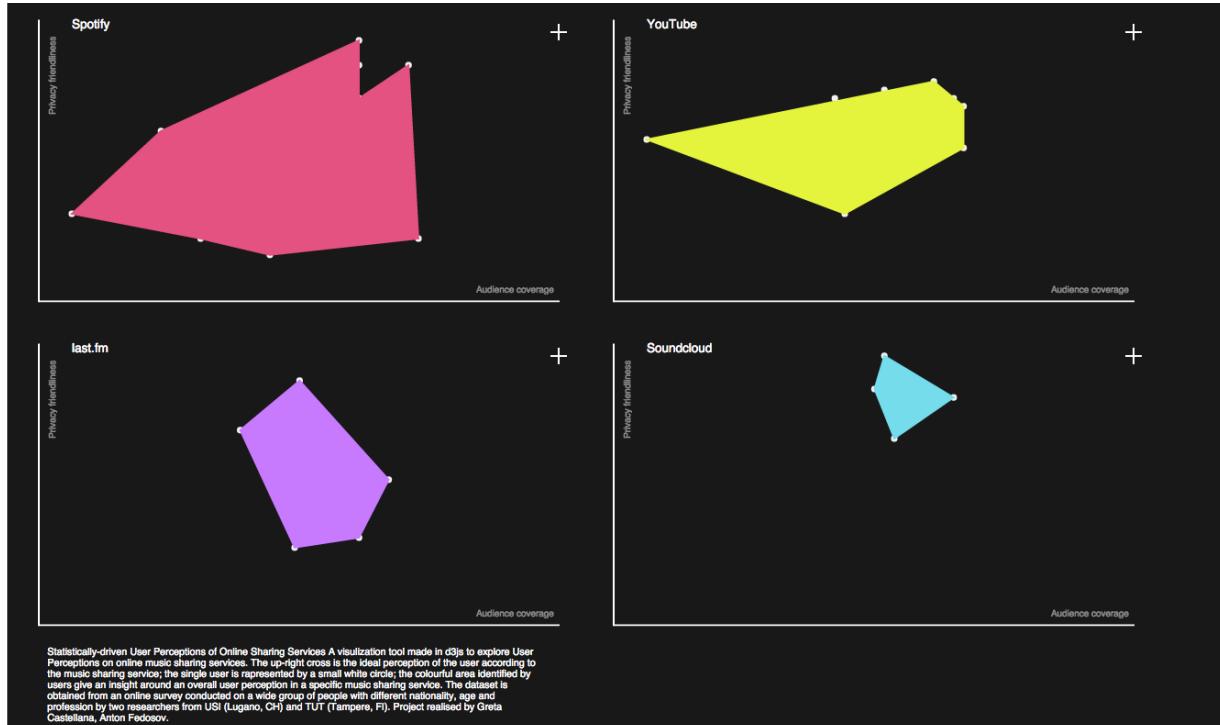
2.7 User perceptions of on-line sharing services

Greta Castellana, Anton Fedosov

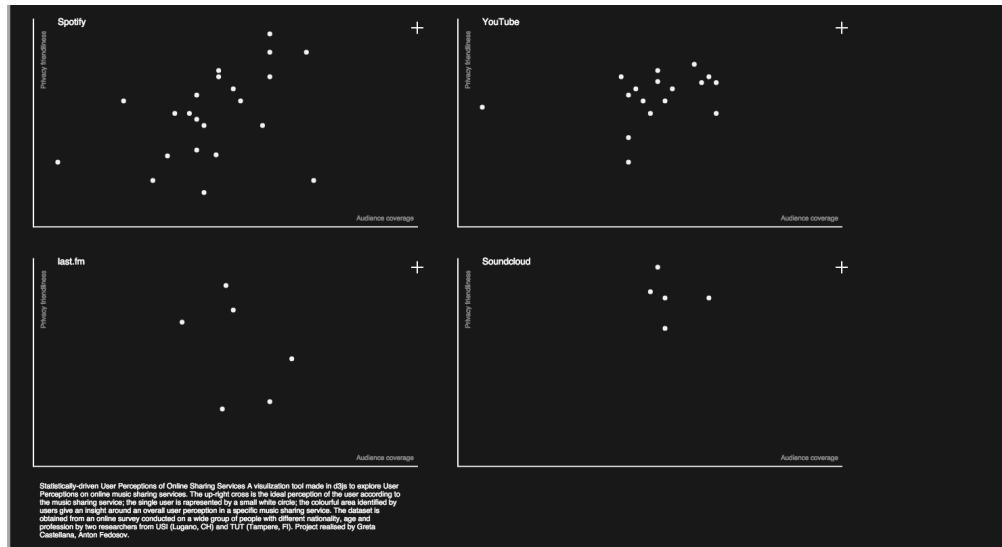
The project, realized with D3.js, visualizes the perception of a sample of users of on-line sharing music services. The “ideal user’s perception” according to the service is represented by the up-right cross of each single system. In all four cases the area of the users’ perception, identified by white circles, is far from the “ideal users’ perception”.

The dataset is obtained from an online survey conducted on a wide group of people with different nationality, age and profession by two researchers from USI (Lugano, CH) and TUT (Tampere, FI).

