Digital social interactions in the city: reflecting on location-based social networks

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1.Introduction

This chapter discusses how digital interactions are increasingly interwoven with spaces and places in urban settings and how such interactions are mediated by and in turn shape the technologies that facilitate them. We focus on the understanding of interactions using location based social media (particularly Foursquare) as a way to reflect on issues of technological support to human activities, and on the relationship between code, digital agency and the physical world. Our perspective is that of human-centred computing, particularly CSCW (Computer-Supported Cooperative Work) - a multi-disciplinary field studying collaborative practices in socio-technical systems with a focus on unearthing and detailing the mediational role of technology in human cooperation, coordination and social interaction.

Whether purposely built for mobile devices and with a focus on location (e.g. Foursquare; Swarm), or simply featuring in other platforms that rely on location data such as Facebook Places or Twitter, various location-based social networks (LBSN) increasingly mediate social and interpersonal interactions in urban settings. Essential technological infrastructure enabling such interaction is the possibility of linking data to particular places by means of devices capable of detecting their own location through Global Positioning System (GPS) or other mechanisms. On such basis, however, location based social media user activities take different forms: from "checking-in" (e.g. users register their presence at a venue), to linking location data to digital content to be then shared, to gameplay associated with occupying a location and performing certain activities there. The form of sharing these activities socially with contacts and other users is also constrained by the platform - for example a photograph with location information; or presence at a location with associated content; or a map of movements and check-ins, etc.

Such practices become coded into the system, representing both the log and content of social interactions, as well as the location to which they relate. Therefore a digital "cloud" of social interactions becomes embedded into the physical reality of a city, of its neighbourhoods, public places, cafés, transportation hubs and any other locations identified by social media users (by user-initiated check-ins or by the content that is generated, such as photographs or textual recommendations and tips), and by the tools they use (for example, through automatic geo-tagging). Conversely, the code determining a platform's interaction and functionality is continuously changed to reflect user activities and feedback, and to implement design decisions on how LBSN services work.

Among others, two sets of issues surrounding this topic are emerging that we wish to investigate further: firstly, how such localised interactions in physical spaces are triggering and feeding back into the software: how are various location-based social media platforms framing people's perceptions and identifications of locations? How is code both facilitating and scaffolding a set of social interactions relating to various spatial configurations in physical spaces?

Secondly, we are interested in the rematerialisation of such cloud of interactions in the physical world: how are physical spaces and places affected by their digital counterparts and by people's activities on LBSN? There are already occurrences of rematerialisation of digital presence and interactions in the physical world: for example, venue owners displaying badges on the premises that tell customers about their online presence (on Tripadvisor, Booking.com, etc.). Could LBSN interactions in relation to a venue be made somehow more perceivable and/or tangible in the physical world by the way in which certain environments are designed? Could the presence and interactions that are encoded in LBSN software shape more distinctively the physicality and materiality of places?

Overall, it is an open question whether this would be useful or meaningful, and whether it could have implications beyond technology design: for example, should new approaches to urban planning and environmental design become concerned with accommodating and facilitating these social interactions as they do so for in-presence, analogue ones?

In the following sections we define and discuss these issues surrounding LBSN, drawing both from and consolidating the findings of human-centred computing literature on physical/digital interactions using location based social media, and from empirical studies of LBSN use that we have conducted in two cities.

2. Location-based social media: identifying interactions

Since the introduction of LBSN commercial platforms in the mid-2000s, a number of studies have been conducted within human-centred and social computing examining how these are used by various groups of users [1; 3]. One of the main focuses of such work has been Foursquare: a mobile app launched to the public in 2009, Foursquare counts over 50 million registered users worldwide, with approximately 50% of them based within the USA[1].

