PANEL TITLE: THE TEMPORALITY OF MOBILE MEDIA

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Description

Scholarship on mobile media has often focused on the relationship between mobile media and space/place, including studies on locative technologies (Frith, 2014), social-spatial coordination (Ling, 2004), proximity (Oppegaard & Rabby, 2015; Wilken and Goggin, 2013), absent presence and telecocooning (Gergen, 2002; Habuchi, 2005) and place-making (Farman, 2010). From Sarah Sharma's (2012) perspective, the focus — possibly an overemphasis — on spatial dynamics in locative and mobile media not only relies on the most simplistic analysis of the media, but also "risks aligning the field too closely with the logic of the market."[i] Drawing on the work of Harold Innis, she goes on to argue that such an overemphasis on the spatial dynamics of mobile and locative media plays into the centralizing characteristics of imperial powers: "Civilizations that emphasize space over time tend to be imperial powers, involved in the conquering of space at the expense of the maintenance of culture over time."[ii]

Building off Sharma's provocations, this panel focuses on several aspects of mobile technologies where mobility and time intersect in the most fundamental of ways. As we will discuss in our talks, the dominant focus of mobile media studies has been on spatial impacts. While this research has certainly been useful to move the field forward, it has resulted in a disproportionate focus on space over time, or spatiality over temporality. Consequently, the vast majority of work on locative media—and even most of the work on voice and texting—tends to ignore the temporal impacts of mobile media adoption. This panel seeks to flip that relationship by devoting four talks to the oft-neglected interrelations between mobile media and temporality.

The first presentation focuses on an established form of mobile communication: text messaging. The talk draws from a large-scaled study performed in the United States

and Japan to argue that waiting is key to the social impacts of text messaging, with temporality structuring how people communicate and understand their relationships mediated through text messages. The second presentation then shifts to a newer type of mobile media: the location-based social media service Yik Yak. That presentation uses qualitative data to analyze how the location-based social feeds of Yik Yak become a way to access the "pulse" of a city by merging spatiality and temporality to reveal rhythms of college life.

The latter two presentations also focus on location-based social media. The third looks at design elements, arguing that quantitative research into mobile practices, while valuable and often essential, can elide the messy everyday practices of mobile users. Through field work performed on a location-based Hawaiian art application, the presentation argues for an increased focus on how time shapes the practices of locative media users and should play into mobile application design. The final presentation builds on the first three by approaching temporality and spatiality through the business side of location-based services. The presentation analyzes Foursquare and Banjo to examine how app developers seek to capture data about temporal rhythms to both improve and monetize their product.

The four presentations in this panel provide a unified focus on the temporality of mobile media. Together, we focus on the how the delay and waiting shapes text messaging, how locative media reflect temporal rhythms, how designers can account for temporality in location-based applications, and how rhythm analysis can help understand data collection practices of app developers. Taken as a whole, we believe this panel will be a valuable addition to existing conversations surrounding smartphone technology and help provide a different perspective on how time shapes our engagement with emerging mobile media.

References

Farman, J. (2012). *Mobile interface theory*. New York, NY: Routledge.

Frith, J. (2015). *Smartphones as locative media*. London, England: Polity Press.

Gergen, K. (2002). The challenge of absent presence. In J. Katz & M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp. 227–241). New York, NY: Cambridge University Press.

Habuchi, I. (2005). Accelerating reflexivity. In M. Ito, D. Okabe, & M. Matsuda (Eds.), *Personal, portable, pedestrian: Mobile phones in Japanese life* (pp. 165–182). Cambridge, MA: MIT Press.

Ling, R. (2004). *The mobile connection: The cell phone's impact on society*. San Francisco, CA: Morgan Kaufman.

Oppegaard, B., & Rabby, M. (2015). Proximity: Revealing new mobile meanings of a traditional news concept. Digital Journalism, 4(5), 621-638

Sharma, S. (2012). It changes space and time! Introducing power-chronography. In *Communication Matters: Materialist Approaches to Media, Mobility and Networks*. New York: Routledge.

Wilken, R., & Goggin, G. (Eds.). (2013). *Mobile technology and place*. Routledge.

