

LOCATION-BASED VISUALIZATION OF URBAN EXPERIENCES: A CASE STUDY ON OLFACTORY DATA

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ABSTRACT

Visualizing data regarding space and time is always a challenging task. Yet, what really brings out this challenging aspect of design is trying to successfully visualize an intangible concept—and creating an urban olfactory map, for example. Here in this study, we focus on a case study regarding an urban smellscape, as well as coming up with visualization solutions for the representation of olfactory data. This study aims not only at contributing to the niche subject of olfactory map visualization, but also at providing insights for new visual representation methods for the urban scent archives and for the field of experience mapping.

INTRODUCTION:

Visualizing data regarding space and time is always a challenging task. Yet, what really brings out this challenging aspect of design is trying to successfully visualize an intangible concept—and creating an urban olfactory map, for example. In our day, maps have moved beyond conveying solely geographical information, into providing humankind with knowledge regarding very niche fields of interest such as urban life, local sounds, taste, experience, human proxemics. Maps now supply users with spatial and temporal information concerning past, present (and even future) experiences. There has emerged a new field of cartography, experience mapping, which relates to this research's visualization trials of urban experience. Here in this study, we focus on a case study regarding an urban smellscape (Figure 1), as well as coming up with visualization solutions for the representation of olfactory data. We have briefly studied the various

Figure 1: Sketches on how the urban olfactory data of a street can be visualized..

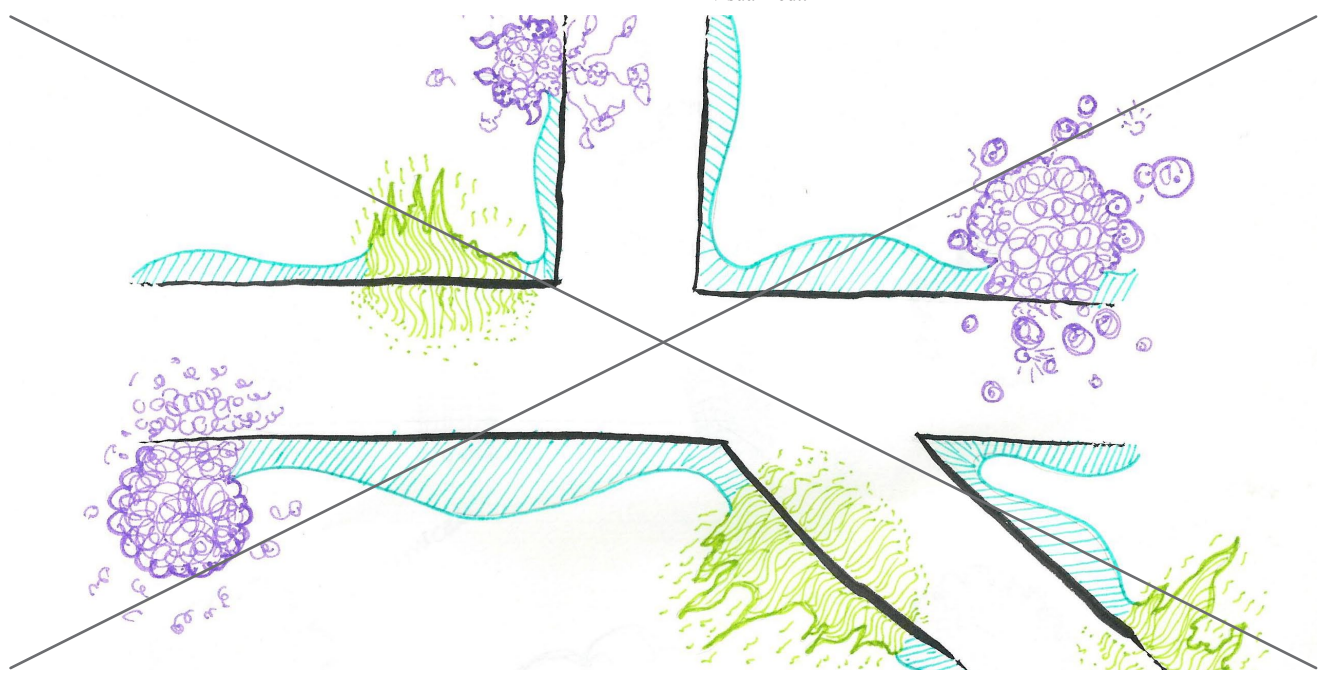




Figure 2: This map was produced by the ARHA department before we started exploring on more representative ways of visualizing olfactory data..