While the core interaction offered by the service remains that of linking digital activities to a particular place or commercial venue, the Foursquare layout and how it operates have changed significantly since its public launch. Users register their presence at a venue by checking in. Photographs can also be uploaded when doing so, and comments and tips added to a venue. Initially, Foursquare incorporated a game-like element, where users would gain points whenever they checked in and could become "mayor" of a certain place by checking in repeatedly there over time, and could also gain "badges" by achieving a certain number of check-ins or by completing particular tasks (e.g. checking in at movie screenings). Users' check-in performance would be compared to that of their contacts, although they could compete for a mayorship against any other Foursquare user. Both badges and point scoring features were partly phased out in 2014 as part of a major re-development of the platform. The remaining supported activities were split into two separate apps, a re-designed Foursquare and a new app called Swarm: Foursquare now functions as a venue-finding and recommendation app only - it helps users locate places of interest near them in various categories (food, shopping, etc.), to "like" a place thus marking it as a favourite, and to read and add tips and recommendations about a place. The platform can also be used by owners of registered businesses for promotions and marketing. On the other hand, all the interactions relating to broadcasting one's location to contacts and gaining recognition for it are now supported by Swarm, an app where users interact only with direct contacts, gaining certain rewards for repeated check-ins. Swarm supports some new activities, such as planning outings to particular venues involving contacts, and profile personalisation through digital "stickers" that can be freely added. On Swarm it is not possible for a user to see who else is checked in at a venue, unless it is one of their contacts. Activity on both Swarm and Foursquare can also be shared on other social media.

While usage of Foursquare/Swarm is yet to be studied in-depth as we write, researchers have explored the previous incarnations of the app for a number of years. Such studies have extended earlier work examining practices and motivations around social location sharing [1], and have focused on various aspects of Foursquare, notably which interactions people perform on the app, how users manage their visibility, reputation and privacy, and how they explore physical spaces through the app. We now examine such findings in greater detail.

In their empirical study of checking in behaviour, Lindquist et al. [7] identified a set of motivations as to why people decide not only to interact with the app at a venue (e.g. finding the venue on Foursquare, reading content about it), but also to broadcast their presence to followers. People check in not only for social motivations, but also for personal ones, such as keeping an account of their own movements, of the places they visit and how often. However, the social motivations are more frequent and more articulate. A set relates to communication and coordination with friends and family: the desire to share personal information at a distance with contacts, and –in return- to see where friends have been. Often Foursquare is used as a way to coordinate meetings and other activities with friends. Another set of motivations relates to the wider Foursquare community: people enjoy discovering new people frequenting similar venues to oneself, and reading their recommendations. In some cases people check in at a venue just before they leave for safety reasons – leaving a "false trail" to avoid potential stalkers.

As for deciding which places to check in at, people make distinctions between routine and non-routine places: some decide not to check in at routine places because they are seen as uninteresting, and instead check in at places that are seen as special or exciting (e.g. large events, entertainment venues, etc.). Others check in at routine places either to gain Foursquare points or because they were bored and checked in for something to do. Other considerations are made by users when deciding to check in at private places, such as a private residence or their own home: there are privacy concerns regarding revealing such locations, and people often refrain from checking in at somebody's home in order to keep its location private. Checking in at one's own home is often done as a way to tell friends that they are home safely, or available for calls or visits.

[1] https://foursquare.com/about

Interestingly, privacy concerns also come into play when deciding not to check in at certain public venues, such as at the doctor's, the bank, etc. Moreover, impression management concerns emerge in these decisions as well: for example deciding not to check in at a fast food restaurant because it would make a bad impression on others [7].

Cramer at al. [2] further explored aspects of privacy and self-presentation focusing on the performative effects of checking in. They identified instances of purpose-driven [12] motivations (similar to those detailed in [10]) such as obtaining discounts, discovering new places, gaming (gaining mayorships), as personal bookmark, and amusement when bored. Instances of social-driven [12] check-ins were motivated by networking with friends, recommending a venue, but also wanting to learn about the people frequenting a venue who are unknown to them in real life.

However, Cramer et al. observe how LBSN activity goes beyond the two categories of purpose-driven and social-driven. Their data shows instances driven by self-presentation, lifestyle choices and identity. Self-presentation requires a finer understanding of the audience that a check-in will be shared with. Furthermore, the authors examine the perspective of the check-ins audience: people saw check-ins from friends as a way to obtain recommendations on things to do and places to visit, or as a motivation to attend an event or place. They were also annoyed by friends who checked in too frequently (thus sending repeated notifications), and/or without a clear motivation.

Cramer et al. found that motivations can change for every instance of check-in (and for each venue), and that certain motivations can sometimes conflict with others: for example, wanting to check in for the purpose of gaining gaming points might contrast with not wanting to annoy others with many notifications [2].

