Workshop: Code and the City

3-4 September 2014, NUI Maynooth

Venue

Phoenix Boardroom
1st floor, Phoenix Building, North Campus, NUI Maynooth

Timetable

2nd September

Opening reception/meal in evening

3rd September

9.30: tea/coffee
10.00-10.30: Welcome, opening talk by Rob
10.30-12.30: Session 1
12.30-13.30: Lunch
13.30-15.30: Session 2
15.30-16.00: coffee break
16.00-18.00: Session 3
19.30 - late: Evening meal

4th September

9.30 tea/coffee
10.00-12.00: Session 4
12.00-13.00: lunch
13.00-15.00: Session 5
15.00-15.30: coffee break
15.30-17.00: Session 6 - discussion/wrap up

Code and the City

Rob Kitchin, NIRSA, National University of Ireland Maynooth

Software has become essential to the functioning of cities. It is deeply and pervasively embedded into the systems and infrastructure of the built environment and in the management and governance of urban societies. Software-enabled technologies and services augment and facilitate how we understand and plan cities, how we manage urban services and utilities, and how we live urban lives. This paper will provide an overarching overview of the ways in which software has become an indispensible mediator of urban systems and the consequent implications, and makes the case for the study of computational algorithms and how cities are captured in and processed through code.

Session 1: Automation/algorithms

Cities in code: how software repositories express urban life

Adrian Mackenzie, Sociology, Lancaster University

Is code an expression of urban life? This paper analyses around 10 million software repositories on Github.com from the perspective of how they include cities. The methodology here relies on data-intensive work with bodies of code at a number of different levels. It maps the geographies of Github organisations and users to see how location anchors coding work. More experimentally, it tracks how urban spaces, movements and architectures figure in and configure code. The paper's focus is less on how code shapes cities and more on apprehending code and coding as a way of experientially inhabiting cities. This approach might better highlight how code expresses urban experiences of proximity, mixing, movement, nearness, distance, and location. It might also shed light on the plural forms of spatiality arising from code, particularly as algorithmic processes become more entangled with each other.

Autonomy and automation in the coded city

Sam Kinsley, Geography, University of Exeter

This paper addresses the transformative sense in which computation has become an infrastructure upon which has been founded mechanisms to both support and intervene in how we live in cities. Software code lies at the heart of apparatuses of control and automation that are being progressively embedded into the fabric and infrastructures of global cities. The production and performance of cities increasingly 'takes place' in concert with a host of quasi-autonomous computational agents, regardless of whether or not we are aware of it. We are constituting what Bernard Stiegler calls a 'generalised automisation': we are supplementing, and in some cases replacing, the deliberative capacities of autonomous individuals with automated systems. Infrastructures of software and hardware have a growing agency in how we collectively communicate, remember and conduct

ourselves socially. Indeed, as these automated logics imbue the various municipal infrastructures we rely upon daily we are ourselves internalising those logics and performing our lives accordingly. This is rarely a planned process but rather an accretion of programmatic agency. Nevertheless, the widespread infrastructure of code in the city is being used not only to both support and surveil increasing amounts of everyday activities for the 'better' governance and maintenance of cities, through the collection and retention of ever-increasing quantities of data, but also to anticipate and intervene into how we perform the city as such. The purpose of this paper is to interrogate the spatial politics of software-based automation in cities and the challenges this presents to our collective negotiation of right to the city.