aspects of odor measurement (such as intensity, and hedonic tone assessment) and decided to concentrate on the pleasantness level of a smell. This study aims not only at contributing to the niche subject of olfactory map visualization, but also at providing insights for new visual representation methods for the urban scent archives and for the field of experience mapping.

MOTIVATION:

The motivation behind the explorations on visualizing a smellscape map, comes from a related study on collecting olfactory data from the city in order to expand the archive of İstanbul's intangible cultural heritage regarding urban scents. The Department of Archeology and History of Art (ARHA) at Koç University; has been running workshops for obtaining olfactory data from the Eminönü district of the city, which is known for hosting the famous Spice Bazaar—a place with an abundance of smells. Eminönü has ever been a center for trade and a variety of goods throughout its history. This district is quite populated and touristic, with a wide range of shops. The repertoire extends from coffee shops, and spice stands to textile markets. With so much information gathered from this particular location, their study required an effective method of visualizing all sorts of scents that radiated from a variety of shops and streets (Figure 2).

Portraying a region's olfactory characteristics require heavy brainstorming in terms of what aspect of odor to portray, how to portray it and how easy it is to read this scent map. With the emergence and raising-interest of urban experience mapping, designers started asking themselves these questions alternately while shaping their sensory and olfactory maps. The Re_Search Lab, situated in Berlin, conducted a research on the notion

of smelling and transforming scents into a language. The study was fueled by the archive of over 6000 scents currently preserved in the lab (Toolas, 2011). Another recent contributor to this field is Kate McLean, a designer who creates sensory maps of different cities. She speaks of setting human subjectivity as her basis in cartographic practices. She suggests that, "using humans as sensors is a method of affective cartography that aggregates personal insight leading to interpretation of place thereby making the map affective" (Pink 2009). Unless one works with a trained nose to successfully interpret and categorize all sorts of smells, our designs are prone to becoming subjective. As we came up with solutions on how to illustrate several aspects of smells, we embraced the fact that our categorizations and visualizations of scents are still based on personal experiences and preferences. However, within this exploratory study, we aim at building a basis for more in-depth studies on a live, user generated, interactive smellscape map. In this paper, we share our insights from the preliminary studies on data collection and explorations on visualization.

BACKGROUND

Urban experience mapping, and focus on intangible culture heritage expanded greatly in the recent decades. Steering away from standardized visuals and information, people started taking interest in their own experiences, alternative routes or journeys. This need of accessing or mapping out niche branches of knowledge inevitably increased and motivated citizen participation in urban life. Meanwhile, emerging concepts such as social media, folksonomie, user generated content and novel technologies (Bilandzic, M., & Forth, M. 2009), bring together new discussions on building user



generated experience maps within the fields of user experience design, sustainability, sensory ethnography and intangible cultural heritage.

To illustrate the correlation between the above mentioned fields, it is important to discuss about sensory ethnography with respect to intangible cultural heritage. Sensory ethnography is associated with the broader topic that is ‘visual anthropology’. The former field recently emerged, aiming to study cultures and people by focusing on the “multi-sensoriality of experience, perception, knowing and practice” (McLean 2014) (Figure 3). The Sensory Ethnography Lab established by Harvard University helped expand this area of study. Sensory ethnography did not only contribute to those who intended to specialize in visual anthropology, but also contributed to the durability and demonstration of the elements that make up intangible cultural heritage. Sensory ethnography’s concentration on personal multisensory experiences in social life illustrates a more colorful social portrait, and establishes an effective approach in the study of intangible cultural heritage.