Guha and Birnholtz [5] have further explored the ways people think about location sharing and how impressions are formed and managed. They identify a blurring between public and private spheres of life when sharing a location and viewing a check-in: for example, one's presence at certain places is kept private (e.g. the gym) although such places are strictly speaking public. On the other hand, certain places are private (e.g. a friend's home), however people decide to check in there and to reveal its location (e.g. there is a party going on). Such decisions are usually made depending on how visible the user thinks the check-in will be: people are careful about how certain contacts might perceive their behaviour, and about how certain check-ins might create tensions within their network. An example of this is checking into a restaurant in order to claim a discount but at the same time broadcasting being out to the social circle at a time when it could be inappropriate. Tensions might also arise when sharing one's location could be perceived in different ways by different contacts (e.g. a friend vs. a parent).

Guha and Birnholtz have also detailed certain tricks that people employ when sharing their location, such as checking in at locations where someone is not in order to make a better impression. They call one phenomenon "check-in transience", linked to the fact that Foursquare displays in its newsfeed to users only the latest location where their contacts have checked in. People who don't want their "real" last check-in displayed for too long on their contacts' newsfeed will check in somewhere else immediately so that the friends will see that latter check-in [5]. Participants in this study admitted to making judgments on people they do not know well in real life based on their check-ins (e.g. which café they visit, etc.), and therefore are very sensitive about how they present themselves to and are perceived by their contacts.

All these studies have highlighted the many privacy concerns surrounding LBSN interactions. Users tend to be aware of them, particularly regarding residential privacy [6], and decide to risk exposure only in particular circumstances.

Foursquare public data has also been used for other developments, for example recommendation systems, such as algorithms for predicting which tips attract more attention on Foursquare and for supporting the creation of marketing strategies on LBSN [13], and models combining cellular data and LBSN activity to infer the types of activities in neighbourhoods and urban centres and to aid urban planning and management [8].

The findings of this small but in-depth set of studies reveal much about people's use of LBSN and their motivations and strategies. In relation to the issues we are focusing on in this paper, we have already seen instances of the complex relationship between the system (its code and other components such as the database logging user-generated content) and people's interactions, and how the two shape one another. One example of this is users being careful about the last location they check in at because the software will keep displaying it until a new one is shared. However, much remains to be studied. The playful and game-like aspects of LBSN and their connection to real-world spaces are yet unexplored, although other location-based social gaming practices have been studied in depth [9]. More crucial to overcome, in our opinion, is the limited attention paid to the way in which LBSN contribute to the way places are made, lived and reconfigured. While other technological platforms have been investigated in terms of how they mediate understanding of and attachment to real world environments [4; 10],

existing human-centred computing work on LBSN focuses mainly on individual practices, often without focusing on the actual locales in relation to which they occur.
It is important to pay attention to the way venues, neighbourhoods and cities are lived and perceived by virtue of the cloud of digital interactions and data that is tied to them: do LBSN activities impact on place attachment? Or on the way an area is discovered, explored and navigated?
We have addressed some of these issues in two small-scale studies of LBSN interactions via Foursquare in Limerick and Sheffield. We now describe our empirical explorations and the main findings arising from them.

