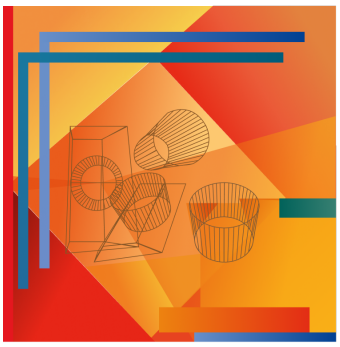

Proceedings of the International Conference on Advanced Visual Interfaces (AVI 2026)

Venice, Italy

June 8-12, 2026

General Chairs: Antonella De Angeli, Albrecht Schmidt

Program Chairs: Rosella Gennari, Fabio Pittarello

Long Paper Chairs: Paloma Díaz, Alessandra Melonio

Short Paper Chairs: María Menéndez-Blanco, Luigi De Russis

Proceedings Co-Chair: Niccolò Pretto


The Association for Computing Machinery

1601 Broadway, 10th Floor

New York, New York 10019, USA

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WELCOME

It is our great pleasure to introduce the 18th edition of the International Conference on Advanced Visual Interfaces organised by the Ca' Foscari University of Venice and the Free University of Bozen-Bolzano, in cooperation with the Association for Computing Machinery (ACM) and the ACM Special Interest Group on Computer-Human Interaction (ACM SIGCHI), and Hypertext and the Web (ACM SIGWEB). With the theme "Interactive Creativity: Agencies, Interfaces, and Ethics", AVI 2026 invited reflection on how interfaces shape creative practices, distribute tasks and agency between humans and computational systems and to bring ethical responsibilities to the foreground of HCI.

Generative AI presents new challenges and opportunities in how we interact with technology. The pragmatic and hedonic needs of diverse user groups, as well as their expectations of interactive systems, are changing with AI. At the same time, creativity and agency remain central to realise the full potential of individuals and societies. At AVI 2026, we encouraged the community to discuss these fundamental issues and to explore how we can create meaningful agency, design truly collaborative interfaces, and embed the values we believe in.

AVI 2026 took place in San Servolo, a small island of Venice. For centuries Venice has been a centre for the exchange of goods and ideas, and a place where engineering and the arts have shaped the fabric of the community. It is also a delicate and fragile ecosystem that is constantly changing. We believe this provides the ideal venue to reflect, reframe, and speculate about creative solutions to more sustainable and rewarding technological futures.

We thank the Program Chairs Rosella Gennari and Fabio Pittarello, the Steering Committee, the Organising Committee, all the authors and participants, and we wish all of you an exciting conference in Venice!

Antonella De Angeli and Albrecht Schmidt
AVI 2026 General Chairs

FOREWORD

The 2026 edition of the International Conference on Advanced Visual Interfaces (AVI 2026), held in Venice, Italy, from 8 to 12 June 2026, continues the conference tradition of bringing together researchers and practitioners working at the intersection of Human-Computer Interaction (HCI) and advanced visual interfaces, while expanding on different forms of interaction and experience. The first two days of the conference hosted workshops and tutorials, followed by the main conference programme. The scientific contributions addressed both consolidated AVI themes related to information visualisation, as well as novel interaction styles—e.g., augmented and virtual reality, intelligent interfaces, social interaction, interaction in natural and urban spaces, multimodal and multisensory interaction, tangible and embodied interaction—and emerging challenges related to artificial creativity and responsible design across various applications, including art and creativity, cultural heritage, security, health and well-being.

AVI 2026 received 107 submissions to the long papers track and 35 submissions to the short papers track. Following a rigorous double-blind peer-review process, 33 long papers and 18 short papers were accepted for presentation and publication in the conference proceedings, corresponding to acceptance rates of 30% for long papers and 51% for short papers. The review process involved an international Program Committee composed of 37 Associate Chairs and a broad panel of expert reviewers from the international HCI research community. Each paper received at least three reviews, including one by an Associate Chair, who coordinated the discussion process, synthesised the reviews, and prepared the meta-review supporting the final decision process. Final decisions were taken jointly by the Program Chairs together with the Long and Short Paper Chairs, based on reviewer evaluations, discussions, and Associate Chair recommendations.