Today, various thematic experience mapping examples can be seen in our daily life. The spectrum of cases is considerably broad and diverse. The purposes of maps are generically as follows; citizen engagement, transportation, tourism, urban planning, crisis management, personal health monitoring. Because of this variety information design concern of these maps becomes more important. Studies on urban data visualization is an active challenge. Apart from the conventional visualization and mapping techniques, some design researchers and designers have been working on much more experimental visualization approaches. One of the pioneers is MIT Senseable City Lab (Figure 4, 5). In their studies both experimental and appealing visualization techniques are successfully applied. In the near future we believe that experience based urban data visualization will be much more effective in the daily life than it is today.

One other sub-category of urban experience maps the sensory map—the type of cartographic study this research covers. A prominent contributor to sensory mapping, which has spread over the years, is Kate McLean—and one of her most celebrated works is the Amsterdam smellscape she produced (McLean 2014).



Figure 3: The smell legend and a preview of the Amsterdam smell map created by Kate McLean (2014).

Figure 4: This is an interactive location based data viz. study where not only traffic data but also details on incidents and cause and effect are visually represented (Anwar et al. 2014).

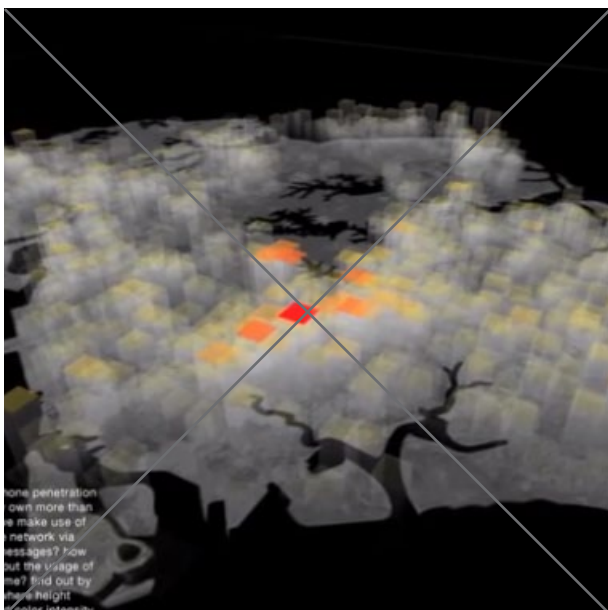


Figure 5: Live Singapore project of MIT, SenseableCity Lab. This interactive, live visual collects the data from the city and provides several different data viz. techniques. This figure is about mobile phone use (Kloockl, K., 2011)

(Figure 3)

Going through these pioneers and briefs we received from the ARHA department, we discuss an information architecture and categorization of smells for the smellscape. According to Vincenzo Belgiorno et al. (2012), Hedonic tone assessment deals with several levels of pleasantness in odors, varying from extremely unpleasant via neutral up to extremely pleasant. The Odour Impact Assessment Handbook also offers several labels for odor quality or character, such as: fruity, floral, offensive, earthy, medicinal etc. We build our approach upon these ideas.

Different from other studies in this field that work with high abstraction levels, we study methods of representational scent visualizations. Moreover, our purpose in this study is to explore urban olfactory map visualization with clear and minimal layers of information. We derived three major categories for a trial map, and a smellscape prototype was produced according to pleasant, neutral and unpleasant odors. And in this paper, we share our insights from this exploratory experience.