Interfacing Urban Intelligence

Shannon Mattern, Media Studies, New School NY

Technology companies, city governments, and design firms – the entities teaming up to construct our highly-networked cities of the future – have prototyped interfaces through which citizens can engage with the smart city. But those prototypes, almost always envisioned as screens of some sort, embody institutional values that aren't always aligned with those of citizens who rightfully claim a "right to the city." Based on promotional materials from Cisco, Siemens, IBM, Microsoft, and their smart-city-making counterparts, it seems that one of the chief preoccupations of our future-cities is to reflect their data consumption and hyper-efficient (often "widgetized") activity back to themselves. We thus see city "control centers" lined with screens that serve in part to visualize, and celebrate, the city's own supposedly hyper-rational operation. Public-facing interfaces, meanwhile, are typically rendered via schematic mock-ups, with little consideration given to interface design. They're portrayed as conduits for transit information, commercial and service locations and reviews, and information about cultural resources and tourist attractions; and as portals for gathering user-generated data. Across the board, these interfacing platforms tend to frame their users as sources of data that feed the urban algorithmic machines, and as consumers of data concerned primarily with their own efficient navigation and consumption of the city.

In this talk, I'll consider how we might we design urban interfaces for urban citizens, who have a right to know what's going on inside "'black boxed' [urban] control systems" – and even engage with the operating system as more than mere data-generators or reporters-of-potholes-and-power-outages. In considering what constitutes an ideal urban interface, we need to examine those platforms that are already in existence, and those that are proposed for future cities. Even the purely hypothetical, the speculative – the "design fiction" – can illuminate what's possible, technologically, aesthetically, and ideologically; and can allow us to ask ourselves what kind of a "public face" we want to front our cities, and, even more important, what kinds of intelligence and agency – technological and human – we want our cities to embody.

<u>Session 2:</u> Abstraction and urbanisation

Encountering the city at hackathons

Sophia Maalsen and Sung-Yueh Perng, National University of Ireland, Maynooth

The growing significance of hackathons is currently developing in a mutually informing way. On the one hand, there is an increasing use of hackathons to address issues of city governance – Chris Vein, US CTO for government innovation has described them as 'sensemaking' tools for government, encouraging agencies to make use of hackathons and "let the collective energy of the people in the room come together and really take that data and solve things in creative and imaginative ways" (Llewellyn 2012). On the other, regular hack nights appear as creative urban space for citizens to discuss problems they encounter and which are not necessarily considered by government, and produce solutions to tackle these issues.

In this paper, we explore potential opportunities and tensions, as well as excitement and inattentiveness, emerging as solutions are proposed and pursued. Through this, we reflect upon how such processes translate the city and transform ways of living in places where the solutions are applied. We further ask whether the positive discourse surrounding hackathons is justified or whether there are limits to their ability to deal with the complexity of urban issues.

Disclosing Disaster? A Study of Ethics, Praxeology and Phenomenology in a Mobile World

Monika Büscher, With Michael Liegl, Katrina Petersen, Mobilities.Lab, Lancaster University, UK

Intersecting mobilities of data, people and resources are an integral part of a new digital urbanism. Thrift speaks of Lifeworld.Inc, a new entertainment-security sector driven contexture where people's everyday activities, movements, physiological data, thoughts, desires and fears are so richly documented in real time that commercial enterprise as well as urban services (transport, energy, security) can dynamically anticipate and shape them 'just-in-time' (2011). While this opens up novel opportunities for more efficiency, comfort, and sustainability in networked urban mobilities, it also provides new leverage for mobilizing disaster response. In a 'century of disasters' (eScience 2012), where urbanization has increased vulnerability and climate change contributes to increased frequency and severity of disasters, this opens up a perspicuous site for investigations of post-human practices, phenomenologies and ethics. Big data analytics and information sharing for risk prevention and disaster response can exacerbate the unprecedented surveillance contemporary societies practice (Harding 2014), Kafka-eske transformations of privacy and civil liberties (Solove 2004) and a splintering urbanism (Graham & Marvin 2001). At the heart of these transformations is a digital phenomenology of invisibility, immateriality and 'intelligence' that does not lend itself to human control. 'Smart cities' may depend on smart citizens (Greenfield 2013), but the technologies contemporary societies produce do not support human intelligence. We report from 'inside the belly of the beast' of innovation in mobilizing Lifeworld.Inc data for disaster response (Balka 2006). Drawing on experience from collaborative research and design projects (e.g. http://www.bridgeproject.eu/en), we discuss the relationship between lived cyborg practice, phenomenology and ethics in networked urban mobilities. Using a disaster perspective for a disclosive ethical investigation (Introna 2007) does disclose some potentially disastrous transformations, but it also highlights avenues for alternative, radically careful as well as carefully radical design (Latour 2009).