The accepted papers were organised into thematic sessions that reflected both the breadth of contemporary HCI research and the distinctive focus of AVI 2026 on creativity, ethics, and emerging forms of interaction. The programme explored topics including diverse users in context, dynamic urban spaces, interacting with visual information, diverse artefacts in context, trust, awareness and decision-making, interfaces supporting different points of view, interaction methods and patterns, and the crafting of written narratives. Collectively, these sessions highlighted current research directions in tangible, embodied and situated interaction, as well as multimodal and multisensory experiences, intelligent and trustworthy systems, domain-oriented applications, and interfaces designed to support interpretation, collaboration, and creativity beyond exclusively visual paradigms.

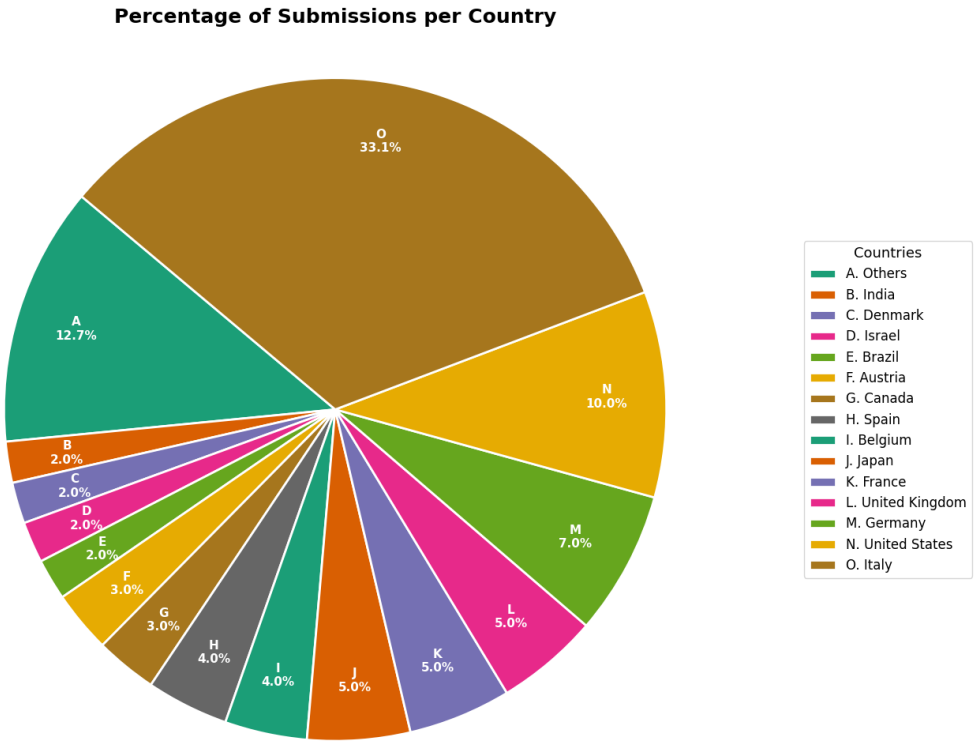
The entire conference programme is particularly rich in both scientific content and presentation formats, reflecting the diversity of forms and modalities that interaction and interfaces take today. AVI 2026 features 23 posters, 17 demos and interactive experiences, 13 workshops, and 4 keynote presentations. This edition also introduced the Interactive Experiences (IE) track alongside the traditional demo track. The IE track was conceived to provide space for experiential, performative, and embodied experiences that cannot be adequately communicated through conventional paper presentations alone. This innovation further broadens the scope of AVI and reinforces its role as a venue attentive to emerging forms of interaction research and practice.

