
Mood in the City - Data-Driven Reflection on Mood in Relation to Public Spaces

Viktoria Pammer¹

Knowledge Technologies Institute, Graz Univ. of Technology
Know-Center
Graz, Austria

Abstract. This paper maps out the design space of urban location-related mood self-tracking as starting point for individual and urban reflection: What are the benefits for key stakeholders, and what are system design options? Data-driven reflection here means that reflection is based on data; in this instance taking mood related to public spaces as starting point for reflection, but “attaching” to mood additional data that contains information about context such as comments, tags or pictures. We argue that individual citizens could become aware of own mood and act on this knowledge, e.g., intentionally seeking relaxing or stimulating places. Urban reflection means both discourse on the liveability of public spaces amongst citizens and by stakeholders who manage or decide on the design of public spaces in cities, the most obvious of whom are city government or building project organizers.

1 Mood in the City

Reality impacts humans’ affective states; in public spaces, their design as well as the actions and interactions of other people impact the affective states of all who pass through. The relationship of mood and places has been of interest to all sorts of people for a variety of reasons: In “the pursuit of urban happiness”¹, researchers and (city) designers investigate what sort of city design makes people feel happy and relaxed. To this purpose, plans for building highways were cancelled in Bogota in 1998 and cycle lanes were planned instead². Since then, computer scientists have taken an interest and become involved. An initiative called *urbangems*³ analysed Google street view images of London with state-of-the-art image analysis methods, and used crowdsourcing to rate images in the dimensions beauty, happiness, quietness, deprivation. The authors found that the amount of greenery is the most positively associated visual cue with beauty, happiness and quietness [15]. Similar results are found in a study based on geo-tagged tweets [1]. In [16], the authors used these findings as basis for providing

¹ www.researchswinger.net

² <http://www.bbc.com/travel/feature/20130828-reclaiming-the-streets-in-bogata>

³ www.urbangems.org

directions within a city that are not based on length of route (shortest path recommended) but on emotional pleasantness. As self-tracking technology has become available and acceptable to the masses, galvanic skin response trackers are used in the *bio mapping*⁴ initiative to automatically track emotional arousal of study participants in conjunction with their geographic location. The underlying rationale is to “become aware of our own and each others’ unique body reactions to the environment [to] create a better world” (ibid). In addition to these societally motivated works and initiatives on a socially larger scale, mood tracking is also used for more individualistic purposes. A plethora of mood self-tracking apps exist on the web⁵ in the Quantified Self spirit. Other works have investigated mood tracking more scientifically: The affective diary [17] investigated mood representations and reflections on it throughout the day, emphasising in research questions however the automatic capture of mood and its representations. AffectAura [11] explored user reactions to long-term representation of automatic emotion detection. The authors found that a historic representation of affective data does support memory, but is without “cues” (contextual data) insufficient to reconstruct memory; thus mood data cannot be the only data but needs to be connected to contextual information. The authors did not explore reflective learning however. In [12], a system for location-based emotion tagging has been developed, but not evaluated or used by a significant number of users (WiMo). Within WiMo, users can decide to share their mood tags with others via places. All mood entries are sent to a WiMo server. Note that in all the above-described related work, mood tracking is sometimes manual, and sometimes “automatic” via sensors that approximate mood via physiological reactions. Sharing in these apps fulfils as main purpose that of communicating own mood, but not that of reflecting together, or reflecting on mood in relationship to others’ mood. Finally, I myself have been part of a research team that has explored shared mood tracking in the workplace, finding indications for shared mood tracking to improve collaboration in virtual meetings [4] and work performance in call centers [5].

2 Reflective Learning

Reflective learning (which I will use as synonymous with “reflection”) is the process of critically exploring the past in order to learn for the future (see e.g. [2]). As such, reflective learning means reviewing the past in order to learn for the future. Learning is to be taken broadly: Learning means changing one’s perspective, one’s perception, one’s knowledge, planning to act differently in the future, or actually doing so (ibid). It is this direction towards the future, which distinguishes reflective learning from rumination or “mere” awareness; although awareness is a precondition for reflective learning.