3. Studying Foursquare Use in Two Cities

The existing studies of Foursquare we discussed in the previous section employed a methodology consisting of surveys and interviews. For our study, we have combined a series of interviews with online observations of interactions on Foursquare. The most extensive part of our study (comprising of online observations and interviews) has been focused on Limerick, a regional city in the Mid-West of Ireland. A second part of the study consists of online observations only, and focused on Sheffield, a regional city in South Yorkshire (UK).
We conducted on line observations of 15 Limerick venues – every month since October 2012, and of 10 Sheffield venues every month since December 2012. We chose similar venues for observation in both cities to compare online activity at locations holding similar purposes. The venues included: public markets, museums, train and bus stations, public parks, university buildings, cafés, shopping malls, pubs and restaurants, cinemas, theatres and sporting venues. The observations consisted of monitoring mayorships and check-ins and the addition of content (photos, tips, etc.) for each venue. These data were documented through notes and screenshots.
The semi-structured interviews of the Limerick Foursquare users were conducted between October 2012 and May 2013 and involved 12 local participants. We combined the interviews with on line observation of the accounts of the participants for 2-week periods.
In their check-ins, our participants expressed support for a new business, shared wi-fi access details at venues and provided information on hidden gems in the city. Check-ins also were used to signal personal availability ("I am at work", "I am in town", "I am out of town"). People checked in at certain venues for one-off or particularly significant happenings (performances, conferences, sport events), similarly to what has been observed in previous work. However, many users we observed checked in regularly at a familiar place, where the purpose of checking in was not only broadcasting an exceptional or exciting occurrence (e.g. an unexpected meeting), but also for describing the day's mood, or ongoing activities.
Motivations for using Foursquare that emerged echo to a large extent the findings from previous studies: there are personal motivations as well as social motivations underlying the decision to check in and provide content. As the respondents to our interviews included businesspeople in the 40-60 year-old bracket (whereas the participants in previous studies were mostly younger university students), we saw motivations connected to professional activities and not only to socialization and lifestyle. For example, people checked in to endorse a venue for business meetings. Another example is that checking in at home signals one's non-availability for work matters. An additional motivation that we noted in our observations is civic activism: people check in to broadcast that they are doing something good for their city, encouraging others to join. In answer to our interview questions, participants thus explained their motivations to check in: "going to places so that I feel I own them"; "when I do check in – I spot people that I know"; "*tell someone I'm up, tell someone I'm moving*".

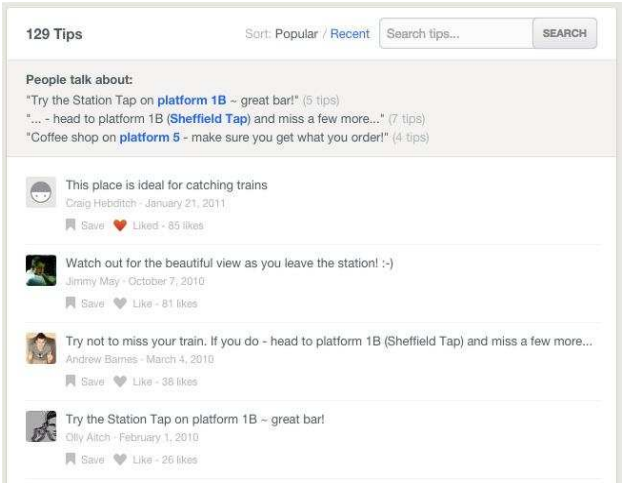

Fig 1. Tips for Sheffield Train Station

Our online observations gave us insights on how spaces and places become represented on LBSN in a way that previous work had not highlighted. Activities associated to venues can be surprising, or provide insights that are not obvious by looking at the venue description, or by visiting that location in real life. For example, in Limerick the Stella Ballroom is classified on Foursquare as a historic site and not simply as an entertainment venue (it is now used as bingo hall), and many check-ins refer to the exhibition held there on the history of Limerick ballrooms. In Sheffield, many check-ins and tips at the train station refer to socializing, as one of Sheffield's most popular pubs is located there and many people check-in at the station, rather than at the pub venue (Fig. 1).

Popular venues attract many check-ins and user-generated content. Their representation on Foursquare depicts their busy atmosphere: the Milk Market in Limerick is a hub of LBSN activity on Saturdays (the day the full market is held), where people check-in as it is "the place to be" and where friends tend also to converge. In that case, checking-in is also a way to see if other friends have arrived. Foursquare activity at this location peaks at weekends, thus the venue's cloud of interactions fluctuates significantly on different days. A similar example in Sheffield, albeit within a different temporal frame, is the Crucible Theatre: while attracting a steady flow of LBSN interactions throughout the year by theatre enthusiasts, it becomes a veritable hub during April when the World Snooker Championship is held there. Indeed, the majority of tips left by users are updated during that period and refer to the tournament, rather than to the regular theatrical season (Fig. 2).

