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Approaching Aesthetics on User Interface and Interaction Design

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Abstract
Although the HCI community inevitably contributes to
engagement via beauty according to the attention paid to
known and yet to be discovered principles of aesthetics for
digital interface design, it is lacking an epistemological
corpus which should include the notion, human factors
and the quantification of aesthetic aspects. The aim of
the proposed workshop is to discuss these issues in order
to strengthen aesthetic studies specifically for HCI and
related fields. We want to create a forum for discussing,
drafting and promoting the foundations for disciplined
aesthetics design within the HCI community. We thus
welcome contributions such as theories, methodologies,
evaluation methods, and potential applications regarding
effective aesthetics for HCI and related fields. Concretely,
we aim to (i) map the present state-of-art of aesthetic
research in HCI, (ii) build a multidisciplinary community
of experts, and (iii) raise the profile of this aesthetics
research area within HCI community.

Author Keywords
Aesthetic design, computational aesthetics, user interface
design, modeling, aesthetic engagement.

Introduction
Aesthetics are influential in how willingly, how comfortably
and how efficiently humans interact with objects, devices,

idea and systems. Nowadays, users are becoming engaged and proactive while using beautiful products, which could potentially help them to enhance their soft skills such as taste, empathy and mindfulness [2, 5]. Meanwhile, the word "aesthetic" has been mentioned in commercial keynote presentations more often than ever before and some technical products have won significant recognition due to their aesthetic excellence [9]. On the other hand, academia, industry in general and the public are beginning to acknowledge serious aesthetic weaknesses in the increasingly extreme and sterile visual presentation of technology. Thus, there is a growing demand to rethink the significance of aesthetics for future design [7].

When aesthetics are regarded as a basic axis for HCI design along with the conventional metric of usability, we may expect all aspects of the industry and consumers at all levels to benefit and be revitalized. Compared with aesthetic studies in other disciplines (philosophy, humanities, architecture, psychology, art, etc.), the study of aesthetics in the field of HCI is in its infancy [1]. The HCI community has striven to contribute aesthetics in terms of disparate concepts, design guidelines, methodologies, prototypes, etc. However, there remains no accessible integrated corpus or forum of research directions or findings regarding relevant principles, factors, elements or parameters for aesthetics specifically for HCI designers, i.e., for user interface and interaction design of layouts, surfaces and spaces.

Addressing these issues, the goal of this workshop is to discuss the basis of aesthetic consensus in HCI design and potential methodologies and strategies to develop an understanding of the aesthetic factors for interactions on surfaces and spaces. We believe this discussion will connect designers and users, humanities and technologies,

and raise awareness of aesthetic significance in HCI.

Relevance to ISS Community
Our world is increasingly comprised of digital interactive surfaces and spaces in diverse modalities. As one of the most professional academic communities for discussing new interactive techniques, the ISS community continues to work on creating unique experiences on user interfaces. Aesthetics research aims to contribute principles of design towards more *comfortable, appealing, satisfying and engaging* interfaces [5] and interaction experiences via the intelligent application of aesthetic principles and by considering aesthetics as a basic and essential aspect in all interface design. The serious research of aesthetics for HCI will contribute to interface and interaction optimization 'across the board'.

Overall, our workshop will provide the community with an opportunity to enrich the research repository through discussing future research directions. Along with continued community building, we expect to raise the general awareness of computational aesthetics among the ISS peers and colleagues.

Workshop Goals
This workshop focuses on developing approaches towards the application of aesthetic design factors for user interfaces and interactions, and it anticipates two general outcomes from discussions:

1. The facilitation of multidisciplinary and interdisciplinary discussion on the aesthetic interface and interaction design within the HCI community from the four threads: theories, evaluation, methodologies, and potential applications;

2. Raise awareness of the importance and potential of

HCI aesthetics within the academic community and establish the path ahead. We expect that future designs could regard the aesthetics metric as an essential aspect and apply aesthetic thinking to practical design. We hope to receive full consideration and achieve appropriate integration into interactive surfaces and spaces of the future.

The workshop seeks to invite broader participation from experts such as designers, researchers, artists and so on from academia and industry and it will gather valuable feedback for further development of HCI aesthetic design, which will contribute to future aesthetics workshops and discussions.

Workshop Themes

We suggest several relevant themes and topics of discussion during the workshop.