The keynote programme of AVI 2026 reflects the conference theme and its emphasis on creativity, multimodal interaction, ethics, and future human-centred technologies from complementary perspectives. Hiroshi Ishii reflected on embodied and tangible interaction through his pioneering research on Tangible Bits and Radical Atoms, and presented his more recent vision of "TeleAbsence", inspired by both artistic practices and human-centred design. Stefania Serafin explored multisensory experiences grounded in sound, movement, and bodily perception, exemplifying AVI's growing interest in interaction beyond purely visual interfaces. Francesco Ricci discussed trustworthy recommender systems and the broader implications of AI-supported decision making, contributing to discussions on responsible AI and human-centred intelligent systems. Felienne Hermans addressed the societal implications of AI and automation, connecting directly with AVI themes concerning artificial creativity, ethics, and human agency.

AVI 2026 also continues the innovation introduced in recent editions concerning further space for students. This year, dedicated events coordinated provide doctoral candidates with opportunities for networking, mentoring, and visibility within the broader conference community. The programme includes a dedicated Doctoral Consortium (DC) session, followed by DC madness presentations and poster sessions integrated into the main conference, fostering direct interaction with senior and peer researchers. In addition, AVI 2026 strengthens student participation through a Student Volunteer programme chaired and coordinated by students themselves. Together, these initiatives reinforce AVI's commitment to supporting new generations of researchers.

Workshops remain a central component of the AVI experience, with 13 workshops exploring emerging topics and interdisciplinary perspectives across HCI, multimodal AI, creativity, accessibility, immersive environments, and human-centred technologies. Together with posters, demos, and IE's, these activities contribute to an articulated and dynamic conference programme that encourages discussion, experimentation, and collaboration.

The distribution of submissions and committee memberships suggests that AVI is progressively strengthening its international profile. The plot below shows the distribution of submissions by country; countries with fewer than 10 submissions were grouped into the “Others” category. While Italy still represents the largest share of submissions (33%) and committee members, both scientific contributions and organisational responsibilities are distributed across a broad range of countries spanning Europe, America, Asia, and the Middle East. This diversity highlights the growing international reach of AVI and its ability to attract participation and collaboration from multiple research communities and geographical areas.



AVI 2026 is the result of the commitment and dedication of many people.

We sincerely thank all members of the Organising Committee for their work for the conference organisation. We are grateful to the DC Chairs for creating novel interaction spaces for students, and to the Student Volunteers Chairs, who coordinated the call for student volunteers; the Web Chair, Publicity and Social Network Chairs, who brought the

conference communication to a new artistic level; the Industry Chairs for their support; and the Accessibility and Inclusion Chairs, who considered diverse perspectives for the conference, drawing on their expertise in accessibility.

We also warmly thank the Poster Chairs and the IE and Demo Chairs for bringing fresh ideas and energy to the conference, as well as the Workshop Chairs, who managed a record number of submissions and coordinated the entire process, from selection to organisation. Finally, we thank the Paper Chairs and Proceedings Chairs for their fundamental contribution to the scientific programme and proceedings.

In recognition of the collective effort invested in shaping AVI 2026, we decided to include as many members of the Organising Committee as possible among the editors. Although it was not feasible to include everyone this year, we hope it is clear that each member of the committee made a meaningful contribution to the conference. AVI would not be possible without the commitment and dedication of its Organising Committee.

We are particularly grateful to the General Chairs, Antonella De Angeli and Albrecht Schmidt, for their guidance and support. We also thank the Associate Chairs, Program Committee members, and external reviewers for ensuring the scientific quality of the conference and for their careful and timely evaluation work.

Last but not least, our appreciation also goes to the initiators of AVI, started in 1992, as well as the AVI Steering Committee for their trust and support throughout the organisation of this edition. We thank all Keynote Speakers, Workshop Organisers, and Student Volunteers for their valuable contributions to the conference. Finally, we express our deepest gratitude to all authors and participants whose enthusiasm, creativity, and research contributions continue to shape AVI as a vibrant and internationally recognised forum for advanced interfaces and interactions, with a distinctive attention to human factors.

