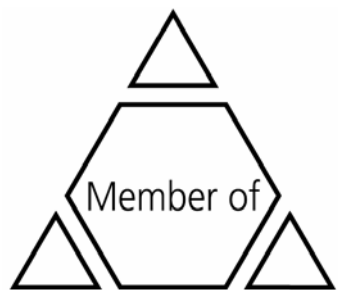


Emotions in HCI

An Affective E-Learning System

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Fraunhofer

Institut
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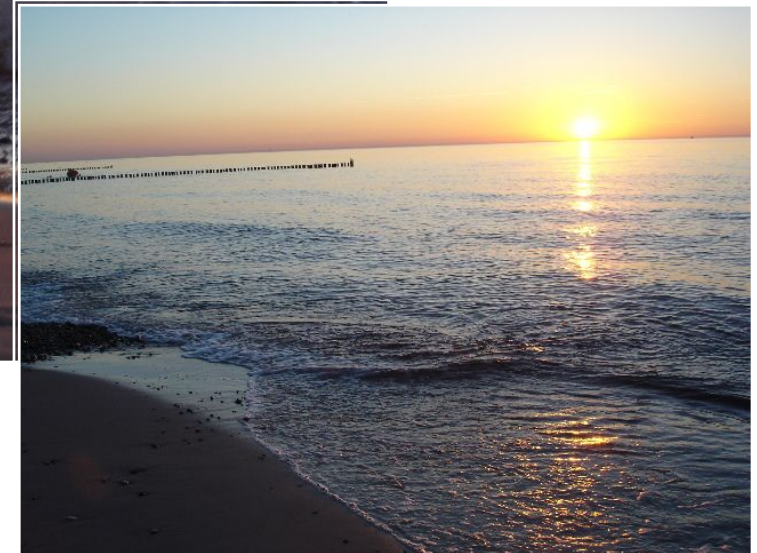
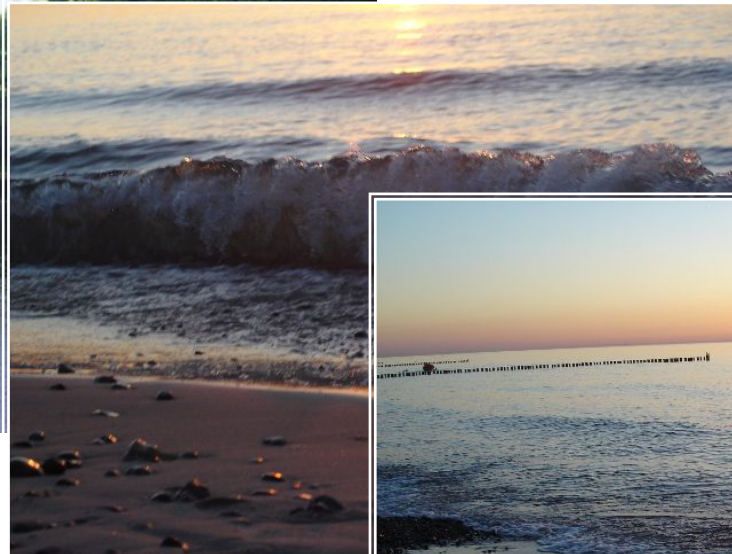
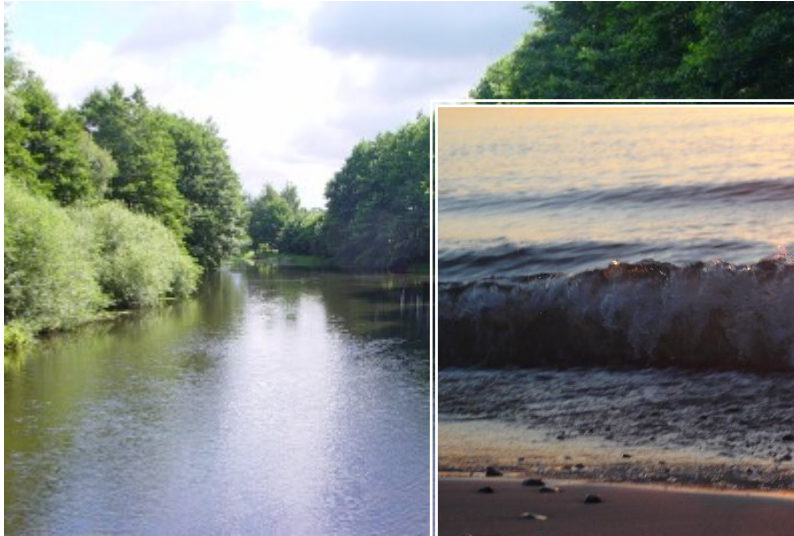




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- Fraunhofer Institute for Computer Graphics
- Emotion Recognition Technologies
- Affective E-Learning System
 - Define negative and target emotions
 - Support user in handling negative emotions
 - Affective measures to counter negative emotions
 - Enable better learning as well as greater satisfaction
 - Pilot study for a first evaluation