Riot's Ratio, on the genealogy of agent-based modeling and the cities of civil war

Matthew Fuller and Graham Harwood, Cultural Studies, Goldsmiths

The urban riots of the USA in the late 1960s were some of the most powerful political events of that era. As well as drawing numerous responses from media, the civil rights movement, black nationalists, and groups such as the Situationist International, the uprising also triggered a range of research responses including some of the first computational models of cities. T.C. Schelling's "Models of Segregation" attempted to provide a logical model for racial segregation and laid much of the groundwork for what later became agent-based modeling. Such work is expressed contemporarily for instance in the riot and insurgency modeling of J.M. Epstein and others. For the state, such events mark a schizophrenic relationship to the contingency of riot and how the algorithms play out in such a scenario. How can it govern events that both demonstrate and excite its power and also undermine it? This paper will propose a tracing of the genealogy of such models alongside a reading of other ways of using urban modeling in relation to the urban riots of that era and now. A parrallel reference point here will be the work of W. Bunge a quantitative geographer and spatial theorist. Bunge consistently argued that geometrical patterns and morphological laws express disadvantage and injustice under contemporary capitalism, and that identified patterns could be remedied by rational methods.

The history of computing, from G.W. Leibniz onwards, tangles with the problematic of developing rational approaches to complex, multi-dimensional problems with a high-degree of what J. Law describes as "messiness". This paper will examine the ways in which rationality, or ratio, is positioned in relation to urban conflict as a means of discussing the relations between the city and software. The paper will develop a discussion of ratio in relation to questions of abstraction, reduction and empiricism. We are especially concerned to find a relationship between abstraction and the empirical that, by working with the materiality of computational systems recognises, and perhaps works with, the tendency to reduction(ism) but through which modes of abstraction may also work with the highly and complexly empirical.

Session 3: Social/locative media

Digital social interactions in the city: Reflecting on location-based social media

Luigina Ciolfi, Human-Centred Computing, Sheffield Hallam University

Location-based social media increasingly mediates social and interpersonal interactions in urban settings. Such practices become coded in software representing both the log and content of social

interactions and the location to which they relate. Therefore a digital "cloud" of social interactions becomes embedded into the physical reality of the city, of its neighbourhoods, public places, cafés, transportation hubs and any other location identified by social media users (by user-initiated "check-ins" or by the content that they generate, such as photographs) and by the tools they use (for example, through automatic geo-tagging). Two sets of issues to be investigated are emerging: firstly referring to how such localised interactions are populating the algorithms and infrastructures provided by the software: how are the platform of location-based social media framing people's perceptions and identifications of locations? How is code both facilitating and representing a set of social interactions relating to various spatial configurations?A second set of issues regards the re-materialisation of such cloud of interactions in the physical world: could it be made somehow perceivable and/or tangible in the physical world by the way in which certain environments are designed?

Overall, could new approaches to urban planning and environmental design become concerned with accommodating and facilitating these social interactions as they do so by supporting in-presence, analogue ones?

This paper will attempt to define and discuss these issues drawing both from interaction design and human-computer interaction literature on physical/digital interactions and from two preliminary empirical studies of location-based social media use in two cities.

A Window, a Message, or a Medium? Learning about cities from Instagram

Lev Manovich, Computer Science, The Graduate Center, City University of New York

Short Abstract:
What are we learning when analyzing can social media data? Is it a window into real-world social and cultural behaviors, a reflection of lifestyles of particular demographics who use mobile platforms and particular network services, or an artifact of mobile apps hardware and software? In other words - is social media a "message" or a "medium"? I will discuss these questions using recent projects from my lab where we analyzed and visualized millions of Instagram photos.