Rosella Gennari and Fabio Pittarello
AVI 2026 Program Chairs

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TABLE OF CONTENTS

KEYNOTE TALKS

SESSIONS

Interfacing Points of Views

Long Papers

Crafting Written Narratives

Long Papers

Interaction Methods and Patterns

Diverse Artefacts in Context

Interacting with Visual Information

Long Papers

Short Papers

Dynamic Urban Spaces

Long Papers

Short Papers

Domain Experts and Practitioners

Long Papers

Short Papers

Trust, Awareness, and Decision

Long Papers

Short Papers

Diverse Users in Context

Long Papers

Short Papers

POSTERS

DEMOS AND INTERACTIVE EXPERIENCES

WORKSHOPS

In cooperation with

With the support of

The Venice Lagoon Climate Change Dashboard as a tool for capacity building for local populations

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Abstract

Among the many visualisation technologies, dashboards enable extensive exploration of data and its relationships. They enable the reporting and display of static data, historical series, and dynamic (continuously updated) data with a wide range of visualisation options. Therefore, in today's knowledge-based society, dashboards are extremely useful tools for both raising public awareness and activating accountability and/or decision support systems (or planning decision support systems). It is therefore essential to cultivate a data culture and provide useful insights for approaching these tools and interpreting the data they produce. The paper proposes a novel and imaginative method for engaging with data and its visualisations by incorporating analogue techniques. This approach encourages users to interact with data in tangible ways, fostering deeper understanding and new perspectives even when specific technical skills and expertise are lacking.

CCS Concepts

• **Information systems** → Information systems applications; • **Human–centered computing** → Visualization; • **Applied computing** → Education.

Keywords

Spatial-temporal analysis, Visualization Technologies, Open data, Climate change

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1 Introduction

Visualisation technologies have become prevalent across numerous fields, including planning [1, 2, 3, 4]. However, as [5] observe, "despite the wide use of visualisation to support decision-making in urban management, the understanding of urban data visualisation remains limited in the literature." Currently, neither plans nor public administrations systematically employ dashboards, with or without maps, nor do they often integrate them into GIS environments. The use of open data to engage citizens or to demonstrate the progress of short- and medium-term policy objectives or plan actions is even less common.

Today, many open data sources provide both historical series and real-time data dynamics, which are highly valuable for monitoring, informing, raising awareness, and supporting accountability. Moreover, many dashboards now offer extensive customisation, enabling users to explore data and investigate diverse combinations. Taken together, these features position dashboards as effective tools for building citizens' capacity on local issues, such as climate change and pollution, and as valuable components within Planning Decision Support Systems.

This paper introduces a simplified, educational dashboard designed for workshops that utilise demographic, climate, and pollution data from the Venice Lagoon. The initiative aims to foster a "data culture" and foundational analysis skills through creative visualisation techniques that blend digital and analogical approaches to data and their interrelationships.

2 Dashboards and awareness

> "A dashboard is a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance." [6]

While this is the current use of this visualisation technology, it has acquired many potentialities over time (the term appeared in 1847 according to the Oxford English Dictionary, or 1846, according to [7]). The tool essentially allows you to 1) focus on certain aspects; 2) extract and display the data from these aspects in a synoptic manner; 3) interact with the data or with data visualisation methods. Often, however, this experience of browsing and exploring data requires specific skills to understand the results and trends displayed. Very often, this deficiency also inhibits data navigation or limits the acquisition of data, information, and knowledge. For these reasons, dashboards can also be classified by their intended audience: a technical user, i.e., with appropriate training and expertise, who must perform certain functions or provide an action support system (piloting, rating, etc.); an integrated pool of users, some with technical training and some decision-makers, to guide or support decision support systems (such as for control rooms or operational rooms); many end users, with varying degrees of knowledge of the topic, the technologies used, and with different interests or needs (interactive information available on websites, newspapers, etc.).