METHOD

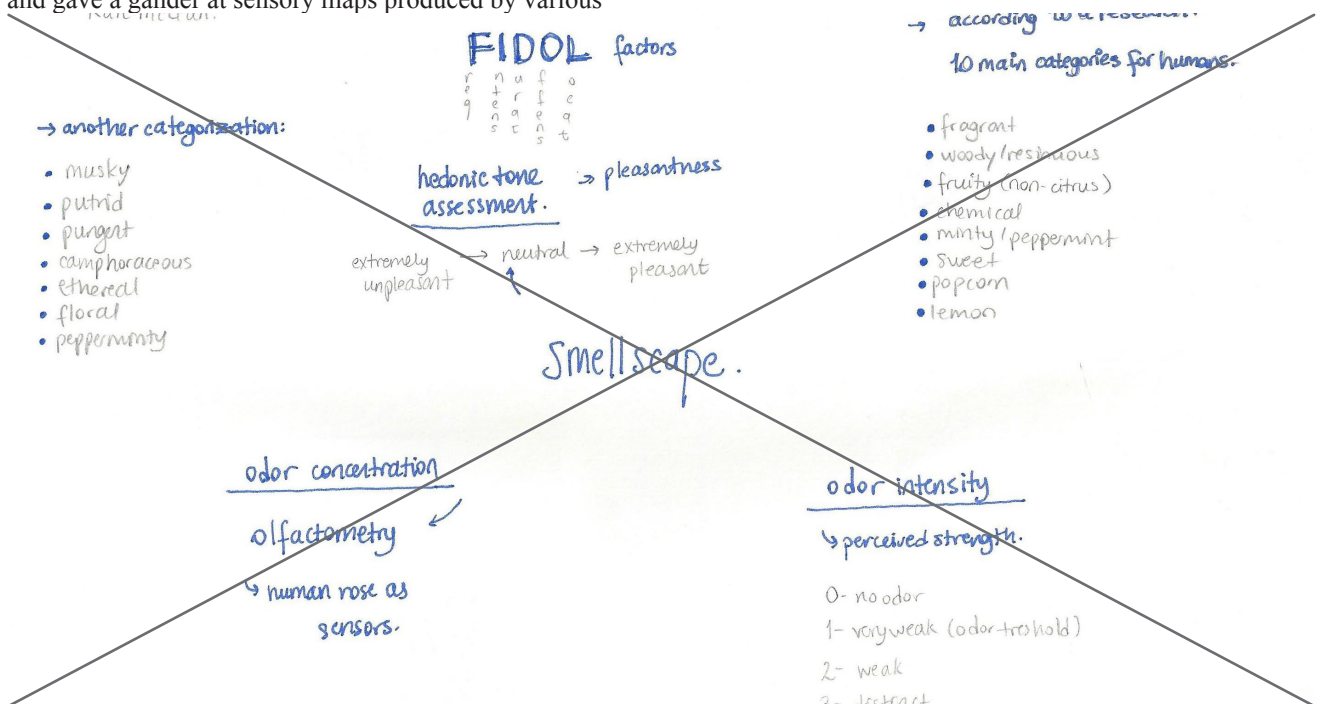
Our initial efforts of generating design solutions for an olfactory map consisted of carefully inspecting the data and visuals that were gathered and produced by ARHA. Through out the data collection process, they had created a diagram (Figure 2), which color-coded every different scent that oozed out of the shops in Eminönü. There would be too many categories if our olfactory map color-coded the list of scents in original the data set— there were more than 25 of them. We studied the methods of visualizing an abstract concept like scents and gave a gander at sensory maps produced by various

designers to draw influence, while we researched for odor assessment and attempted to reduce the large number of smell codes to no more than 3 categories. Using the category labels Hedonic Tone Assessment offers for the pleasantness degrees of a smell, we derived three levels of data to portray in my urban smellscape trials: (1) pleasant - coded purple, (2) neutral - coded blue and (3) unpleasant - coded green. We firstly studied the visualization of the pleasantness levels of smells, during which the ARHA department took a smell walk around the neighborhood. This small tour helped us comprehend the times we realize we are keenly smelling something in the air, what kinds of smell we are quick to sense and how they spread. We used these experiences to produce a prototype and later moved onto integrating the types of essences (by using textures) into our olfactory map. Throughout these studies, we also had discussions and feedback sessions within our design group.

THE DESIGN PROCESS AND DISCUSSIONS

One of the most important problems regarding a smellscape design is that, it is not possible to create an objective urban olfactory map if one is not an expert of odor assessment. A designer's creations will yield, no matter how much one focuses on user-experience research, quite personal approaches when it all comes down to visualizing the pleasantness or unpleasantness levels of a smell. Making a distinction between smells is therefore a subjective action. The designer aims to create a universal language for mapping out information for any types of users to benefit from, but as urban planner

Figure 6: The sketches from the process of building the information architecture of the smellscape..



