Mood Adaptive Display Coloring

Utilizing Modern Machine Learning Techniques and Intelligent Coloring to Influence the Mood of PC Users

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Marc Hermann

- Study of Computer Science, Doctoral Thesis 2013 (Ulm University, Germany)
- Certificate of Higher Education Pedagogy (Baden-Württemberg Certificate)
- Software Developer (Inneo Solutions GmbH, Germany)
- Senior Developer (Veroo Consulting GmbH, Germany)
- Since 04/2009 Lecturer for several courses like C, C++, and Java Programming, Software Engineering, Algorithms, Human Computer Interaction (Aalen University for Applied Sciences, Germany)
- Current Research Areas include Topics in Human Computer Interaction, E-Learning, Gamification and Mobile Augmented Reality
Motivation

- colors affect human emotions and behavior (Elliot and Maier 2012)
- emotion can already be recognized and measured quite precisely with machine learning
- goal: improve attention and productivity of work with computer devices
Mood Adaptive Display Coloring

- background activity providing awareness of mood of user
- no interruption in work flow
- basic knowledge of color psychology as foundation
- highly customizable/personalizable
Solution Concept

- modular architecture for high adaptability
- user profiles for customizability
- replaceable interface providing communication between components for high interoperability
- face recognition client for passive mood recognition
- user client for active mood input
Solution Architecture

- core of service is the color server
- hudkit used to provide a color overlay
- communication between color server and hudkit realized by websockets
- color server listens on its d-bus interface for commands
- all clients communicate with server by d-bus interface
- default and user profile are used by color service
Survey

- Online-Survey on colors and associations
- Default profile based on results of survey

<table>
<thead>
<tr>
<th>Color</th>
<th>Ca</th>
<th>V</th>
<th>Sa</th>
<th>Co</th>
<th>M</th>
<th>St</th>
<th>H</th>
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<td>13.38</td>
<td>7.32</td>
<td>9.37</td>
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<td>6.02</td>
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<td>5.44</td>
<td>9.38</td>
<td>8.32</td>
</tr>
</tbody>
</table>

Emotional Connection to Colors Survey, n=522, Values in %
Ca=Calm, V=Vitalizing, Sa=Safety, Co=Concentrated, M=Melancholy, St=Stressed, H=Happiness
Usage Example

A: neutral, B: mad, C: bored
Conclusion

- concept of software reacting on user's mood by changing coloring of display
- survey to identify colors for moods
- fully functional prototype for MAD-Coloring
- concept for case study
Future work

- software improvements, especially in display component
- emotion recognition improvements combining multiple inputs (e.g. facial recognition and health sensors of smartphones)
- study, preferrably long-term study involving medical/psychological professionals
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Questions?

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