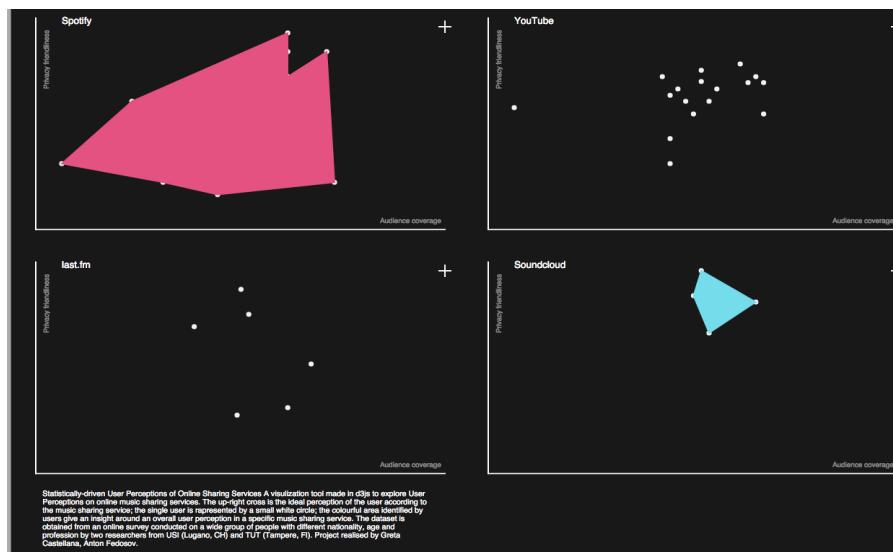
Link: <http://bit.ly/adv15-userperceptions>



Boxplot with the visualization of users's perception of four on-line music streaming service: Spotify, YouTube, last.fm, Soundcloud



Visualization of the users



Visualization through coloroured areas

3. Colophon

3.1 Teacher

Fabio Franchino, www.todo.to.it

Fabio is a computational designer and a founding partner at ToDo. He has always been involved in creative processes, ranging in fields from music to design, passing through performing and generative arts. One day he discovered the potential of programming as a medium and unconventional tool for his creative purposes. He explores ideas through evolving processes, often finding unexpected, meaningful outcomes and new aesthetics. After gaining senior experience with ActionScript and Processing, recently he has been exploring JavaScript and web technology, trying to discover further creative potentials. He has taught in several institutions and has held workshops in his field of expertise; he also organized the first Italian event devoted to computational practices in art and design.

3.2 Coordinator

Serena Cangiano, www.maind.supsi.ch

Serena Cangiano is coordinator of the Master of Advanced Studies in interaction design at SUPSI (University of Applied Sciences and Arts of Southern Switzerland) where she also teaches the design of interactive physical artifacts. As educator, designer and researcher at Laboratory of visual culture SUPSI, she is interested in the combination of open source practices with the discipline of interaction design, which is also the focus of her doctoral research discussed at University Iuav of Venice in 2015. Since 2012, she co-manages the Fablab Lugano where she works on the development of prototyping based workshops for designers.

3.3 Participants

Gennaro Abbatiello, CH, software developer

Carola Bartsch, DE, interaction designer

Roberto Camboni, CH, software developer

Greta Castellana, IT, information designer

Claudia Ciarpella, IT, interaction designer

Anton Fedosov, IT, Ph.D student in Computer Science

Fabian Frei, CH, software developer

Myoungun Kim, HK, interaction designer

Samantha Lim, SCP, interaction designer

Massimiliano Mauro, IT, information designer

Giorgio Olivero, IT, interaction designer and design director of TODO

3.4 Photo gallery

Flickr album, *Adventure in data visualization 2015*, in Flickr, <https://www.flickr.com/photos/maind-interaction/albums/72157656145085480>, last visit 28.09.2015

3.5 Press coverage

M. Mauro, *Le avventure didattiche della summer school*, in Wired.it, last visit 28.09.15

<http://www.wired.it/lifestyle/design/2015/09/14/avventure-didattiche-summer-school/>

The screenshot shows a news article on the Wired.it website. The header includes the Wired logo, a navigation bar with categories like ATTUALITÀ, INTERNET, GADGET, MOBILE, SCIENZA, ECONOMIA, LIFESTYLE, PLAY, LOL, IDEE, JOBS, VIDEO, GALLERY, DATA, and MORE. Below the header is a sub-navigation bar with HOT TOPIC, PREMI NOBEL, INFLUENZA, FACEBOOK, CINEMA, TWITTER, and MARTE, along with a VEDI TUTTI button. The main title of the article is "Le avventure didattiche della summer school". To the left of the title is a profile picture of Massimiliano Mauro and his name. Below the title is a large image of a 3D-printed cube with a glowing yellow pattern resembling a brain or a circuit board. A caption below the image reads "(photo: Claudia Ciarpella)". To the right of the image is a video player interface with a play button and the word "LIVE!". At the bottom of the article, there is a summary in Italian: "L'estate è ormai finita e rimangono solo le foto sui social di spiagge stupende, montagne silenziose e delle più stravaganti mete. Per molti il posto di lavoro. Tra i viaggiatori estivi c'è chi si è avventurato in una summer school, esperienze di più giorni dove tornare tra i banchi di scuola per affinare le proprie doti, scoprirne nuove o fare amicizia." On the far left and right sides of the article are navigation arrows. On the far left, there is a sidebar with a "99 CONDIVISIONI" counter and sharing icons for Facebook (75) and Twitter (24). On the far right, there is a box with the number "35" and the text "Nuovo su Wired".

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Department for Environment Constructions and Design

SUPSI

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