Output 2: Portfolio Submission “Between Craft and Code”

Exhibition:
“Between Craft and Code – Making Sense of Data Materialisation” exhibition, 2015 (Portsmouth, UK)

Activities:
Artists workshop (21/4/2015, Portsmouth, UK)

Artefacts:
A “Algorithm” – set of instructions generated from data set
B “Ship Crew Interface” – graphical user interface
C “CodeEye” – vibrotactile interface

“Between Craft and Code” makes a significant contribution to debates on 1) design and engineering collaboration 2) data visualisation and interface design aesthetics and 3) the academic and popular perceptions of creative processes across STE(A)M subjects and disciplines. In this project, the integration of design into industrial engineering settings and applications is a new approach and promises to add value to increasingly digitized environments lacking the human touch. Drawing on perceptual theory, this design research is furthering the development of a wider approach to data visualisation aesthetics, from visualisation to a more intuitive and immediate data materialisation. The exhibition concept and associated symposium and workshop posed challenges and questions to creative practitioners as well as the audience, by asking us to rethink existing stereotyped perspective on the ‘art & design’ based creative process being opposed to a ‘coding’ based creative process, which tends to be perceived as linear and prescribed.

“Between Craft and Code” has a range of interrelated artefacts and research questions attached to it, so will be presented as a portfolio of work.

1) The data used as content in these responses was taken via vibration sensors from marine engines, and serves to monitor and diagnose engine faults. Historically, ship engineers would often diagnose engine faults simply by ‘feeling’ the engine or ‘listening’ to its sounds. On modern ships, this is not possible due to the opaqueness of the engine, and the rationalisation of skilled crew members. In collaboration with data scientist Dr. Edward Smart (IIR, UoP) the design challenge was defined as such: visualising the internal status of the engine part, with an indication of components becoming faulty. This dynamic content was to be visualised as a trend, rather than an old-fashioned traffic light system, as these are not finely tuned enough to communicate parameters like decay. The design concept I conceived brings the abstract sensor data back into its analogue form as much as possible, so it can be immediately understood by a nonskilled crewmember.
2) The reductive concept and term ‘data visualisation’ has been extended here to a more ambitious ‘data materialisation’. The design concept and research is drawing on the theory of perception, embodiment and metaphors to inform data visualisation and interface design. The data materialisation design output takes the data back from an abstract numerical, towards an intuitively recognisable form. The graphical user interface visualises jarring engine parts as circles going off centre, utilising a bodily sense of ‘something is going wrong’. To present the data in different sensory forms, I conceived the vibrotactile interface CodeEye, which was produced by Simon Kunath. Textile artist Cassi Hill was briefed and commissioned for a textile sculpture materialising the same dataset.

3) The exhibition concept for “Between Craft and Code” is based on an algorithm (a set of instructions, artefact A) and a live data set, which was then used to generate responses by 3 different creative practitioners. Drawing on complexity theory and system art, this concept allowed the outcomes to be undefined and emergent. The work allows us to question the tensions between perceptions around craft-making as generative, complex, messy, intuitive process and code making (i.e. computer programming) as a programmable, linear, constrained and logical process. A symposium bringing together faculty staff from Creative and Cultural Industries at the University of Portsmouth was held in relation to this exhibition, with presentations ranging from crochet to computer games hacking. An artist workshop offered physical interface design exercises working with a live data set. Both events were open to the public.

This portfolio output is based on a trajectory of previous research I have conducted on Haptic Interfaces, embodiment, perception and metaphors in the MEDIATE project, my PhD research and the ‘Affordances4Learning’ project collecting narratives about learning.
Artefact 1: Algorithm – a set of instructions generated from data set

System Rules for Data Handling

1) If the value stays below 120 this is healthy and nothing changes.
2) If the value goes over 1000 state changes to off centre and back (2 sharp intense spikes)
3) If the value is over 120 for more than 2 points on x axis, then state changes to off centre permanently (sustained spikes)
4) If value for 2 parts/graphs is over 50 for more than 2 points on x axis, then add another element which behaves in counterpoint
Artefact 2: “Ship Crew Interface” – on board GUI interpreting the data using the algorithm (visual modality)

Figure 1: Screen photograph of GUI prototype “Ship Crew Interface”
Figure 2: Design sketch interpreting the rules for a graphical user interface
Artefact 2: “CodeEye” - vibrotactile interface interpreting the data into vibration patterns (haptic modality)

Figure 3: Mock-up of “CodeEye” showing location of hand placement and vibration actuators
Exhibition: “Between Craft and Code”

Figure 4: Viewers in front of the “Ship Crew Interface” by Simone Gumtau at the exhibition “Between Craft and Code” 2015
Figure 5: “Textile Data Wall” hanging by Cassi Hill at the “Between Craft and Code Exhibition” 2015
Figure 6: “CodeEye” vibrotactile interface by Simone Gumtau and Simon Kunath at the “Between Craft and Code” exhibition 2015