ABSTRACT 1: TEXTING AND TIME: THE EMOTIONAL EXPERIENCE OF WAITING IN MOBILE MEDIA CULTURE

By Jason Farma

A contemporary phenomenon that started with teens in Japan is called *kara mail* or "blank messages." These are blank text messages — simply an empty text bubble that pops up on the recipient's mobile phone — that are usually sent between close friends or romantic partners. When someone sends one of these text-less messages, the significant other is expected to send back a blank text message with as little time elapsed as possible. The idea behind these messages is that a partner should always be paying attention, anticipating one of these blank messages. Some expect that a response in the form of an identical blank message should come no more than 10 seconds after the initial one is sent. Here, there is seemingly no content to these messages; however, the message in these blank texts is *time*. The messages take on meaning based on how long a person is left waiting for a response. Time, especially when time is spent waiting, is a significant experience in intimate relationships. This has been true throughout history and is pronounced in our mobile era in which teens and college students are using text messages to communicate, keep connected, and coordinate.

We send text messages and wait for a response. We send emails. We wait for a response. We post pictures and wait for likes. Our social lives are spent waiting because our media are designed to let people respond when they get a chance. It always has been understood that waiting is an in-between time; but what if waiting is the very thing that has been shaping us throughout history? As technologies have advanced throughout history and made our wait times shorter, we see that the act of waiting in each era tells us an incredible amount about a culture and how it understood human connection, intimacy, and knowledge. Looking at our own contemporary uses of text messages offers some key insights about how waiting is shaping our relationships with one another.

This presentation looks at the emotions linked with waiting in mobile culture. Our findings are drawn from three studies of college students in North America and Japan. From boredom to anxiety, from stress to obligation, the emotional components of asynchronous media directly contribute to both the interpretation of messages and to communication practices, such as how quickly someone decides to respond.

We began our research with the simple question: What are the emotional experiences that accompany the time between sending and receiving mobile messages? We decided to start with a small, qualitative study that dug deeply into the personal experiences of a few students at the University of Maryland, College Park. Our follow-up studies included a national study of college students in the United States and Canada at 16 colleges and universities, as well as a study of college students in Tokyo, Japan. For our initial small study, the diversity of uses, contexts, and expectations around time lag were extraordinary. Of the eight students who completed our study, we found very little overlap in how they used their devices for mobile messaging, where and when they texted, and what they thought of to be standard times to respond and receive a response from the people they communicate with. What emerged was a rich tapestry of

examples that opened up for us the range of uses college students engage on a daily basis. Our national study in North America (n=212) consisted of 30 questions broken into four specific themes: demographics, use, relation, and expectations of mobile messaging, a smaller version of our qualitative study around the last five text messages received, and a narrative-based section asking participants to respond to particular instances of mobile messaging. The study conducted in Tokyo took place at Waseda University with 40 undergraduates and at Tokyo University with 25 undergraduates.

The preliminary data shows interesting trends about expectations surrounding response times with mobile messages. Context — relationship status, events surrounding the message exchange, and norms for message response rates for that specific relationship — was the most important factor in how a person responded to time lag in a message exchange. In addition, some the separate studies showed similarities. A vast majority of respondents reply and expect a reply within 30 minutes, with a large majority of those expecting responses in less than 10 minutes. Mobile messaging was also the dominant choice for contact, support, emotion, and coordination among respondents. Wait times that exceeded the expectations for a specific relationship led to significant emotional responses, with students feeling "rejected," "extremely unimportant," and "worried that they said something wrong and have damaged the relationship."

One of the more telling data points in our study was the choice of messaging platform respondents used in their message reporting. In our national study in North America, 116 said that they use text messaging (with an additional 14 iMessage, which, for all intents and purposes, can be considered the default "text" for iPhone), which is a significant number of users of the native messaging platform on mobile devices. However, in Japan, 100% of the students surveyed used the LINE platform. One key distinction between North American platforms and LINE is that students in Japan are unable to turn off "read receipts;" that is, LINE requires users to see if their message has been delivered or not. In terms of waiting, this shifts things significantly for these students. They use two terms that highlight this shift: *midoku-through* (which means "not yet through" or "not yet delivered") and *kidoku-through* (which means "already delivered"). Typically, a student's anxiety about a message that has not been responded to does not begin until the message is *kidoku-through*. Until the message is read, several students said, "I could wait forever for their response," and "It's important to have patience" until the recipient reads the message. After the message is *kidoku-through*, their wait time expectations are very similar to those of students in the United States and Canada.