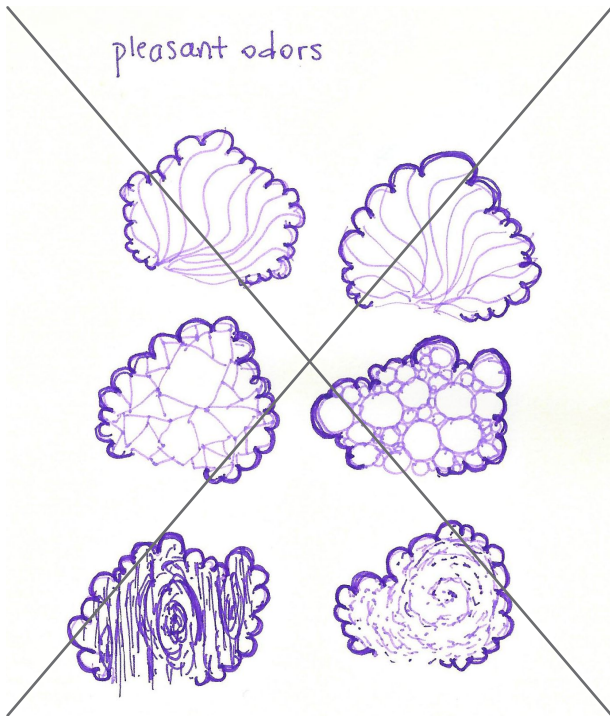


Figure 7: Our studies of patterns and textures regarding the visualization of pleasant smells and indicating their characteristics..

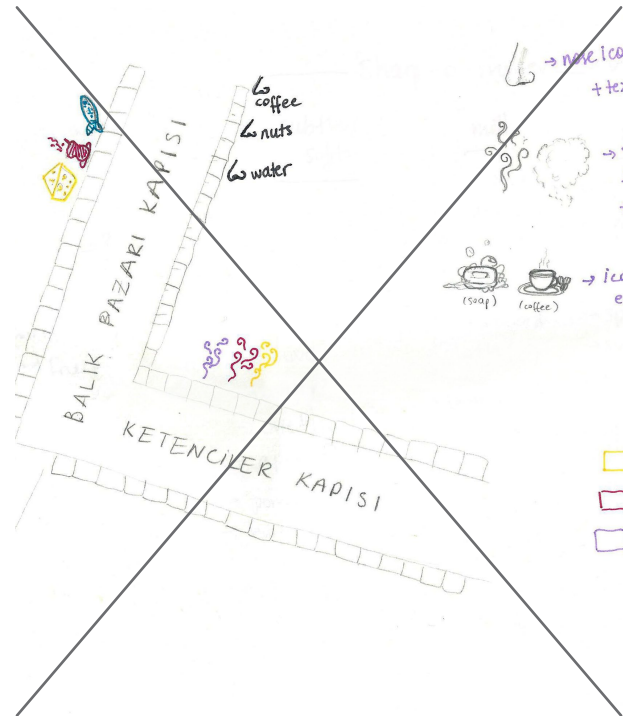


Figure 8: The initial sketches of the smells spreading from Eminönü's shops. At first, we were studying the methods of visualizing all of the smell codes.