According to the literature, urban geospatial dashboards are distinguished based on their purposes and interface styles. Regarding

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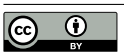

AVI '26, Venice, Italy

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purposes [6, 8, 9, 10, 11], we have operational dashboards, which describe spaces, phenomena, and their states through measurements; analytical dashboards, which go beyond descriptive statistics to perform data tests and diagnoses, or to demonstrate relationships between variables and, in some cases, even construct statistical-interpretative models or their relationships, models, etc.; strategic dashboards, which build future forecasts based on specific models. Regarding the graphical user interface styles used, however, there are two distinct trends: one that employs single-page styles and one that utilises drill-down [11]. For operational purposes, the single-page dashboard design is the most commonly used, allowing users a synoptic view of the information. Typically, the drill-down style is used for analytical and strategic purposes, and therefore requires customisation, in-depth analysis, and often the use of drop-down menus. Often, however, the boundary between the single-page and drill-down styles is blurred. However, considering this bipartite nature and the ability to visualise or manipulate data. It collects as much data as possible, often from the platform, traffic cameras, various monitoring stations, smart grids, newspapers, ex-Twitter messages, and so on. It allows the recipient to explore the data and its interactions, as well as choose the topics and levels of detail to explore. It's also possible to compare data at different spatial (districts, neighborhoods, and communities) or temporal (daily, monthly, or yearly) scales and by topic (childcare services, correctional facilities, education, environmental protection, health, homelessness, sanitation, police and firefighters, and more), export it, and explore the indices, comparisons, and correlations (textual explanations and specific attachments are also available). Finally, achieving strategic objectives necessitates interactive engagement, often facilitated through participatory processes. Each of these forms of data experience contributes to social learning and enhances citizens' awareness of their city's performance, thereby fostering greater engagement. Public bodies can leverage these tools in diverse ways to address a range of needs and objectives.

3 A prototype of an educational program though a dashboard

To address operational-descriptive needs, we developed a user-friendly, single-page dashboard utilising open data from ISTAT, ISPRA, and ARPAV. This dashboard highlights key climatic, demographic, and pollution indicators for the Venice Lagoon. Named DASHBOARD_LaVECC1, it was created using the Shiny R package (https://shiny.posit.co/), a free and open-source framework supported by Posit and integrated within RStudio (Version 2025.09.1+401) [12]. The dashboard comprises 10 thematic panels—8 of which are dynamic—that explore the impacts of climate change in the area over periods ranging from 2000 to 2025, depending on data availability.

Three dynamic visualisations from the dashboard were selected as an analytical framework for engaging non-expert citizens in the interpretation of urban environmental data. The dataset encompasses three dimensions particularly relevant to urban resilience: temperature (to examine heat trends and thermal extremes in the built environment), wind (a critical variable governing tidal dynamics and urban microclimate), and pollution (to assess urban waste patterns and their spatial distribution). Each visualisation corresponds to distinct data characteristics and affords different modes of inquiry into urban environmental change.

In the case of temperature, two data types are considered: aggregated temperature data — comprising the mean of average, minimum, and maximum values — and absolute temperature data (see Figure 1). The line graph reveals a recurring pattern in the urban heat time series: a consistent ~3℃ differential between mean annual temperature and the annual absolute extremes. Critically, when maximum temperatures are examined in isolation, an exclusive reliance on average values proves to substantially underrepresent the intensity of urban heat stress — and, by extension, its impact on the liveability and thermal comfort of urban spaces. The average is a central value, and we might be interested in knowing the extreme values (indicated by the asterisk or red sun). Furthermore, averages can yield a frequency not found in extreme values, as in the case of the maximum average value in 2000 or the homogenization and flattening of various oscillations. So if we're interested in heat waves, perhaps actual values could be more useful than average values. The same is true if we want to study microtrends within our time series. And precisely on the maximums, we've built an analysis exercise using the similarity with the spheres of an abacus. Using three axes aligned at the highest temperatures and returning a value of 2 (black) for centring on the temperature, a value of 1 for semi-centring (grey), and a value of 0 (no centring), it is possible to study the historical series as a plot, a symphony, a texture. This allows us to verify the frequency in an analogical and artistic way, that is, without any technical expertise. It is easier to notice a micro-trend of two high peaks in close proximity in 2022 and 2024 (both above 25 ℃), unlike what happened in the past, which in the period 2000-2021 presented only 4 peaks (2003, 2006, 2015, 2018), with 2024 recording the highest absolute value of the series (31.3 ℃).