Reflective learning can be understood as a cognitive process as well as a social process [14]. In the first case, it is the individual actor who learns (individual

⁴ www.biomapping.net

⁵ For instance: <http://www.moodjam.com>, <http://www.moodscope.com>

learning), while in the second case it is a social entity that learns via its members negotiating understanding, best practices, or pre-scribed processes (collaborative learning). In organisational contexts, reflection is seen as key driver for learning (see e.g., [6,7]). In such contexts, individual and collaborative learning naturally intertwine (for examples see e.g., [8]); for instance when an individual actor realises that something can only be changed at a collaborative level; or when an individual within a discussion reflects on what the discussed change in strategy will mean for own work practice.

By data-driven reflection, I mean the concept that reflection can be based to a significant extent on data; going so far as deriving “triggers for reflection” (the direct reason that makes a person or group reflect, see [8]) from data. This concept is taken by different communities, such as learning analytics, quantified self [3] or personal informatics [10].

3 Contribution: Data-Driven Reflection on Mood in Relation to Public Spaces

In this paper, I investigate data-driven reflection on mood in relation to public spaces. This is a novel concept, both for the field of computers and learning, and for the fields of social innovation and urban development. While the concept of data-driven reflection is not new for the first; it is new for the latter. Vice versa, while using something like “bottom-up dialogue” in an urban context is new in the scientific discourse in computer-supported learning, it is a big part of “business as usual” in social innovation and urban development.

I frame the task of driving social innovation and urban development bottom-up as a similar one to reflective learning in organisations: There is a mixture and inter-relationship of individual and collaborative reflection processes, and it is different stakeholders and stakeholder groups who can or should learn. I conceptualise district communities or cities as social entities that involve people with a variety of roles; from the role of “mere” citizen, to that of building project manager, to that of city official.

In this paper, I try to map out the related design space: First, I discuss the *benefits* for different stakeholders, as perceived benefit of use is one of the key predictive factors of technology acceptance. Second, I discuss *system and interaction design* directions - there is a wide variety of possibilities, and decisions will need to be taken on the path towards concretising and implementing a use case of such urban reflection as envisioned.⁶

⁶ An early version of this paper has been presented and discussed at the Smart City Learning Workshop of ECTEL 2014 and is online available at http://www.mifav.uniroma2.it/inevent/events/sclo_ectel2014/index.php?s=201&a=362. The workshop did not publish proceedings however; in addition, the paper has been updated to reflect discussions at said workshop, changes in my emerging understanding of the relationship between urban location-based mood tracking and reflective learning, and comments of ARTEL 2015 reviewers.

4 Benefits of Use

Technology acceptance has been linked, in organisational settings, to perceived ease of use and benefit [18]. In this section we discuss the potential benefits of location-related mood tracking for two key stakeholder groups in urban settings: Citizens who track their own mood in relation to places and share it in relation to public spaces, and decision makers in the public sector such as city governments or in the private sector such as building project managers.

4.1 Individual Reflection

For individuals, location-related mood tracking can serve - at a purely individual level, no sharing is necessary - to become aware of own mood in relation to places. This in turn can be useful to consciously reflect on the interaction between mood and places, and to act on this knowledge: For instance, people could use places as resources for wellbeing, and to avoid where emotionally draining places. They could also consciously aim to change their mood in relation to places, e.g., try to consciously relax in typically stressful places such as crowded public transports. Relevant individuals are not only a city's citizens, but also tourists, or people who come to a city for work. These processes are cognitive learning processes, and the goal of reflection is for individuals to improve the quality of their personal or work lives.