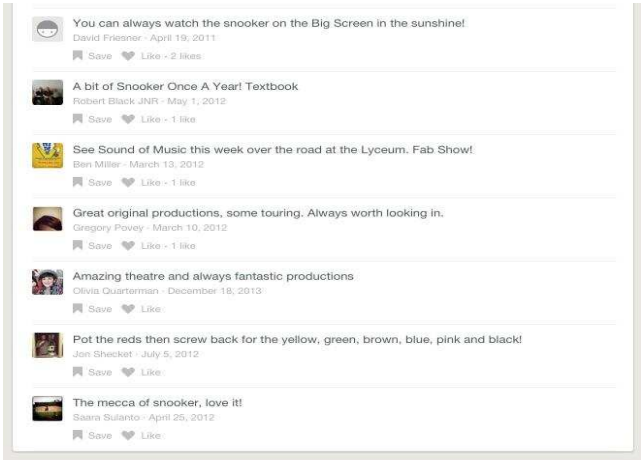

Fig. 2 Tips for the Crucible Theatre, Sheffield

Foursquare venues used to collect a trail of banter and "private" messages between people in the form of a venue tip, for example between regular frequenters battling for a mayorship. In this case, the tips were used not to provide information for the larger community, but to foster the connection between particular users (Fig. 3).

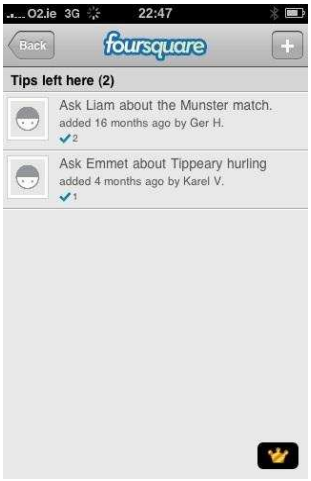

Fig. 3 Tips used as private banter at a Limerick pub venue

The gaming aspect also gave rise to a proliferation of Foursquare venues: users could create new venues - increasing venue granularity in places where sub-locations can be identified (for example, a platform at the train station) – to be first to check in and obtain points.
Our online observations also gave us insights on the content that users create for particular venues. Photos have a variety of subjects and purposes: for example, photos uploaded to the Absolute Hotel in Limerick illustrate events taking place there (conferences, business meetings, etc), recommended food at the hotel restaurant (a function similar to that of tips), or various corners of the building and the view from it. This content represents a place from multiple points of view: structural characteristics, but also activities taking place there and people frequenting it.
Our study looked at two cities and we were thus able to compare Foursquare interactions in both settings. While there were many similarities between them, some differences could also be noted. Probably due to the significant difference in geographical size and size of population between the two cities, in Sheffield (the larger of the two) the Foursquare user group is much larger than Limerick, however there appear to be weaker ties between users overall (e.g. number of interactions between users), with some tight "packs" of friends interacting with each other on Foursquare but likely knowing each other well in real life. More Sheffield businesses use LBSN, with venues offering special deals, discounts, etc. This goes alongside a more lifestyle-oriented use of tips, which are mainly directed to a general audience with recommendations for good nights out, etc. The use of Foursquare in this case is more similar to the likes of Tripadvisor mobile and Yelp. In Limerick, the overall smaller community of Foursquare users translates in more frequent informal interactions between people (both real-life friends and strangers).

4. Discussion

The insights from both previous work and from our study pose a number of issues for discussion regarding the relationship between Foursquare, its users and the locations it connects to.
First of all, there is a complex relationship between how the system is shaped by user interactions and user-generated content and, conversely, how people's activities are mediated and shaped by the system's functionalities and architecture. When a system like Foursquare is released, selected functionalities are included in the code and they shape the practices of early adopters, who initially play by the rules to see what the new platform can do. As the user base diversifies, new practices appear – not originally intended, but afforded by the code (such as users exploiting the fact that Foursquare displays only the last check-in on friends' newsfeeds either to emphasize a location, or to hide their presence). The system's owners can choose to close loopholes (for example, not allowing check-ins at faraway locations) or to support the new practices by including them in the next release. Very often, innovations introduced top-down via new versions of the code are met with resistance by frequent users, as their current practices are disrupted. They have to go through a whole new sense-making cycle and appropriate the new version by altering their practices.
Not only the activities that the code enables, but how they are enacted is another aspect that reciprocally shapes interactions: the code is designed for a specific context and so are the ways of content production. For example, textual contributions are called "tips"; however, as Foursquare is trying to move into the market occupied by Yelp, it becomes obvious that Foursquare's tips are not actual reviews and couldn't be used as such. Users leave tips such as the amount in coins you need for parking in a specific place, or recommendations such as "Try the chowder", which aren't actual