LINE picks up where the *kara mail* blank messages left off; now, students exchange stickers on the platform with one another, expecting a return sticker from their partner with as little time elapsed as possible. Time has always been a part of the content of mobile messaging, but text messages at this moment in time are especially poignant examples. LINE was started shortly after the 3/11 disaster at Fukushima when many of Japan's residents were unable to reach their loved ones over phone or by social media. A lack of response during this moment of crisis launched a platform that continues the significance of time for mobile messaging and the sustaining of social relationships.

The study of waiting for messages is an important avenue into understanding the relationship between social intimacy, technology, and spatial dynamics. It reveals the power inherent in how different people wait differently (or are expected to wait differently). It reveals the seams of social relationships and how our mobile technologies weave themselves into those relationships in ways that highlight our expectations of how social time is practiced.

ABSTRACT 2: THE TIME AND PLACE OF LOCATIVE SOCIAL MEDIA
By Jordan Frith

Much of the initial excitement surrounding the Internet revolved around its impact on space (see Benedikt, 2000; Castells, 2000). Social commentators at the time spoke of "a world of digital sensation" (Heim, 1993, p. 93), "free from the constraints of geography" (Wilken, 2008, p. 39). Negroponte (1995) predicted a future in which people would "socialize in digital neighborhoods in which physical space [was] irrelevant" (p. 6). Friendships in this new environment were expected to emerge through a confluence of interests rather than proximity (Baym, 2015). The famous "No more there" commercial run by MCI in 1994 ("No More There," 1994) captured the zeitgeist when it imagined the Internet dismantling the social barriers of distance. While the Internet's broader impact is unquestionable, the suggested effect on physical space was never fully realized. Physical space still matters as much as it ever did (Massey, 2005). After all, the rise of social networking sites has seen people's online connections resemble their offline, spatially bound, networks rather than the more spatially dispersed interest-based sociability of chat rooms or MUDs (boyd & Ellison, 2008).

Many digital applications (often referred to as locative media) are now specifically designed to connect people to their physical surroundings and shift content as people move through space (Wilken & Goggin, 2015). The 'power of the Internet' has accordingly been harnessed "to facilitate connections between people based on geographic proximity" (Humphreys, 2010, p.763-764). The GPS functionality of smartphones means that digital information can now be tethered to specific locations, just as it can be accessed on the move. For de Souza e Silva (2006) this intermingling of physical world environments with digital space has produced what she refers to as 'hybrid space.' As Saker and Evans (in press) suggest, this 'hybrid space' "[gives] rise to new embodied experiences and social connections in place" (p. 2). However, research has often neglected how the increased hybridity of our spaces impacts individual experiences of time.

This presentation reports on qualitative research into the practices of one specific locative application: Yik Yak. Launched in 2013 by a pair of college graduates (Shontell, 2015), Yik Yak quickly became somewhat of a phenomenon with young people (Hess, 2015). The founders raised well over $60 million USD in venture capital funding and earned a valuation of over $400 million USD within a year of the application's creation (Shontell, 2015). Based on the design of earlier location-based applications like Whisper and Secret, Yik Yak allowed users to anonymously publish and read short posts (though the application made a slight shift towards optional persistent identities in 2016). At the same time, Yik Yak represents a different type of anonymity than sites like 4chan

because of its engagement with physical proximity. The posts, or "yaks" as they are commonly called, people can see are determined by their physical location. In denser areas, only posts made within a 1 ½ mile radius are available. In less dense areas, the radius can range up to 10 miles. After the data collection for this study was completed, Yik Yak also added a "base camp" from which people can post to regardless of their location and optional avatars.

Yik Yak has been the topic of much debate. For the most part, discussions have revolved around the anonymity the application affords its users and controversy-related context of cyberbullying, racism, and generally unpleasant discussion threads (Dewey, 2014; Mahler, 2015; Stone & Kingkade, 2014). The other main focus has been on Yik Yak's influence on how people experience space, echoing a growing body of research into locative media and place (Frith, 2015). However, far less research has been published on how locative media both impact and reflect upon temporal dynamics. Consequently, this presentation uses data collected from six months of ethnographic research and interviews with 18 Yik Yak users, to analyze how locative applications like Yik Yak can impact the temporal as well as the spatial. While the presentation will address both spatiality and anonymity, the primary focus is on how people use Yik Yak to access a "pulse" of the city that reflects the temporal rhythms and inflows and outflows of residents.

