

Beyond UI Analysis: Modeling Flows of Interactivity

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ABSTRACT

This paper reports from our ongoing research aimed at analyzing and conceptualizing interactive systems. With a point of departure in the notion of ‘dynamic gestalt’ we argue for the need of modeling techniques that make a particular kind of theoretical analysis of interactivity possible. Via three examples we demonstrate a tentative approach for doing this and we discuss how this adds to the existing body of research, in particular how our work contributes to the development of new forms of intermediate knowledge in HCI research including strong concepts and annotated portfolios. We conclude the paper by suggesting that our proposed approach moves beyond traditional UI analysis in HCI and that our approach might lead to new forms of intermediary knowledge that might be suitable for education and research in our field.

Author Keywords

Architecting interaction, Concept-driven interaction design, Dynamic Gestalt, Interactivity, Modeling interactivity.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Within HCI we have seen an increasing interest in design-driven interaction design research, even though it is not an approach that has a concise and generally accepted meaning. One aspect of design-driven research that is commonly recognized is its focus on artifacts as key objects of study. We have in earlier research argued both for a concept-driven design approach [4] and for the creation of explicit methods to characterize designs [5]. Some recent research have made significant progress that can be summarized as a better understanding on (1) how to manifest a particular concept in the design of an interactive system [1,2,4] and (2) how to analyze existing artifacts in

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relation to the design concepts they reflect [1,5,7].

However, in this paper we argue that we also need analytical tools to describe and model interactive systems in terms of their interactive *flow*, *character*, or *dynamic gestalt*. In terms of defining and exemplifying these notions there has already been some work, for instance [3]. However, explicit approaches and analytical tools based on this work are still lacking.

In this paper we discuss the need, purpose and role of such analytical tools and with a point of departure in the notion of ‘dynamic gestalt’ we outline the idea of “modeling interactivity” as a first step in this direction.

INTERACTIVITY & DYNAMIC GESTALT

One core aspect of interactive artifacts is that they are temporal. Interactivity happens over time. It is a back and forth between man and machine in giving and taking of control. It is back and forth in entering or modifying information and receiving information. Interactivity is a constant flow of information exchange, governed by the underlying *model of interactivity* which enable and constraints how the exchange can happen between user and machine.

Depending on their design, different digital artifacts manifest different architectures of interactivity [6]. Some require constant and frequent interaction, some are pushy and demanding, some work in the background and only require infrequent attention from the user. This can be described as the temporal/interactive character of an artifact, or as labeled by [3] the artifacts ‘dynamic gestalt’.

We argue that our field is in need of modeling techniques to capture temporal interactivity into some form that make descriptions, comparisons, and theoretical analysis possible.

MODELS OF INTERACTIVITY EXEMPLIFIED

As a way to illustrate our thinking, we here present three simple examples where the flow of interactivity is fairly distinct and accordingly can be modeled in some isolation.

Our tentative approach to model the flow of interactivity in interactive systems enable us move beyond general labels such as “social media” and instead highlight the particular way interactivity has been designed in a specific systems. For instance, the “share” function/interface element so common nowadays in a wide range of social media systems is in fact fairly differently implemented across different social media systems. The particular way “share” is

implemented lead to very different models—dynamic gestalts. We illustrate this difference in the underlying models of interactivity across three digital services: *Facebook*, *Snapchat*, and *Secret*.

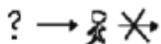
In *Facebook* the “Share” feature enables further sharing of content from person to person to person, indefinitely.



In *Snapchat*, the “Share” feature can be used to share content with another person but once it is viewed it disappears (cannot be further shared)



In the third example, *Secret*, the sender is removed from the underlying model of interaction. Some content is shared from someone (unknown) but cannot be further shared.



So, while these three digital services all support “share”, the underlying model of interactivity is fundamentally different, and makes it possible to distinguish between the three services, not on an interface level of analysis, but related to how each service regulate the flow of interaction.

DISCUSSION AND IMPLICATIONS

We think about the examples above as a way of modeling the dynamic gestalt of a particular interactive artifact. We suggest this tentative modeling technique as a way of moving the analysis of interaction beyond the surface and the interface of a digital artifact. The idea is to analyze how an interactive system manifests, enables, scaffolds and regulates the flow of interactivity. It is also a move away from usability and user experience in the sense that the analysis focuses on the underlying model of interactivity as a way to describe a particular system. The three examples above have distinct models of interactivity that enable different possible actions for the user, but whether or not they are usable or leads to good user experiences is not part of the analysis. In short, our proposed approach enables us to:

- *describe* “the anatomy” an interactive system, or at least some aspects of it. This goes beyond interface-centered interaction design since we look at interactivity from the viewpoint of how the design enable and regulates possibilities for interaction in the digital artifact.

- *distinguish and compare* between different interactive systems. As with the examples, the fact that each social media application has a “share” feature does not mean that they are similar or even related. The underlying model of interactivity points to radically different designs leading to different patterns of use and experiences.

- *suggest* a new type of interactive systems evaluation. Beyond “usability testing” (which actually captures user

experiences of interactive systems) we focus on the anatomy of the artifact per se, i.e. how it is configured.

On a theoretical level, these aspects contribute to existing research in HCI when it comes to the “anatomy” of interactive systems [7]. Further on, our approach is artifact centered. It is an approach aimed at revealing and describing intrinsic properties of designed artifacts in a way that can lead to a better understanding of what kind of interactivity a particular artifact permits, hinders or supports. This way of modeling interactivity can be seen as leading to intermediary knowledge in the sense that it becomes suitable for the description and analysis of particular systems without being a universal theory about interactivity.

Still, what is needed for an approach like this to become established is first of all that a large number of artifacts has to be analyzed. These examples have to be combined with conceptual work on what constitute suitable notations appropriate to capture interactivity flows. Another requirement is that different researchers conduct this kind of analysis on the same digital artifact or system. Such comparative or replication studies would provide materials that would be a start of a pattern resource library of dynamic gestalts. In short, it would enable our community to have more in-depth discussions on different models of interactivity and eventually lead to possible classification and categorizations of interactivity.

CONCLUSION

In this paper we have proposed a tentative approach that could complement existing analytical methods aimed at the examination of interactive artifacts. We propose that such studies should be aimed at the examination of the underlying model of interactivity as to move beyond surface focused analysis of interactive artifacts in HCI. We suggest that this form of intermediary knowledge might be suitable for education and research in our field.

REFERENCES

1. Gaver, B & Bowers, J (2012) Annotated Portfolios, ACM Interactions, Vol 19, Issue 4, 40-49.
2. Hook, K. and Lowgren, J. 2012. Strong concepts, ACM ToCHI. 19, 3, Article 23.
3. Löwgren, J. & Stolterman, E. (2004) *Thoughtful Interaction Design* Cambridge, Mass: MIT Press.
4. Stolterman, E. & Wiberg, M (2010) Concept-driven Interaction Design Research, HCI, 25, 2, p. 95-118.
5. Wiberg, M. & Stolterman, E. (2014) What Makes a Prototype Novel?, in proc. of NordiCHI'14.
6. Wiltse, H. & Stolterman, E. (2010). Architectures of interaction, In proc of NordiCHI'10.
7. Youn-Kyung, L, Stolterman, E., and Tenenber, J. (2008) The anatomy of prototypes, ToCHI 15, 2.