The Notion of Aesthetics

This topic focuses on defining "aesthetics" and the "aesthetic perceptions of users" and their general significance in interface and interaction design. We seek to invite views from the perspective of philosophy, HCI, neuroscience, cognitive science, linguistics, etc. By discussing the existing context and ideas, we will be seeking consensus and reliable hypotheses at different levels of aesthetic design.

The Balance between Aesthetics and Engagement

In the conventional perception of designers, aesthetics was described as having a negative influence on usability. But as some past studies have suggested, aesthetics could be synergized with multiple attributes such as usability [8] and engagement factors [6]. Moreover, aesthetics is not simply "what it looks like", but matters the complete user experience. We will discuss the potential synergism between engagement and aesthetics, and how to better support interaction technique performance by intelligently applied aesthetic principles.

Aesthetic Evaluation on Surfaces and Spaces

High complexity means many challenges must be faced regarding the evaluation of surface and space-based interfaces. Conventional Likert-based evaluation methodologies lack precision and cannot accurately reflect the aesthetic perceptions of users. We will discuss existing evaluation methodologies for evaluating aesthetic factors and analyze the advantages and disadvantages of the various methodologies as well as rethink ways to conduct empirical studies. We aim to generate a relatively comprehensive solution to understand the aesthetic perceptions of users regarding surface and space interaction in both qualitative and quantitative directions.

Computational Aesthetics

Empirical studies and metrics-based computational methodologies [3, 4] have been proposed to compute the degree of interface aesthetics, while most of them were expected to improve their quantitative performance. Here we will discuss current state-of-the-art qualitative and quantitative methodologies based on the features of surfaces and spaces. We will analyze and mine the potential and objective factors which comprise interaction aesthetics. We expect to understand the commonality among different modalities and thus seek a computational basis to understand and evaluate aesthetics interaction.

Application on Practical Design

We expect that aesthetics design will concretely help designers to work more creatively, generate more practical design suggestions, and integrate design factors for model-based optimization. We will discuss application

directions and potential visions which aesthetic design is expected to provide. We believe the expected aesthetic methodologies and evaluations will open up new possibilities and opportunities to close the disconnect between designers and users, and help produce aesthetic metrics that will contribute to HCI the community and extend the sensibility boundaries of users.

Planned Activities

The workshop is comprised of morning and afternoon sessions. In the morning session we will provide opening remarks and welcome attendees to the workshop. Then, each attendee will briefly introduce themselves to the group, followed by a relevant presentation. After the morning break, attendees will give short talks on their accepted workshop position papers and related Q&A will be permitted before the lunch break.

During the afternoon session, attendees will be divided into working groups to discuss the proposed workshop themes one by one in terms of views, knowledge and potential solutions addressing the challenge. After the afternoon coffee break, groups will be tasked with summarizing the results of their discussions into the roots of the problem, potential solutions, and opportunities in order to enrich the HCI aesthetics research repository.

Finally, the organizers will share closing remarks and attendees will have an opportunity to share feedback and discuss future directions.

References

[1] Bardzell, J. Interaction criticism and aesthetics. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM (2009), 2357–2366.

[2] Kim, H., and Fesenmaier, D. R. Persuasive design of destination web sites: An analysis of first impression. *Journal of Travel research 47*, 1 (2008), 3–13.

[3] Miniukovich, A., and De Angeli, A. Computation of interface aesthetics. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, ACM (2015), 1163–1172.

[4] Nordhoff, M., August, T., Oliveira, N. A., and Reinecke, K. A case for design localization: Diversity of website aesthetics in 44 countries. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, ACM (2018), 337.

[5] Ren, X. Rethinking the relationship between humans and computers. *IEEE Computer 49*, 8 (2016), 104–108.

[6] Salehzadeh Niksirat, K., Sarcar, S., Sun, H., Law, E. L., Clemmensen, T., Bardzell, J., Oulasvirta, A., Silpasuwanchai, C., Light, A., and Ren, X. Approaching engagement towards human-engaged computing. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*, ACM (2018), SIG14.

[7] Soegaard, M., and Dam, R. F. The encyclopedia of human-computer interaction. *The Encyclopedia of Human-Computer Interaction* (2012).

[8] Sonderegger, A., and Sauer, J. The influence of design aesthetics in usability testing: Effects on user performance and perceived usability. *Applied ergonomics 41*, 3 (2010), 403–410.

[9] Tractinsky, N. Toward the study of aesthetics in information technology. *ICIS 2004 proceedings* (2004), 62.