- **Fraunhofer Society**
 - Largest research network in Germany
- **Fraunhofer Institute for Computer Graphics Rostock**
 - Shift towards human-computer studies, interaction (HCI)
- **Dept. Human Centered Interaction Technologies**
 - Strives for a better understanding of users' issues at interaction process with computer systems



Emotion Recognition Technologies

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- Emotion detection is the basis of emotion-aware applications
- Emotion recognition sensor system (EREC)
 - Analyse physiological data to deduce emotional states
 - Sensor glove, chest belt and data collection unit
 - Sensors, e.g. for skin resistance and skin temperature
 - Wireless





Affective E-Learning System

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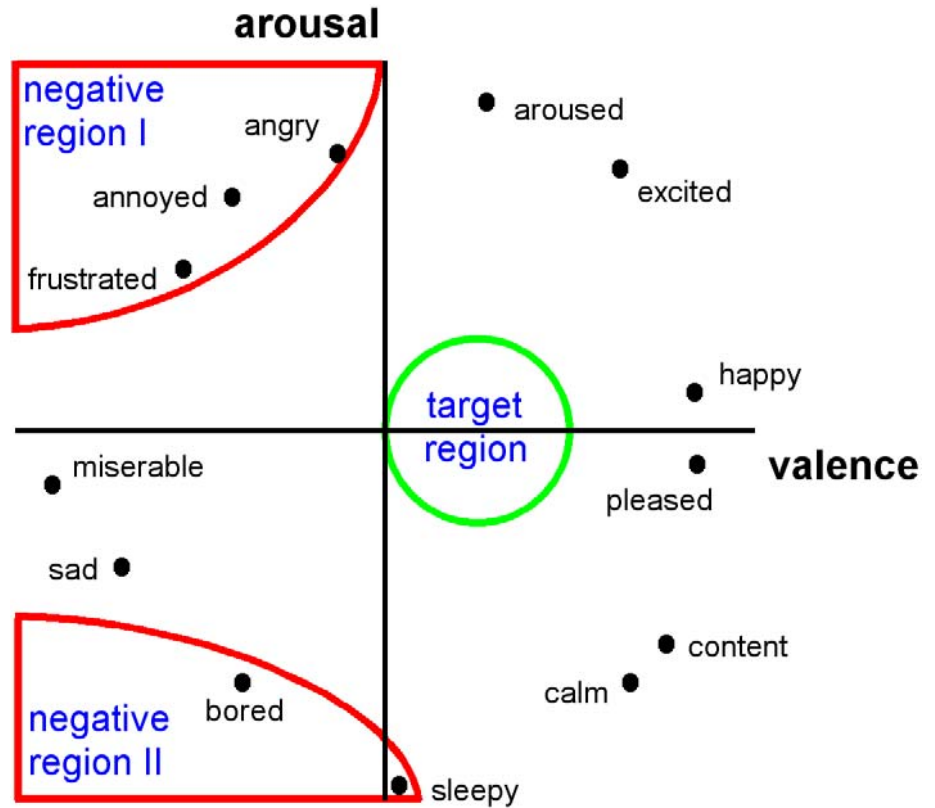
- Affective Computing
 - "... computing that relates to, arises from or deliberately influences emotions (Picard 1997)
- Why should we consider emotions?
 - Emotions are essential part of human communication
 - -> considering emotions means to create a more comfortable learning atmosphere
 - Negative emotions like angeriness or boredom reduce performance
 - -> considering emotions means to create a more successful learning atmosphere
- Many other domains exist



Affective E-Learning System

■ Negative emotions and target emotions

- Negative region I: anger, annoyance, frustration
- Negative region II: boredom, sleepiness
- Target region: best suited for learning





Affective E-Learning System

■ What else is needed? Affective measures!

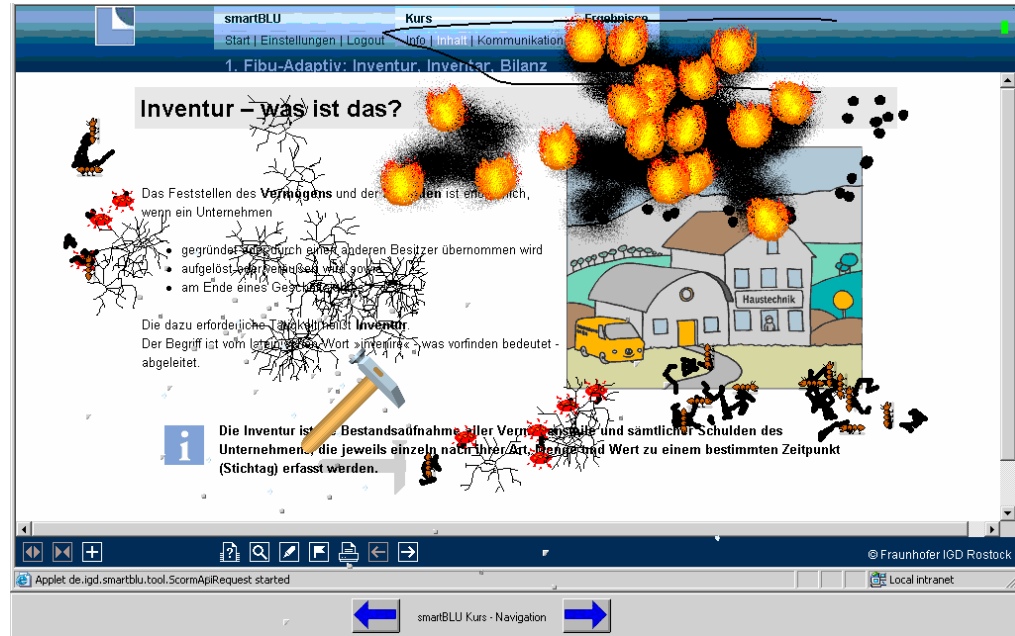
| Region | Measures | Class of measure |
|---|---|--|
| Region I (anger, annoyance, frustration) | Change of lesson Let user express displeasure Communication with agent Stress relief Suggesting a short break Mood induction | Application-dependent Application-independent Application-independent Application-independent Application-independent Application-independent |
| Region II (boredom, sleepiness) | Starting a quiz Using multimedia instead of text Verbal motivation Starting a game for a short while Mood induction | Application-dependent Application-dependent Application-independent Application-independent Application-independent |