Long Abstract:

Over last few years, tens of thousands of researchers in social computing and computational social sciences started to use available data from social networks and media sharing services (such as Twitter, Foursquare and Instagram) created by users of mobile platforms. The research uses techniques from statistics, machine learning, and visualization, among others, to analyze all kinds of patterns contained in this data and also (less frequently) propose new models for understanding the social. The examples include analysis of information propagation in Twitter, predicting popularity of photos on Flickr, proposing new sets of city neighborhoods using Foursquare users check-ins, and understanding connections between musical genres using listening data from Echonest.

In my talk I will address a fundamental question we face in doing this research: what exactly are we learning when analyzing can social media data? Is it a window into real-world social and cultural

behaviors, a reflection of lifestyles of particular demographics who use mobile platforms and particular network services, or only an artifact of mobile apps? In other words - is social media a "message" or a "medium"?

I will discuss this question using three recent projects from my lab (softwarestudies.com). The projects use large sets of Instagram images and accompanying data together with data science and visualization tools. Phototrails.net (2013) analyzes 2.3 million photos from 13 global cities to investigate how different kinds of events are represented in these photos. The project also investigates if the universal affordances of Instagram app (same interface and same set of filters available to all users) result in universal digital visual language. Selfiecity.net (2014) analyzes the distinct artifact of mobile platforms – selfies. We compare thousands of selfies to see if cultural specificity of different places and cultural is preserved in this genre. Finally, our third project compares Instagram photos taken by visitors in a few major modern art museums, asking if photographs of famous works of the art differ depending on what these artworks are and where they are situated.

Feeling place in the city: strange ontologies, Foursquare and location-based social media

Leighton Evans, National University of Ireland Maynooth

Certain instances of the use of location-based social media in cities can result in deep understandings of novel locations. The contributions of other users and the information pushed to users when in particular locales can help users rapidly attune themselves to places and achieve an understanding of the place. The use of a computational device and location-based social networking to achieve this understanding indicates an alteration in the achievement of placehood using computational technology. Practices and methods of understanding place can, in some situations, be delegated to the device and application. This paper explores how the moment that place is appreciated as *place* (that is, as a meaningful existential locale) can be reconciled with the delegation of the epistemologies of placehood to a computational device and location-based social media application. Drawing on data from an ethnographic study of *Foursquare* users, the phenomenological appreciation of place is understood as co-constituent between the device, application and the mood of the user. Code and computational devices are contextualised as a constant foregrounding presence in the city, and the engagement of the user, device, code and data in understanding place is a moment of revealing that is co-constituent of all these elements. This exploratory paper engages Peter Sloterdijk's theory of spheres as a framework to understand how these four elements interact, and how that interaction of elements can orient a user to a revealing of the city that can be understood as a phenomenological revealing of *place.*

Mobility in the actually existing smart city: Developing a multilayered model for the mobile computing dispositif

Jim Merricks White, National University of Ireland, Maynooth

Mobile computing plays an increasingly important role in the way that space is experienced in the city. This has political consequences, both at the micro level of everyday production and consumption, and at the macro level of institutional and political economy. While geographers have

explored the ontological role which might be played by hardware, software, data and mapping within this spatial paradigm, there remains little concerted effort to explore mobile computing as a technological system which incorporates all of these socio-technical assemblages. By drawing on adjacent disciplines of science and technology studies (STS) and media and communication studies, this essay proposes a multilayered model for such a holistic inquiry: hardware—software—data(base)—GUI (graphical user interface).

By applying this model to a self-reflexive exploration of the taxi service Hailo and the mobility tracking application Moves, I attempt to demonstrate how it might be put to work as a heuristic tool. Following on from my desire to expose and explore the politics of mobile computing, the model is used to draw attention to the networks of power which make up these mobile computing services.