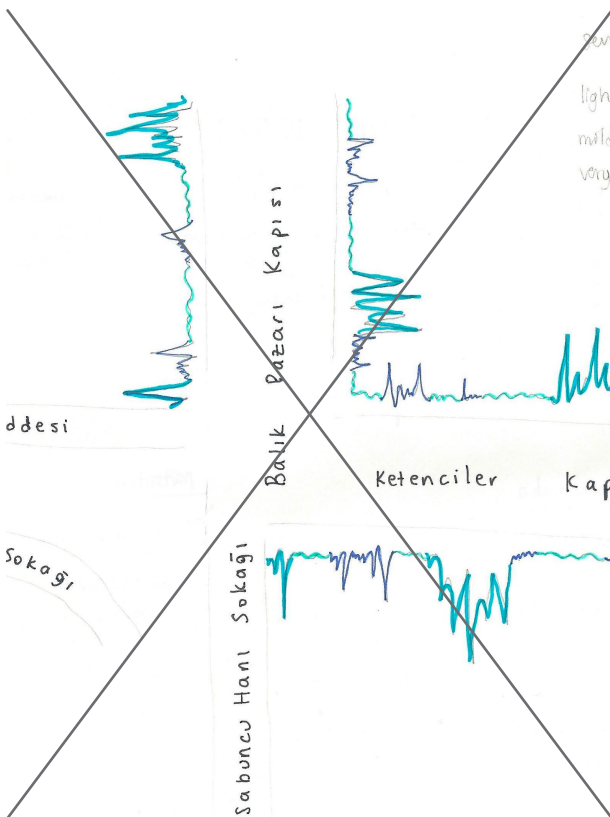


Figure 9: In a second attempt, we tried to visualize smell's density with a line graph like sound waves and pleasantness with colors. However this version is both not representative enough, and doesn't intuitively give the feeling of smell.

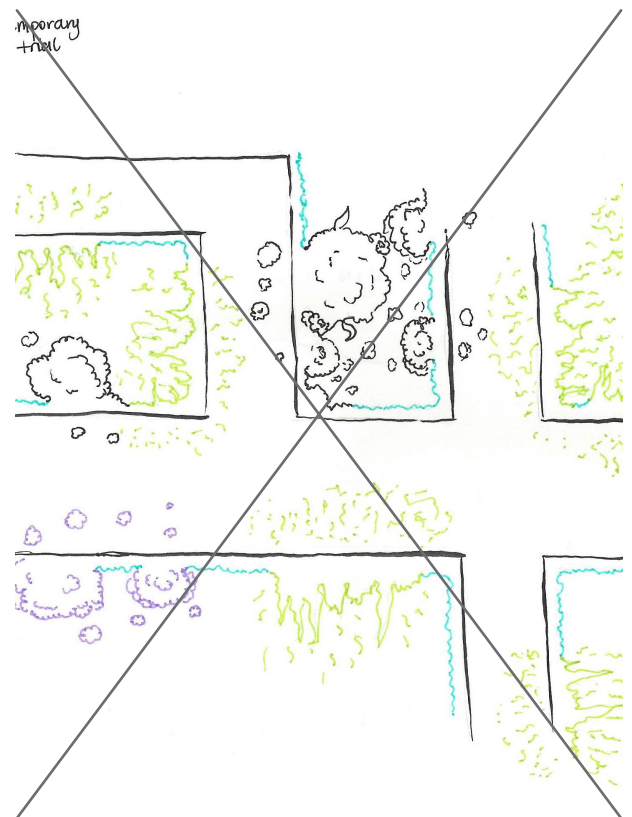


Figure 10: A next version, which is the closest to our final proposal, uses more of the visual elements; such as size, color, line character, some icons attached to the edges.