The data presented in the talk will focus on how the Yik Yak feed becomes a lifeline into the rhythms of the college town where the research was conducted. As I will show, the feed slows and speeds up depending on the schedules of college students; the content reflects the temporal patterns of college life (e.g. posts about finals during finals week, parties on the weekend, and so forth). The temporal in these cases cannot be separate from the spatial. The main argument of this presentation is that locative applications like Yik Yak, by bounding content based on physical proximity, also open up new opportunities to view the movement of time within small slices of physical location. As I show through the analysis of Yik Yak, information accessed through the Internet is increasingly shaped by physical location, requiring exploratory research into how digital information becomes a new type of "lens" through which people engage with both the temporality and spatiality of their surroundings (Dourish & Bell, 2011).

References
Baym, N. (2015). *Personal connections in the digital age* (2nd ed.). Cambridge, MA: Polity Press.
Benedikt, M. L. (2000). Cyberspace: First steps. In D. Bell & B. M. Kennedy (Eds.), *Cybercultures Reader* (p. 29). New York: Routledge.
boyd, danah, & Ellison, N. (2008). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 210–230.
Castells, M. (2000). *The rise of the network society*. Oxford, UK: Blackwell.
De Souza e Silva, A. (2006). From cyber to hybrid: Mobile technologies as interfaces of hybrid spaces. *Space and Culture*, *3*, 261–278.
Dewey, C. (2014). How do you solve a problem like Yik Yak? *The Washington Post*. Retrieved October 16, 2015, from https://www.washingtonpost.com/news/the-intersect/wp/2014/10/07/how-do-you-solve-a-problem-like-yik-yak/
Dourish, P., & Bell, G. (2011). *Divining a digital future*. Cambridge, MA: MIT Press.

Frith, J. (2015). *Smartphones as locative media*. London, England: Polity Press.

Heim, M. (1993). *The Metaphysics of Virtual Reality*. Oxford, UK: Oxford University Press.

Hess, A. (2015). The Upside of Yik Yak. *Slate*. Retrieved October 16, 2015, from http://www.slate.com/articles/technology/users/2015/03/yik_yak_the_anonymous_messaging_app_with_a_terrible_rep_is_actually_pretty.html

Mahler, J. (2015). Who spewed that abuse? Anonymous Yik Yak app isn't telling. *The New York Times*. Retrieved October 16, 2015, from http://www.nytimes.com/2015/03/09/technology/popular-yik-yak-app-confers-anonymity-and-delivers-abuse.html

Massey, D. (2005). *For space*. London, UK: Sage.

Negroponte, N. (1995). *Being digital*. New York, NY: Vintage Books.

No More There. (1994). *Youtube*. Retrieved from http://www.youtube.com/watch?v=nJhRPBJPoO0

Saker, M., & Evans, L. (in press). Everyday life and locative play: an exploration of Foursquare and playful engagements with space and place. *Media, Culture & Society*.

Shontell, A. (2015). How 2 Georgia fraternity brothers created Yik Yak, a controversial app that became a ~$400 million business in 365 days. *Business Insider*. Retrieved October 16, 2015, from http://www.businessinsider.com/the-inside-story-of-yik-yak-2015-3

Stone, A., & Kingkade, T. (2014). Racist posts On Yik Yak prompt university protest. *The Huffington Post*. Retrieved February 10, 2015, from http://www.huffingtonpost.com/2014/09/24/colgate-university-protest-racist-yik-yak_n_5875106.html

Wilken, R. (2008). Mobilizing place: mobile media, Peripatetics, and the renegotiation of urban places. *Journal of Urban Technology*, *15*(3), 39–55.

Wilken, R., & Goggin, G. (Eds.). (2015). *Locative media*. London: Routledge.