<u>Session 4:</u> knowledge classification and ontology

Cities and Context: The Codification of Small Areas through Geodemographic Classification

Alex Singleton, Geography, University of Liverpool

Geodemographic classification group small area geography into categories based on shared population and built environment characteristics. This process of codification aims to create a common language to describe the salient internal structure of places, and by extension, enable their comparison across geographic contexts. The process of creating geodemographic classifications is not a new phenomenon, and in their contemporary form emerged from research conducted in the 1970s that aimed provide a new method of targeting deprivation relief funding within the city of Liverpool. This city level model was later extended for the national context, and became the antecedent of contemporary geodemographic classification. This paper explores the origins of geodemographics in Liverpool, to first illustrate that the coding of areas is not just a contemporary practice; and then extends this discussion to consider the issue of information loss when national classifications are used within a local context.

The city and the Feudal Internet: Examining Institutional Materialities

Paul Dourish, Informatics, UC Irvine

In "Seeing like a City," Marianne Valverde turns to urban regulation to counter some of James Scott's arguments about the homogenizing gaze of high modern statehood. Cities, she notes, are highly regulated, but without the panoptic order that Scott suggests. They operate instead as a splintered patchwork of regulatory boundaries -- postal codes, tax assessment districts, business improvement zones, school catchment areas, zoning blocks, sanitation districts, and similar divisions that don't quite line up. Arguments about online experience and the consequences of the

Internet have a similar air to Scott's analysis of statehood -- they posit a world of consistent, compliant, and compatible information systems, in which the free flow of information and the homogenizing gaze of the digital erases boundaries (both for good and ill). In fact, the organization of the Internet -- that is, of our technologically- and historically-specific internet -- is one of boundaries, barriers, and fiefdoms. We have erected all sorts of internal barriers to the free flow of information for a range of reasons, including the desire for autonomy and the extraction of tolls and rents. In this talk I want to explore some aspects of the historical specificity of our Internet and consider what this has to tell us about the ways that we talk about code and the city.

From Jerusalem to Kansas City: New geopolitics and the Semantic Web

Heather Ford and Mark Graham, Oxford Internet Institute, University of Oxford

In 2012, Google rolled out a service called Knowledge Graph which would enable users to have their search query resolved without having to navigate to other websites. So, instead of just presenting users with a diverse list of possible answers to any query, Google selects and frames data about cities, countries and millions of other objects sourced from sites including Wikipedia, the CIA World Factbook and Freebase under its own banner.

For many, this heralded Google's eventual recognition of the benefits of the Semantic Web: an idea and ideal that the Web could be made more efficient and interconnected when websites share a common framework that would allow data to be shared and reused across application, enterprise, community, and geographic boundaries. This move towards the Semantic Web can be starkly seen in the ways that Wikipedia, as one of the foundations for Google's Knowledge Graph, has begun to make significant epistemic changes. With a Google funded project called WikiData, Wikipedia has begun to use Semantic Web principles to centralise 'factual' data across all language versions of the encyclopaedia. For instance, this would mean that the population of a city need only be altered once in WikiData rather in all places where it occurs in Wikipedia's 285 language versions.

For Google, these efficiencies provide a faster experience for users who will stay on their website rather than navigating away. For Wikipedia, such efficiencies promise to centralise the updating process so that data are consistent and so that smaller language Wikipedias can obtain automated assistance in translating essential data for articles more rapidly.

This paper seeks to critically interrogate these changes in the digital architectures and infrastructures of our increasingly augmented cities. What shifts in power result from these changes in digital infrastructures? How are semantic standardisations increasingly encoded into our urban environments and experiences? And what space remains for digital counter-narratives, conflict, and contention?

To tackle those questions, we trace data about two cities as they travel through Google's algorithms and the Semantic Web platforms of Wikidata and Wikipedia. In each case, we seek to understand how particular reflections of the city are made visible or invisible and how particular publics are given voice or silenced. Doing so leads us to ultimately reflect on how these new alignments of code and content shape how cities are presented, experienced, and brought into being.