In the case of the Wind Direction data, the choice of the spider chart is again inspired by a representation of analogical similarity with the compass rose (see Figure 2). With this data, the user can choose between annual data, which shows a trend analysis, and monthly data that allows them to verify which months were characterized by "acqua alta" (significant tide values), with problems related to damage and traffic disruptions, especially in the historic centre of Venice. The directions to be monitored, as they favour high tide in Venice, are all those related to the Sirocco, namely East-Southeast (ESE, in light blue and enclosed within a red oval), Southeast (SE, in grey), and partly also South-Southeast (SSE, not in our representation). In this case, it is necessary to monitor only the occupation of the lower left quarter to understand the periods in which high tide occurred.

Finally, the waste data allow the end user to experience a crosstable, that is, the value of the resultant resulting from the intersection of two variables, in our case the household user thresholds (represented as a logarithmic value, to abstract and compare the different trends despite differences in scale) and the total kilograms of waste produced in the various municipalities and in various years. Each municipality was represented by an identifying colour and the size of the circle, which represented the population's size in logarithmic proportion (smaller and similar circles belonged to municipalities with fewer inhabitants and with the same scale of values; larger circles represented municipalities with a larger population,

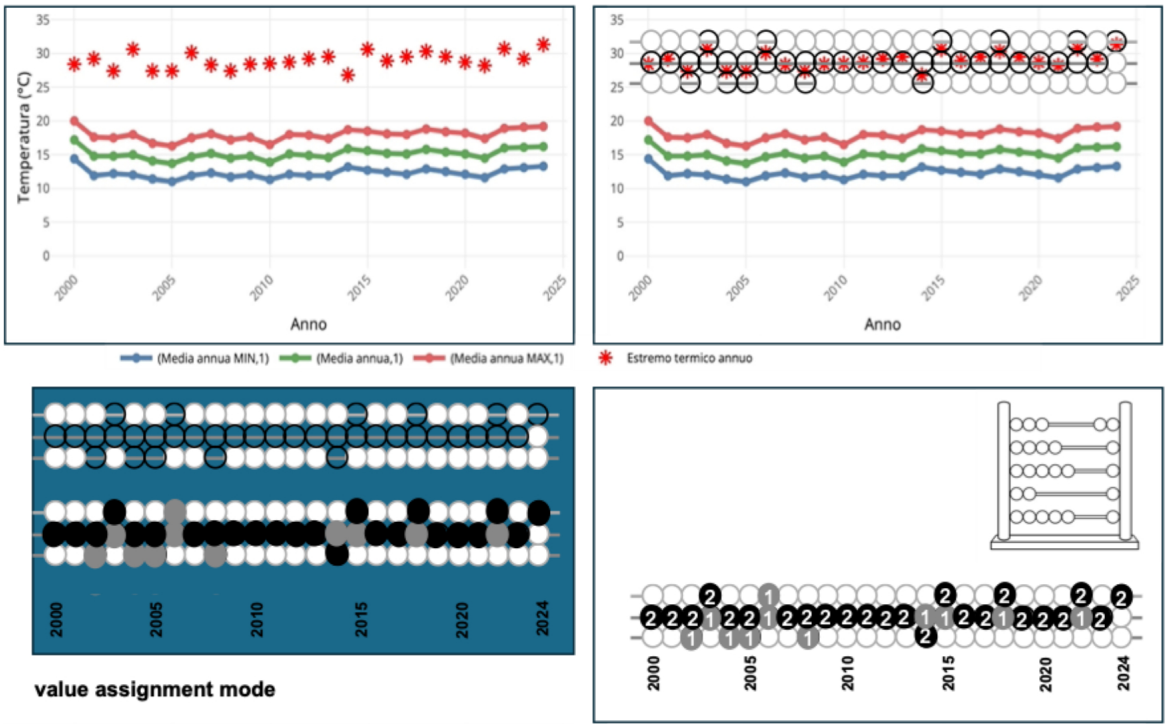

Figure 1: The transition from real data to an analog interpretation of the temporal trends of annual extreme temperatures.