ABSTRACT 3: TIMELINESS, DURATION, CHRONOLOGY, AND MOBILIZATION: EXPLORING POTENTIALLY VALUABLE ASPECTS OF TEMPORAL CAPITAL IN LOCATIVE MEDIA RESEARCH
By Rowan Wilken

Designers of place-based mobile experiences now are creating – as Hjorth (2013) described them – the first distinctive new forms of 21st-century media. The holy grail of this pursuit has become "a reliable measure of the events occurring in the stream of consciousness over time" (Hektner, Schmidt, and Csikszentmihalyi, 2007, p. 6; Karnowski, 2013).

Such temporal concerns of mobile media, though, get intermingled within the chaotic real-life practices of users. Much quantitative research fails to fully acknowledge or investigate the messiness of these mobile moments. Instead of fixed and nonporous borders, these moments often arouse overlapping factors related to user engagement, making them slippery to quantify. Mobile experiences meanwhile can extend far beyond the limits of traditional print or broadcast concepts, particularly in fluid response to the timely needs of individual motives, goals, and conditions in any situation. Yet in practice, many mobile-app designers still operate within a limited broadcast mindset, envisioning

the smartphone as a small television set or eReader, rather than a generative new medium, just waiting for people to realize its possibilities.

Once the potent mobile medium choice has been made, locative designers refine predictions of their likely users and use-case scenarios as well as have to pick the features within the medium to best support those activities (whether using audio, video, still photography, animation, text, haptic sensations, etc., or any of those in combination). These designers also ideally need to decide when those media artifacts are triggered and in what places and at what lengths, initiating which types of interactions. These compositional opportunities are unprecedented. In these situations, devices of countless types (smartphones, tablet computers, smartwatches, wearables of all sorts, etc.) can connect people and the world's storehouse of information – instantaneously curated to the most fine-tipped of interests – with all sorts of objects, settings, and situations. This happens in simultaneous, multifaceted, and overlapping real-time dynamics amalgamating place, mobility, knowledge, and technology. Such complexity meanwhile is fueled and shaped in real time by sociability motivations.

The focus of this presentation will be in-situ examinations of time through related variables under the purview of mobile-media designers and researchers, including timeliness, duration, chronology, and mobilization. In this mobile frame, time can be precisely accounted for – through accurate and behind-the-scenes app analytics – and converted into weights of engagement to create a mobile-media currency of sorts. In other words, when all of the world's media is competing for a person's attention on the same delivery system – i.e., a smartphone – the capital generated becomes related to what gets chosen and – maybe most significantly – for how long. So how do we investigate and understand this temporal currency to better comprehend what is happening (and predict what could happen with better practices)? Worthy of a methodological debate is the idea that when we reach the limits of neo-positivist reductionism (and strict isolation of variables), messier qualitative and action-research methods might take us through the final stretch. Or vice versa. But first, we still need more clarity about what exactly needs to be studied, and how, which creates a need for more formative field experiments.

This presentation, grounded in the past eight years of related in-situ fieldwork, will deconstruct and discuss key time-related aspects that have arisen in a new research project exploring interactive mobile-app discourse. These issues have implications beyond their specific context – about public art in the state of Hawaii as experienced through the research-focused and grant-funded Manoa Public Art app – and this presentation will raise and explore significance of these factors, including:

Timeliness – From a traditional broadcast or print media perspective, timeliness is about information being "new," but that newness level relates primarily to the production cycle (when the media was produced and released) rather than when an audience member wants it, based on interest or context. Old news, in this construct, is information that already has been circulating in the public sphere for some amount of time, from a few hours to a few days, depending on perspective. In mobile-media contexts, though, timeliness can relate to "new" information, like breaking-news alerts, but also to just-in-time prompts within the environment that could lead to questions and contextual

learning that feels just as timely and relevant to the mobile learner. The MPA research project included experimentation with physical environment prompts and alignment with the mobile media provided.

Duration – Museum Studies fieldwork often focuses on duration, or time on task, to try to understand an audience member's engagement with an exhibit or artifact. Generally speaking, the more time with the media, the more engaged a person is considered to be. Mobile devices constantly offer countless distractions and options, at the fingertips, but they also offer a discreet tracking system that can capture the duration a person is engaged with a piece of mobile media, without the need for a researcher watching with a clipboard. The MPA project experimented with various types of media sources to record and analyze engagement with these experiences.

