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The Shape of Time: Reconsidering time in the context of Pervasive Media

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ABSTRACT

Within contemporary research discussion in interaction design, HCI and pervasive media the word **time** is commonly used to represent a wide variety of meanings, concepts and dimensions. Often this is without differentiation between contradictory interpretations of the simple word that belies complex relationships with our world and increasingly with media.

The discussion or the experience of time can be traced to many sources, from Heraclitus and the river of time, Husserl's phenomenological concepts and the Bergsonian interpretations of time to empirical measurements of the swinging pendulum of Captain Clock conflicting concepts of time are freely used to discuss media and interaction. As Chen and Boroditsky argue even the languages we speak influence how we conceive of and verbalise our ideas of **time** and the effects this has on our lives.

This paper considers the issues of how to describe, compartmentalise and resolve the seemingly conflicting concepts of time using the consideration of time as a volume orthogonal to three dimensional space. Taking examples from digital culture, pervasive media, life logging and the quantified self the paper argues for a new analysis of concepts of time as discussed within contemporary digital media research and HCI practice.

Keywords: Multimedia, Time, Interaction Design. Representation, Lifelogging, Quantified Self

1. Some thoughts on Representation

In religion, philosophy and science there are a myriad of measures and concepts of **time** that are used interchangeably. **Time** is described by Bergson as being only perceivable as duration, the moment itself is intangible and can only be experienced as **that which began and ended** [1]. This is in contrast with Marx and the interpretation of capitalism as time having a measurable value, that can be traded and exchanged.

Within the discourse of Interactive Media and Human Computer Interaction **time** is considered using several definitions simultaneously: it is a duration, an event marker, an experience, an economic unit and also a a experience and perception. This creates a free for all where the various definitions of time are ranked by their apparent authenticity and the ideal of incontrovertible 'real time' is moulded and adapted to suit whatever aspect of 'human' or 'computer' needs to be analysed at any particular moment. In contemporary interface design for Digital Media, the timeline is used almost exclusively as the basis of temporal representations. Despite strong discussion and dissent within the field of time-based media, the timeline with its fixed, equal, mechanical increments is almost totally dominant. Representations of personal or experiential time, which relates more directly to how we actually experience time, remain relegated to sub-surrealist dreamlike collisions of discrete events or symbols. (Buzzo, 2013)

2. The Clockwork of Time

Contemporary European perspectives and representations of time can be traced to a framework of mechanical time metaphors, with the equidistant divisions in a timeline or chronology being the most apparent of these. In the case of digital media interfaces the fixed, equal timeline increments are almost totally dominant, creating a wholly artificial grid applied to human experience. From a subjective human perspective, this is equivalent to the abstraction of the equidistant stations of the London underground map contrasted with the experiential understanding of the actual distance between them.

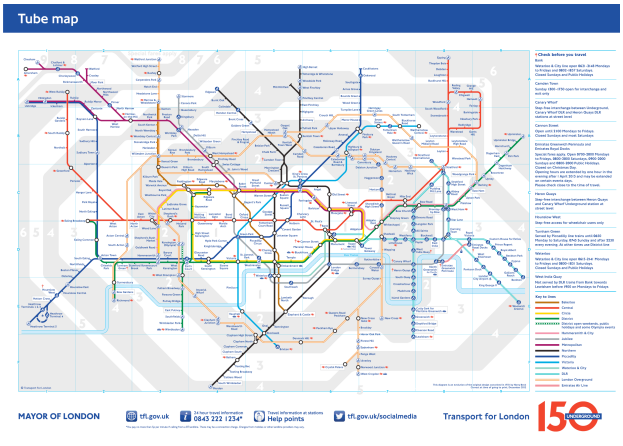

Fig 1: London Underground map

Considering the political aspects of time, and subsequently of representations of time, the argument for a new imaginative reframing of mechanistic time as the single true representation becomes even more compelling. As we move from systems orientated mechanistic models of computation: accounting, record keeping, or tabulation of statements of fact, toward ubiquitous computing, pervasive media and a social model of computing, the notion of engagement changes emphasis. The computer with it's internal clock determining the pace and sequencing of all of its functions is in itself built on the concept