4.2 Urban Reflection

In prior work [13] colleagues and I analysed the functions of sharing information in relationship to reflective learning in an organisational context. We identified four major roles of sharing data for reflection: Data as basis for re-evaluation, as guideline for future behaviour, as starting point for collaborative reflection, and to integrate multiple perspectives. In urban reflection, individuals' mood in relation to public places would mainly serve as starting point for collaborative reflection. The motivation of the individual person to actually share own mood and additional information can only lie in contributing to making a city "better" - making it more liveable and enjoyable. Thus, sharing will need to be additionally facilitated by smooth and enjoyable user experience in terms of interaction with technology, together with displays of respectful and actual treatment of received input on part of responsible stakeholders, in order to achieve a suitable balance of "ease of use" with "perceived benefit" for people to actually do share their mood and comments.

Sharing own mood in relation to public spaces is, from the individual's point of view, an expression towards an audience that needs to be defined: The audience could be other citizens; thus, sharing own mood in relation to public spaces could be the starting point of an asynchronous public discourse on the "liveability" in public spaces. Shared mood could also address stakeholders that decide on and shape public spaces such as city government or building project organizers. The role of sharing own mood data (and optionally related data such as comments,

tags, pictures, etc.) corresponds to what has been called “creating awareness” in [9] as one rationale for triggering a new reflection cycle. Additionally, decision makers could also explicitly ask for focused input from citizens, tourists, people working in the city, etc. This would correspond to “seeking clarification” as rationale for starting a cycle of reflection activities [9].

The multitude of individual moods would be the starting point for re-designing cities. Such processes constitute social processes, and the goal of reflection is for the social entities of district communities (more informal) or cities (including also the formal structures) to improve the “key performance indicators” of a city: Target indicators can be defined and prioritised depending on a community’s current status, but typical indicators would be the quality of urban experience for people living in, working in, or visiting a district or city; or the financial standing of a district or city.

5 System and Interaction Design

In this section we discuss system and interaction design options, and emphasize those that we currently think preferable. Concrete design decisions will need to be explored and verified (or rejected) in future empirical studies: We will consider “valid” or “good” design decisions those that lead to appreciable benefits for key stakeholders as discussed in the above section.

We assume that mood tracking is done via mobile internet-enabled devices such as smartphones or tablets. But are users prompted to enter their mood, do they enter their mood proactively, or is a *hybrid method* implemented (e.g., via reminders)? Additionally, it is a priori unclear whether users will express only their mood or *add additional context information*, e.g., in the form of text, a photo, etc. as users are increasingly used to from other social apps and platforms. We assume, that *location does not need to be manually entered* into the system but can automatically be obtained via GPS, WiFi positioning, QR-tagged public spaces, etc. Positioning only allows for mood tracking related to the place where one currently is. It is unclear, whether in a system as proposed, mood tracking “after the fact” is desirable, e.g., stating in the evening that in the afternoon in the park one was really relaxed.

At the intersection of interaction design and software architecture we place the question of where tracked mood data are stored. In [12], all data are stored on a server, but only shared under specific circumstances. An alternative would be to share every mood entry, i.e., to view the system essentially as a public mood tracking system. At the other end of the privacy spectrum, mood tracking would be individual, and *data stored on personal mobile devices*. Mood data would only be *shared on specific user input*. On sharing, mood entries could be shared with or without usernames. The latter is most usual in social apps and platforms.

So far, we have discussed the capturing of mood. But how about interacting with location-related mood entries? We argue that users should be able to *visualise their own mood in relation to places*. But should *all users of the system get an overview of mood in the city*, or should this be reserved for city government?

Should also non-users of the system, as “users of the city”, of the public spaces, be informed about collectively tracked mood? Should shared mood be visualised only in the respective space, or should it be accessible also remotely? In all these cases, visualisation of collectively tracked mood and interactive exploration of captured mood data is an issue. In the case where every visitor of a public space should have the possibility to explore such data, interaction could be via a public website, or be mediated by an in situ ambient device.

6 Outlook

As next steps, we will concretise the above discussed benefits for multiple stakeholders as well as system and interaction design options in use cases and prototypes around participatory district development activities in Graz. Empirical studies will need to verify whether the above outlined benefits can be reached with urban location-based mood tracking.

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