Chronology – Mobile stories can be both linear and nonlinear, in terms of a narrative but also in relation to the ways in which the audience discovers and interacts with media sources through the mobile device, including when and where. Cognitive load matters, as the mobile device competes for an audience member's attention with the physical setting, its sights and sounds and smells, and the other mobile apps available within a swipe of a hand. Using different approaches to narrative chronology, the MPA project experimented with not only what information to provide users and where but also when and in what sequence.

Mobilization – When in place, and engaged, users can be prompted with mobile design to do activities with their devices that they would not have done otherwise, including sharing information with friends and family. Besides the clear marketing potential, this type of engagement needs further exploration to determine what kinds of activities are easily prompted, what kinds of activities can have social benefits, what kinds of activities can lead to more place/issue engagement, etc., with the ultimate goal of mobilizing a user to do more, whatever that "more" turns out to be. That "more" essentially is a request for more time, and the MPA project experimented with types of those requests to see what might be successful (or not).

In summary, this presentation will illustrate and discuss various efforts to explore time from a design perspective, through an action-research approach. These formative experiments were intended to open new paths of discovery in the field of locative media design by focusing on time-oriented concepts.

References:

Hektner, J. M., Schmidt, J. A., and Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. Thousand Oaks, CA: Sage Publications.

Horst, H. A. (2013). The infrastructures of mobile media: Towards a future research agenda. *Mobile Media & Communication*, *1*(1), 147-152.

Karnowski, V. (2013). Befragung in situ: Die Mobile Experience Sampling Method

ABSTRACT 4: TRACING DIURNAL PATTERNS AND "EVENT ANOMALIES": A RHYTHMANALYSIS OF MOBILE LOCATION-BASED SERVICES
By Brett Oppegaard & Joseph Meyer

In this paper, I explore the importance of the temporal to the data extraction and monetization efforts of location-based mobile social networking (LMSN) and search and recommendation services, such as Foursquare (its offshoot Swarm) and Banjo. A key concern for these firms, I will argue, is to develop software systems that extract data from everyday, routinized uses of their apps to develop an understanding of the spatial and temporal patterns that form around their use – and, even more importantly, of temporal deviations from these patterns.

The conceptual framework that anchors and gives structure to this examination is the Lefebvrian notion of "rhythmanalysis". As Lefebvre (2010, p. 15) writes, "everywhere where there is interaction between a place, a time, and an expenditure of energy, there is *rhythm*". Rhythms have been understood to take many forms and to operate at a variety of scales and durations, such that complex social rhythms are interwoven with cyclical "natural" rhythms (days, nights, seasons, etc.) and with what Lefebvre (2010, p. 8) designates as "linear" rhythms, which he associates with "human activity" as embedded in everyday life. Additionally, and importantly, rhythms, are understood as always "multiple, complex", sometimes harmonious, but often "dissonant" (Edensor & Holloway, 2008, p. 484) – or, in Lefebvrian terms, they are both cyclical and linear, but just as commonly characterized by "eurhythmia", "arrhythmia", and "polyrhythmia" (Lefebvre, 2010, p. 16).

Rhythmanalysis is useful, Edensor (2009, p. 3) argues, for exploring place interdependencies and how they "are always in a process of becoming, seething with emergent properties, but usually stabilized by regular patterns of flow that possess particular rhythmic qualities whether steady, intermittent, volatile or surging". For software developers of LBSN applications, app use is approached as forming around "bundles of rhythms"; paying close attention to these "bundles" or "braiding of rhythms" (Edinsor & Holloway, 2008, p. 484) is productive "in order to grasp the natural or produced ensembles" (Lefebvre, 2010, p. 20) that result from them, whether these be steady or intermittent, or volatile or surging.

In their recent book, *Location-based social media: Space, time and identity*, Leighton Evans and Michael Saker (2017) pay explicit attention to the importance of time to our daily engagements with location-based mobile social networking (LBSN) applications, and how the temporal is structured into the very design of these apps. Evans and Saker argue that well-known LBSN apps, like Foursquare and its offshoot Swarm, work to combine the past and the future in end-user experience of the present. This is to say that these apps seek to "shape the present both through a 'bringing-forth' of past events [by recalling past places and times recorded through earlier check-ins] and project the

user to the future through the possibility afforded to the user to record and log their movement and temporal location" (Evans & Saker, 2017).