of mechanical time, but a version of time that is local and changeable. Your computer can be overclocked, it can be **slow**. The roots of the computer, in clockwork, in mechanical timekeeping, is as a computational engine is driven by it's own internal rhythm. The representations of interface time are naturally remnant of this machine measurement of time, an artificial grid of measurement intricately linked to the mechanical roots of computational devices.

However, as the possibly apocryphal but widely cited example of the Algonquin peoples so neatly illustrates, the mechanical description of time has seemingly always been at odds with the human experience of it [4]. The work of Chen and Boroditsky on the influence of language on health and even economic outcomes illustrates this [2,3]: Before the mechanisation of the language of time, our experience, perception and descriptions of time and duration might have been more subjective, fluid and variable.

3. The Timeline and the Experience of Being Alive

The early Lifelogging experiments from Gordon Bell [5] and the Quantified Self measurement of Stephen Wolfram are extreme examples of monitoring and recording the minutiae of everyday life [6]. Lifelogging is the recording and sharing one's life events in public, typically via the internet. Recording inputs, states, responses and interactions is central to the Quantified Self movement, where incorporating data acquisition technology in every aspect of ones' daily life is commonplace [7].

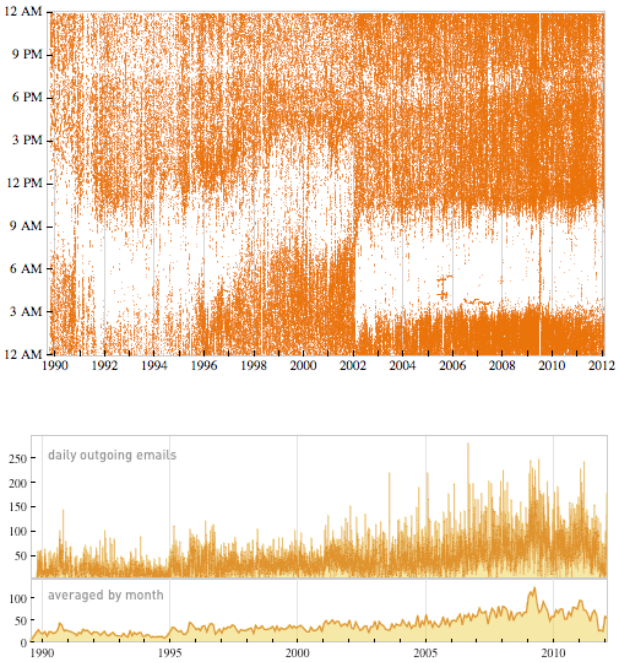

Fig 1: Outgoing mail diurnal and daily

In these examples the experience of self or of being 'present' is distilled in a reductionist fashion to create data, data that are all temporally situated. However upon review this data apparently describes little of the actual life events or experiences that created it, providing little more than revelations about the data itself. It takes human re-interpretation, applying the real world back on top of the data, to change it back into information with emotional meaning. Stephen Wolfram's illustrations of personal analytics, whilst being impressive in their obsessiveness and detail tell us little about the experience of being Stephen Wolfram, despite the data apparently having the deepest rhythms of his life embedded in it.

After centuries of being under the influence of empirical measurement of events and mechanical metaphors in language, our thought processes still carry this intimate and fluid set of relationships between events, perception and what we latterly call **time**.

We think of a person - a birthday party, a location, Devon, - summer, an evening with bright, warm light, on a weekend, a Saturday, a month, a year. Then finally (perhaps after some searching and possibly head scratching) we can apply an external, mechanical definition, Saturday 12th June 2011.

