Making Time: Defining Rhythms in Archaeological Research

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ABSTRACT
In this paper we describe two technology interventions being made on archaeology digs as part of the PATINA project. Our interventions include both physical and digital components, but share in common the goal of exploring and changing the rhythms of archaeological research. A Wireless Kinect is used to create 3D models of the site and finds by collapsing time during a scanning process; a novel tangible interface called Chronotable visualises and provides group awareness on the temporal properties of dig research to explore how working rhythm of the dig is adapted when it becomes legible.

Categories and Subject Descriptors
J.2.3 [**Computer Applications**]: Physical Sciences and Engineering – *Archaeology*.

General Terms
Design, Human Factors.

Keywords
Temporal Rhythms, Archaeology.

"We've been here three weeks on live TV and we've dug up a millimetre of topsoil so far … We've found this and carbon dated it to last Tuesday, so we're very excited." It's too slow. Our attention spans are short. We need stuff! Quick, change the channel. We want, not slow archaeology, we want speed archaeology. We want big fuckers with diggers. "You've got 10 minutes to find a city." "All right! Let's go! Get the diggers in! What the fuck? Get that skull out of the way!" Eddie Izzard, Glorious.

1. INTRODUCTION
In the PATINA project (www.patina.ac.uk) we have explored the personal and social rhythms of research, and particularly the notion that digital technologies can be positively or negatively disruptive to existing research practices. For example, digital technologies can increase communication, flattening access to knowledge and hierarchy and democratising the ownership and control of information; equally digital data can be distracting shifting our focus away from deep thought processes and the sustained flow that focuses on a single idea. In recent work we have particularly focused on research practices in archaeology, which are heavily influenced by the introduction of digital systems such as data visualization, scanning technologies, mobile communication and many other advances. Archaeological practice 'makes time' as both the process and the product of its research, and is therefore very susceptible to the disruptive influence of temporal changes.

In this paper we will explore how archaeology's production of temporal rhythm is constructed in its own rhythmic processes. We are in particularly interested in how research time is represented, absorbed and compressed in archaeology, and whether technologies can positively or negatively adapt or support those processes. Ultimately we wish to explore how effects of technologies on research rhythms driver contemporary issues around research such as specialism, hierarchy and politics.

We will ask and answer questions about whether the technologies that we build have negative or positive effects of the archaeologists' ability to take control of their own interpretative activities, including the alignment between the traditional 'dig time rhythm' of the archaeological tasks, and the rhythm imposed or suggested by the technologies and practices we introduce. There may be effects on level of control, ability to concentrate and attend to a core task well rather than interpreting its results, ability to contribute individual interpretation to a collective whole, level of interruption, overall interpretation results, scale of deviation of views, accessibility of diverse views, and many other factors. Critical to these features will be the pace, rhythm and representation of time suggested by represented in our technologies. One key question, therefore, is whether it is possible and desirable to design a technology (and associated media) that can suggest, or adapt to, a particular interactional rhythm. In the following sections we describe two technologies we have designed to intervene in this context and in the final presentation of this work we will explore whether and how these

technologies influence the working rhythm of the archaeological digs that we will be studying during two months of fieldwork in August and September 2012.

2. INTERVENTIONS

2.1 Wireless Kinect

Figure 1 - Handheld Wireless Kinect

Over the past two years, the Microsoft Kinect has contributed to a significant advance in gesture recognition technologies. We have been working on building a wireless, portable, handheld, battery-powered version of the Kinect which we can use to create 3D scans of an archaeology site and finds that are extracted from the site. Our design uses a significantly modified version of the standard Microsoft Kinect connected via WiFi to a server running the KinectFusion algorithm [13] to create 3D models from the scanned 3D Kinect data, and to a smartphone with a control and feedback interface for the capture process.

We plan to put the device in the hands of archaeologists on a dig so they can determine the parameters of a scan, controlling both the spatial properties through manipulating the device, but also the temporal properties, determining how much time is collapsed by the algorithm into the model. The scan time will determine a number of properties of the captured model, such as resolution, scale and focus. In this situation we are particularly interested in how the archaeologists treat scanning time as a principal feature of the rhythm of their interpretative work, and the ways in which they select capture, both alone and together, these research moments.

2.2 Chronotable

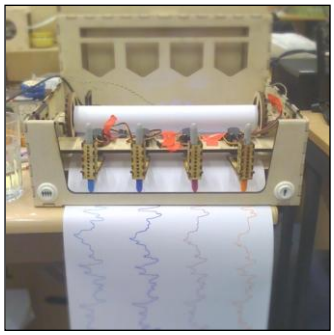

Figure 2 - Chronotable

On the PATINA project we have also been designing interfaces which both visually and tangibly explore how representations of time can support the legibility and manipulation of research patterns and rhythms. In recent work we presented the Chronotape [4], a design which projects digital genealogy data over physical paper in order to support both digital and physical manipulation of family history research. In this work we have extended the Chronotape in scale and functionality to become a 'Chronotable', a system which represents arbitrary temporal data streams over paper in the style of a seismograph or polygraph. We intend to deploy the Chronotable on the dig site to represent the collection of digital data over the dig, and produce a physical representation of the output back into the setting. The different data streams will represent different digital data feeds, such as twitter data using site hashtags, more direct audio or contact information from points around the site, and database information representing site finds. The Chronotable is intended to act as a 'hearth', enhancing reflective moments between people in the way it supports production and reflection on events. Rather than automatically scrolling through the paper, the device reveals it has new data waiting, but does not output recent time until directly spooled by a user, intending to support reflection on recent events. A 'tail' of paper representations of the whole dig promoted later reflection and revisiting of previous events or discoveries, and generates increased awareness and communication of these across the site.

3. PRESENTATION

In the final presentation of this work, we will use the study of these devices to explore the research questions laid out in the introduction. We will principally focus here on the question of whether the ability to concentrate and communicate over digital material is a benefit to or a distraction from interpretation.

4. ACKNOWLEDGMENTS

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