Fundamental to the success of the integration of past, future and present within these LBSN apps, is affording users the ability to record their daily movements, on the one hand, and then of translating these movements, on the other hand, into "events" that detail *where* a user has been, *when* they have been there, and *what* they were doing there (Evans & Saker, 2017).

Striving to understand the complicated ways that places function as "symphonies of events" (Wunderlich, 2009, p. 54) is therefore clearly of direct interest to LBSN software developers. However, arguably of even greater interest to them is capturing and being able to interpret data concerning asynchronous or anomalous activities – that is, aberrations or spikes in the temporal-locational activities and rhythms, those moments of being "out of time", as they are registered through social media activity. Such interest is clearly evident in the work of data scientists working for the New York based LBSN and search and recommendation stalwart, Foursquare (the case of the Las Vegas based social media data analytics firm, Banjo, will also be examined in the full paper). Foursquare's enduring efforts to come to terms with the significances of established rhythms (and deviations from them) are most clearly evident in the published computer science literature co-authored by the firm's chief data scientist, Blake Shaw. In one paper, Shaw and colleagues report on a software system they developed (later to become the Foursquare Explore feature) that "detects events that are anomalous by leveraging machine learning and past historical data" (Sklar, Shaw & Hogue, 2012). While Foursquare determines whether a place is "trending" by measuring the number of venue check-ins within a given time, their longer-term aim is to capture "large deviation from historical behavior", or what they call "off-trending" (Sklar, Shaw & Hogue, 2012) – in subsequent patent filing documentation, this is also described as "event anomaly" (Skibiski et al., 2013). Taking this further, within a later published paper, Shaw and colleagues report on work conducted during Hurricane Sandy that drew from a range of social media sources to model diurnal activities "to provide alerts and indications when patterns are disrupted", concluding that their ability to do this successfully carried "immediate implications for event detection systems" (Grinberg et al., 2013).

My contention in this paper (to be expanded upon in the spoken version), is that rhythms – which naturally the enroll the spatial and the temporal – are of abiding interest to LBSN firms. This is for the simple reason that it is within the complicated polyrhythms of daily life that app use is generally situated. The present main monetization efforts of Foursquare (and of Banjo) are dependent upon their ability to interpret high-volume location-sensitive data in (or close to) real-time. To do this successfully requires an attunement not just to geodata but, increasingly, to the less tangible yet arguably richer store of knowledge, motivations, behaviours, social connections, and so forth, that are part-and-parcel of diurnal and other human rhythms, and which, as we have seen, involve both repetition and the much harder to capture yet particularly revealing rhythmic disruptions or unexpected moments ("the element of the unforeseen").

References

Edensor, T. (2009). Introduction: Thinking about rhythm and space. In T. Edensor (Ed.) *Geographies of rhythm: Nature, place, mobilities, and bodies* (pp. 1-18). Farnham: Ashgate

Edensor, T. & Holloway, J. (2008). Rhythmanalysing the coach tour: The Ring of Kerry, Ireland. *Transactions of the Institute of British Geographers*, *33*(4), 483-501.

Evans, L. & Saker, M. (2017). *Location-based social media: Space, time and identity*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.

Grinberg, N., Naaman, M., Shaw, B. & Lotan, G. (2013). Extracting diurnal patterns of real world activity from social media. Paper presented at Seventh International AAAI Conference on Weblogs and Social Media. http://www.aaai.org/ocs/index.php/ICWSM/ICWSM13/paper/view/6087

Lefebvre, H. (2010). *Rhythmanalysis: Space, time and everyday life*. Trans. S. Elden and G. Moore. London: Continuum.

Skibiski, G., et al. (2013). Event identification in sensor analytics. U.S. Patent No. 8,620,624 B2.

Sklar, M., Shaw, B. & Hogue, A. (2012). Recommending interesting events in real-time with Foursquare check-ins. Paper presented at the 6th ACM Conference on Recommender Systems. http://dl.acm.org/citation.cfm?id=2366028

Wunderlich, F.M. (2009). The aesthetics of place-temporality in everyday urban space: The case of Fitzroy Square. In T. Edensor (Ed.) *Geographies of rhythm: Nature, place, mobilities, and bodies* (pp. 45-57). Farnham: Ashgate.