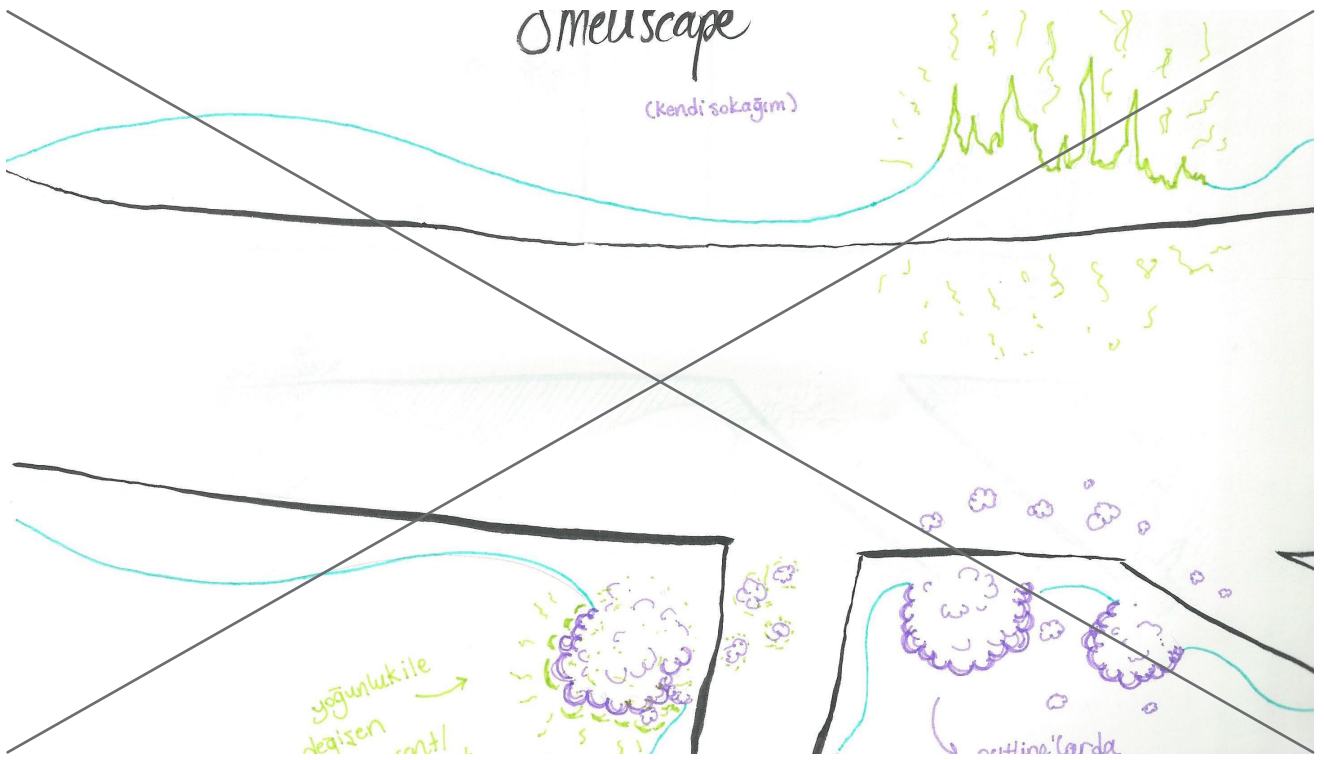


Figure 11: After some while we gave a break to working on the grand bazaar data. Instead of the data we read from the papers, we starting doing smell-walks through the city and try to sketch on the field as we walk around.