Figure 2: The analogy between a compass rose and a spider chart, as a way to help read the predominant direction of the winds.

etc.). How can we explain the trends over the two decades? Simply through the visual appearance of the shape. Where the shape of the same colour differed from the circle, then an oscillation around the same values had occurred (see Jesolo, Cavallino-Treponti, etc.). Where the shift occurred along an axis, such as the horizontal one (as in the case of Mira), the greatest impact was on waste production per capita, unlike where the quantity of waste had not changed much, unlike the population variation, which had decreased significantly, as in the case of Codevigo. Simply hover your mouse over the circle to see the data change over the years (indicated by the arrows in our representation).

These three exercises constitute distinct pedagogical entry points for fostering data literacy among citizens in relation to climate, demographic, and pollution dynamics in the urban (spatial) environment. Beyond their analytical function, they are designed as icebreakers to lower the threshold of engagement with open urban (spatial) data — introducing participants to key data consultation practices such as the identification of thresholds, ratios, and temporal patterns as foundational tools for evidence-based urban (spatial) inquiry.

4 Suggestions and proposals for the future

Currently, we have no empirical evidence of the results of such a training program. Target groups are currently being determined; the first phase will likely involve schools (youth target) and associations (adults, not necessarily with technical profiles), followed by

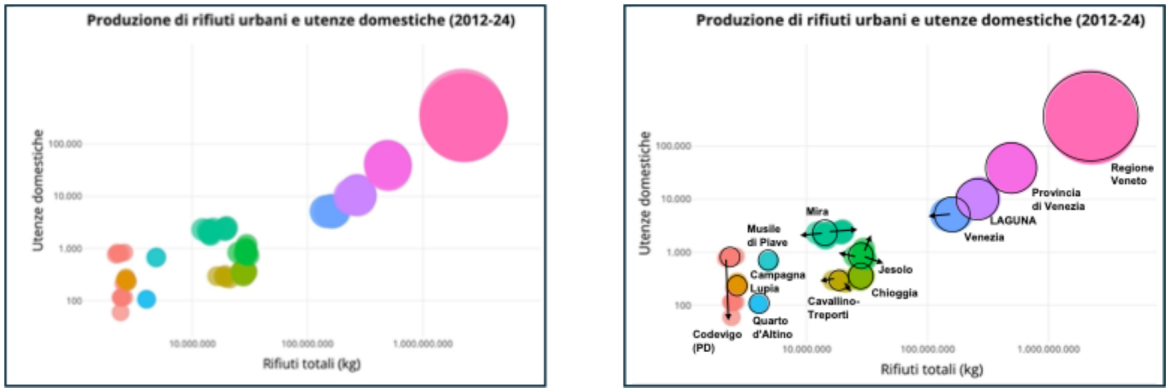

Figure 3: Visualization of the variations in waste production taking into account the ratio between domestic users and kilograms of waste produced per year, through the deburring and moving of the circles.

a second phase involving institutions (officials target) and professionals (professional associations) to test the effectiveness of this program.

Furthermore, the number of monitoring stations in the dashboard will be increased to provide increasingly abundant data and results that better fit the analysed lagoon phenomena, as well as to provide the most realistic possible dimension in the simulations. It will also be verified whether, as exploration options increase, users actually decide to explore the data after an initial familiarity with the dashboard tool.

Further research may also be conducted in the future to verify the possibility of distinguishing learning performance by comparing the differences between dashboards with single-page styles and those using drill-down styles.

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