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- Example measure
 - Stress relief



- ... and putting it together: affective procedure
 - Observing the user
 - If one emotional region persists, select an affective measure
 - Suggesting the measure, if accepted execute.



Affective E-Learning System

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- Pilot study for testing the implemented prototype
 - Learning management system smartBLU was used (www.smartBLU.de)
 - Two testing groups, control group and affective group, each with 5 test participants

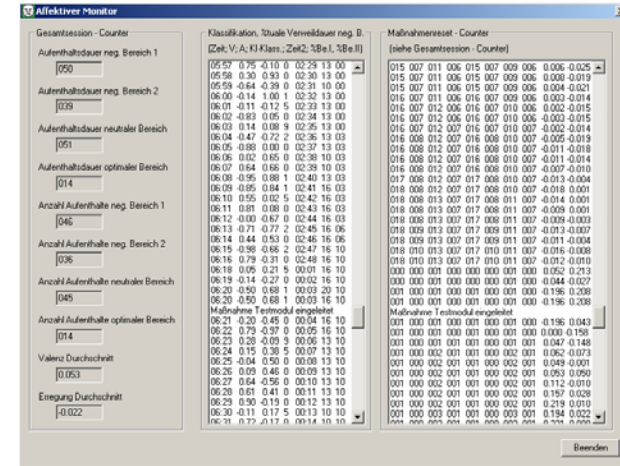
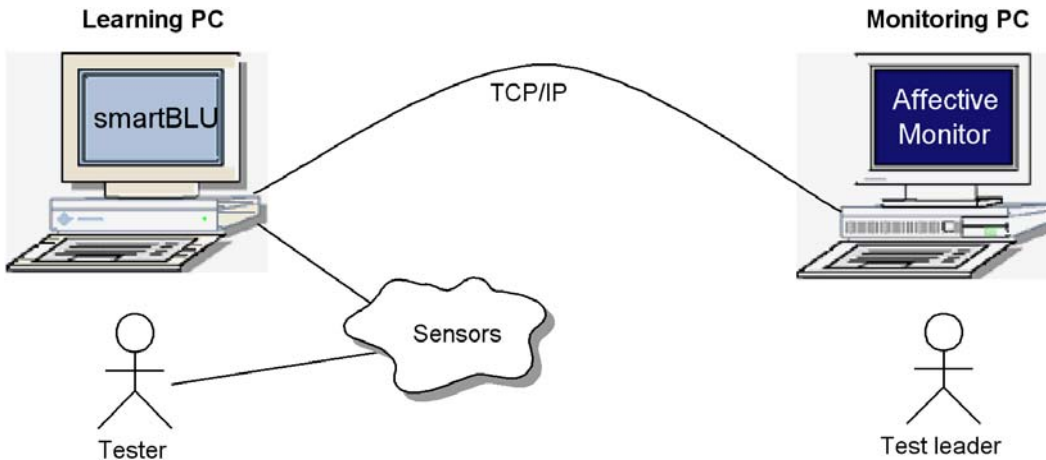
- Three questions should be clarified
 - Are users more pleased when using the affective version of smartBLU?
 - Is a greater success in learning achievable?
 - Do users of the affective version of smartBLU stay less at the negative regions I and II and stay longer at the target emotional region?



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- Setup of the pilot study
- Lesson: Financial Accounting
- Affective Monitor





Affective E-Learning System

■ Findings

- Tendency towards the expected results
- Success of learning of the affective group was slightly better
- Results regarding the other questions were ambiguous
- Possible causes: measuring inaccuracies, limited number of test participants, limited test duration

■ Future work

- Presented approach first attempt of making smartBLU affective
- Selection of measures based on information about the user
- Affective procedure needs to be adapted based on experiences with the individual user
- More extensive studies for final evaluation



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Questions?

Thank you!