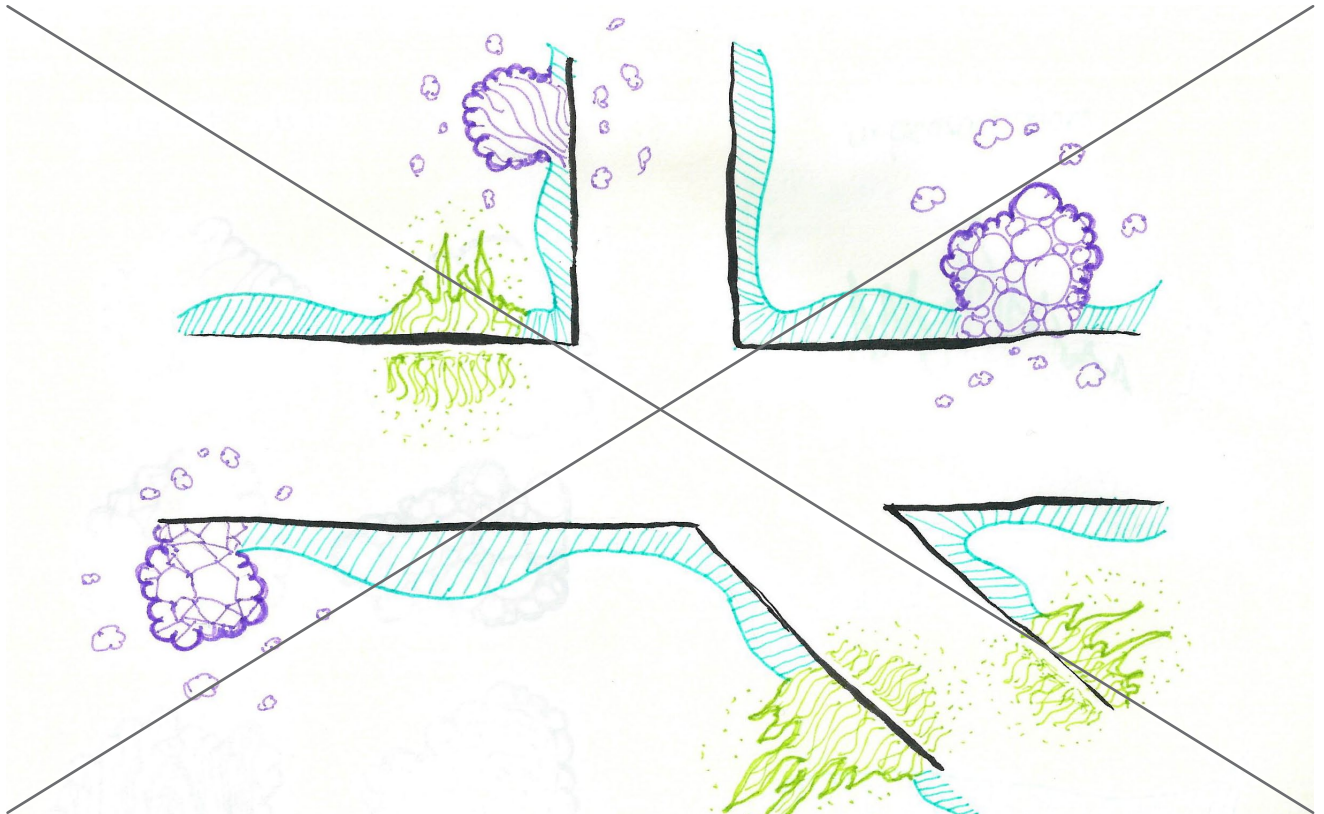


Figure 12: The final version of the urban smellscape, with the integration of textures to enhance the consistency of our design. Three levels of pleasantness are visualized above: purple clouds for pleasant, blue arcs for neutral and green waves for unpleasant scents.

Victoria Henshaw mentions in her book, “it is unlikely that the resulting smellscape will be liked by everyone” (Henshaw, 2014). She also adds, that “the design of urban smellscapes must therefore acknowledge and allow for difference, both in recognizing that odours will be perceived differently by different people, and in thinking about the variety of odours that may be detected in a city or neighbourhood”. It is important to keep Henshaw’s statement in mind, but in designing a data visual, taking user-experience into consideration is also very informative. This way, one can build on subjective knowledge and create a more satisfactory and representative visual for the users.

With these in mind, we went through an iterative design process, where we developed several different olfactory visualization methods. These methods use various representation levels from more representative to abstract. As a main goal, we aimed abstraction. In addition to the above mentioned discussion, we tried to create visualizations that (1) work well together in a visually integrated manner, (2) avoids scattered reading and too much information, (3) explains several different attributes of the smell (such as pleasantness, amount, source) at a time. Previous studies in the literature use color coded shapes for the olfactory data, however we focused more on complex shapes and patterns. Here we share some of the sketches studied.

CONCLUSION AND FUTURE WORK

The visualization of an Istanbul smellscape is only the initiative step of a greater focus. We currently focus on the methods of how to illustrate the scents that surround us in urban life, and which design approach works best in terms of mapping out the layers of information regarding olfactory sensation. This case study will serve as the base of future studies, which will investigate and provide design solutions for this urban smellscape’s different modes of usage (interactive, print etc.) in accordance with user-response. In the more advanced stages of this research, user-experience tests will be conducted and users’ feedbacks will be taken into consideration in revising the urban sensory map. We plan to build a location based interactive system, which generatively visualizes live urban olfactory data. These refinements will be crucial in our contribution to Istanbul’s smell-based intangible cultural heritage archive, and in our studies in the field of olfactory map visualization.

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