This process illustrates how we think of the past as a series of events first and then apply a chronological grid to them. Our internal experience is situated in our subjective perception of time and is then in turn validated by expressing our inner reality in an approved, codified external system of categorisation.

4. Exif, Metadata and Experiential Memory

A look at chemical film photo albums, created before the automatic chronological tagging of digital photography, reveals images arranged and sorted by emotional relevance: by subject, family, the beach, baby pictures etc. These albums hold less information than a digital photo interface but the information that is there is actively and deliberately created using subjective taxonomies and perceptions of time, order and association. As a result they appear as complex and rich in association and meaning beyond simple definitions of nostalgia.

Fig 3: Antique Photograph Album

In digital photography it is only a recent development that information other than the actual pixel level picture data is recorded and associated with each picture. Whenever such digital media entities enter into a computer system they are time-stamped as events in an artificial digital construct, that has a chronological event tree wholly separated from any perceived reality of the media creator. The time component has so far only been applied to the actual file rather than the digital image

contained within, thus allowing the timedata to change as the file is duplicated and rewritten. However, in the last few years Exif and other media metadata standards has introduced the notion that media such as digital images may contain more than just pixels [8]. A digital photograph also contains a date, a geographic location by latitude and longitude, a location by placename, the camera manufacturer and model, exposure and capture settings, names of people present in the image, name of the author of the image etc. The subsequent proliferation of mobile phone based photography where accurate time and locative data is readily available has boosted the use of image metadata massively.

Without these additional elements the digital image is akin to remembering a picture but having no recollection of when, where or what it is, nor even how it came to be in one's conscious memory at all. Though as in the case of Vice Magazine and the 'secret' photographs of John McAfee, accidentally revealing his location as a fugitive via GPS data embedded in photographs posted on the web, this is still something even the most media aware of us are still coming to terms with [9].

In examples such as live mapping, GPS navigation, Google maps, open street map etc, the user is placed at the centre of everything and the world whirls around re-orientating to suit the perceptions of the traveller. When taking a less immediate walk through the digital world of pervasive media the content is commonly laid out end to end, with the user being able to do little more than slide along a line where the relationships between events are dictated by one abstracted attribute, **time**. To fast forward or rewind, we must traverse this computer centered view of events rather than a human view. Having been separated, distilled and sorted into a simple tabulation reinforcing the view that all events, experiences, media, and meaning are equal, and therefore potentially interchangeable.

If instead we can move towards a place where we can consider a picture as the sum total of the pixels *and* attendant metadata locked together then these entities may begin to enrich the pervasive digital media that we create. This would allow them to move beyond single dimensional facsimiles of experience to deeper representations, that can begin to mirror our internal experiences of time and events in the world we inhabit.

Fig 4: Live GPS mapping

5. No Time Without Space

Examples from social media may help us describe the process of an personal event and the subsequent systematic narrowing from the personal through to the empirical applied grid of chronology. We can all imagine how to arrange our social contacts in more sophisticated and useful ways than being listed alphabetically, rather than by relationship. Can we also arrange media by the strength of the relationship we have to it from ***the now*** rather than merely the artificially rationalised divisions of distance?

Considering time in pervasive media as an abstracted attribute that can be applied to or stripped away from human experience and the representation thereof is essentially a regressive step. This reductionist approach delivers scatter diagrams of data points that describe rhythms in the data but not rhythms in peoples lives, experiences or perceptions. Using machine generated abstractions of time to organise media changes the nature of what is recorded. With the manipulation that occurs when our experiences are organised in an alternate taxonomy, our experiences are reframed and essentially changed and we are at risk of becoming spectators of the remediated versions of our own lives.

As we move on to broaden our investigation into other ways of making sense of the endless streams of media we generate, it may be useful to bear the contradictions of time in mind: Time in a physical sense is always intrinsically linked to space, as is our experience of it. Einstein proposed that we cannot have space without time and cannot have time without space - and in a strange way your grandparent's photo album knows this too.

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