reviews. The field name “tips” instilled a specific behaviour – this illustrates how the design choices influence the content contributed by users.
From a different perspective, Foursquare makes the content generated by its user base available for new uses through the Foursquare APIs. All kinds of mash-ups have been created to take advantage of such data, by extending the Foursquare code. Therefore, there is an interesting tension between the possibilities and the constraints offered by the platform, from the point of view of regulated use and of appropriation.
There are also important issues to flag regarding the relationship between people and specific places that is now mediated by LBSN. LBSN extend some of the possibilities that real-world locations offer people to link to others, to take advantage of what a place offers, or to find privacy and quiet. The relationship between a person and a place is made more visible by the encoding of LBSN interactions on a platform such as Foursquare. Furthermore, such relationship is also extended by the possibility of novel forms of digital interactions, such as sharing recommendations among strangers. The platform also makes visible community relationships to a place, and their importance in an urban environment: examples of this are the Milk Market on a Saturday (Fig. 4), and a rugby game in Thomond Park stadium for Limerick, and the World Snooker Championship in April and the December Christmas Village at the Peace Gardens for Sheffield.

Fig. 4 User photographs of Limerick’s Milk Market

While other researchers emphasized the potential for coordination created by check-ins, our findings show that awareness of who else is (or was) in the same place is an important element and it is interpreted as a recommendation for the place itself. Moreover, the digital buzz around a venue (many check-ins, many tips and photographs) is an endorsement of that place’s importance for the community. Users get a glimpse into their contacts’ favourite places and their trajectories. Awareness of events is another interesting element that is a sort of side-product of Foursquare.
Through these visible clouds of interaction, Foursquare and other LBSN platforms make navigating an unknown neighbourhood or area less daunting. The Foursquare venues in a city constitute a crowdsourced map of places that most of the times is very different from an official one. The users’ check-in preferences shape each city’s list of venues that both users and non-users can consult for finding good places for specific purposes: coffee, wi-fi access, etc. This connects to the issue of “rematerialisation” – of whether the digital interactions enabled by the code can be made visible or perceivable in real-world places, either for LBSN non-users or for users by means others than the app. There are already instances where a venue’s connection to LBSN is made visible, for example by displaying Foursquare membership badges in the physical space. However, much more happens in digital form that is only available to the app users: being able to see photos, tips and comments, as well as which Foursquare friends have checked in there. Check-ins by friends, tips and photos make a new place feel familiar, allow users to see how it looked like in certain occasions, or when a specific event occurred. We think it is important for human-centred computing researchers to further explore whether technologies such as ambient or tangible media could be employed to enable some of these interactions in a way that is less confined to a device (the mobile phone) and more embedded into the materiality of the environment. This is connected to issues of physicality and performativity in interaction. The practice of checking-in when arriving at a venue is often frowned upon by some people – as well as being considered socially unacceptable in certain locations/circumstances. Some people’s refined planning in order to make the check-in performance acceptable or discreet is linked also to their

awareness of the visibility of this action to a general audience. Making check-ins and other interactions available in novel ways would require careful consideration of the social visibility and acceptability of such practices.

5. Conclusions

This chapter reflected on people's interactions with a popular location-based social media platform – Foursquare – and on how they are entwined with the code that enables them, with other users, and with the real world spaces and places that they link to. We presented a summary of findings emerging from human-centred computing research on Foursquare, and we integrated these with the results from studies of Foursquare use that we have conducted in two cities. In our studies, we wished to characterise more the relationship between LBSN interactions and the places they occur in, so to extend previous work and to address a gap in human-centred computing research that is only been partially filled [11]. Finally, we highlighted some issues for further discussion, particularly on the relationship between the cloud of LBSN interactions and the real-world places they occur in, and on how code enables, shapes and is in turn shaped by users' activities and instances of system appropriation. In-depth studies of other location-based digital activities such as turfing and geocaching and their ties with the materiality of the city have shed light on such certain digital practices can be better supported: deeper understanding of such dynamics in LBSN can lead to novel contributions in this respect.

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