<u>Session 5</u>: Governance

From community access to community calculation: exploring alternative urban governance through code

Alison Powell, Media & Communications, LSE

Within the last twenty years the concept of the "smart city" has emerged and re-emerged, focusing on various ways that technology layers new capacities over existing urban infrastructures. These "smart cities" are changing. The "smart city" of the early 2000s was a communicative city, while the smart city of the 2010s is a data city. The dynamics of these are different: a communicative city promises representation through voice – the ability to speak and listen - while a data city promises representation through information – information collected about individuals is fed back to civic decision makers who enact decisions based upon it. Data is thus a product flowing from citizen to government. In data cities governance is also different: both communicative and data cities could be the result of top-down governance decisions or subject to bottom-up reconfigurations, the ways that those decisions are enacted are quite different. A communicative city promises a democratic value to citizens of greater access to information, while a data city promises a value to governments of greater access to data about citizens. This structural inequity is particularly evident when we consider what must happen to data in a data city – it must be calculated.

Within a macro-political perspective, centralized calculation of data gathered from citizens is essential for developing visions of responsive, data-rich, centrally controlled smart cities. This seems to close off the potential for an alternative mode of governance for the contemporary data city. However, the expansion of participatory culture has created efforts to democratize collection of data about cities, through citizen science projects including air quality and noise mapping. In these projects, the legitimacy of the hierarchical city is challenged by the oppositional data collected by citizens, taken as evidence of an opposition between the "constituted knowledge" of institutions like city governance and the "adaptive knowledge" of loosely organized communities of practice (see Mansell, 2013). This contest of knowledge contrasts the two modes of combining citizenship, technology and space, the 'hierarchical city' and the 'peer to peer' city. Participatory data collection does seem to enact an alternative to centralized authority, but it is not clear whether data – without calculation – is really shifting governance.

Building upon the central contrast between hierarchical and peer to peer cities, this paper considers how the "micro politics" of cities are altered as calculation is integrated into civic participation. Drawing on historical and contemporary examples of peer to peer cities including community networks, citizen science, it argues that peer to peer calculation is the most significant yet most difficult activation of alternative governance of urban space.

Code and the socio-spatial stratification of the city

Agnieszka Leszczynski, Geography, University of Birmingham

Code has been recognized as intimately implicated in the socio-spatial stratification of cities. Big data in particular are underwriting a sweeping   intensification of practices of socio-spatial sorting, which refers to the organization of city spaces into social and economic categories so as to categorize and effectively manage the individuals who inhabit them. These practices directly shape and reinforce material urban geographies of social disparity. One of the primary areas where we find evidence of this is in the increasing leveraging of big data towards the prefiguring of urban spatial pre-futures of deviance. Big data and attendant analytics are reproducing and reifying disenfranchisement alog axes of race, class, socioeconomic status, and geography at scales from the city as a whole to individual neighbourhoods so as to create material spaces for specific kinds of vertical surveillance interventions (e.g., increased police presence), and to justify the targeting of particular neighborhoods and neighbourhood populations for these practices (e.g., by prefiguring them as criminalized a priori). The ways in which this is enacted in practice is discussed with reference to, amongst others, the EMOTIVE Twitter analytics software program designed as a riot prevention system in the UK, and the Chicago Police Department's turn to big data analytics as a predictive policing measure.

The Cryptographic City

David M. Berry, Media & Communication, University of Sussex

Questions about opacity and transparency have been turned upside down in the post-Snowden era. With the certainty of tracking technologies, surveillance and monitoring, a new turn towards anonymity, opaque presence and crypto-identity has emerged in digital networks. This paper looks to examine questions of cryptography and encryption in relation to the city, particularly in relation to the increasing mediation of life through algorithms, software and code. Key questions are the relationship between opacity and opaque presence and notions of publicness and city space, but also the way in which the city as a *programmable city* will increasingly rely upon the cryptographic layers. Through an engagement with the notion of 'capture' the paper seeks to think through the limits of what we might call plaintext code/space and reflect on the crypto code/spaces and their materialities.