Workshop: “Subliminal Perception in Cars”

AutomotiveUI 2011
3rd International Conference on Automotive User Interfaces and Interactive Vehicular Applications, November 29-December 2, 2011, Salzburg, Austria

Andreas Riener, Institute for Pervasive Computing, Johannes Kepler University Linz
Manfred Tscheligi, ICT&S Center, University of Salzburg
Myounghoon Jeon, Sonification Lab, Georgia Institute of Technology
Joseph Fellner, AUDIO MOBIL Elektronik GmbH, Austria
Organizational: Welcome Address

Introduction
- Welcome to AutomotiveUI 2011 in the famous city of Salzburg…
- Must do's/see's in Salzburg
  - taste a Mozarkugel (only the original from "Mirabell")
  - visit Mozart birth place and living place
  - stroll around the "Getreidegasse" (beautiful shopping alley)
  - drink a punch and eat roasted almonds/chestnuts at the Christmas Market (Domplatz)
- Short presentation of passive participants / short introductory round before start?
- Write down questions / comments / research challenges / ideas which come up during the presentations (→ Post-it)

Aim of the workshop
- At the end of the day we would like to have a work program (trends, challenges) in the field of subliminal perception/persuasion for both research and industry
### Organizational: List of Participants

#### Attendees

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<tr>
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<th>Name</th>
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<tr>
<td>1</td>
<td>Peter Sinclair</td>
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<td>Stefano Damiano Barbati</td>
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<td>Myounghoon Jeon</td>
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<td>Joseph Fellner</td>
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<td>Andreas Riener</td>
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<td>McCall Rod</td>
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<td>8</td>
<td>Hackenberg Linn</td>
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<td>Erik Borg</td>
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<td>Wybranski Bernhard</td>
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<td>Kluckner Patricia</td>
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<td>Gridling Nicole</td>
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Organizational: **Sensory Modalities**

Position papers and modalities addressed

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<th>V</th>
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V... Visual  
A... Auditory  
T... Touch, tactile  
O... Olfactory  
G... Gustatory
## Organizational: Time Plan for the Workshop

### Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>09:00-09:15</td>
<td>Opening and introduction</td>
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<tr>
<td>09:15-11:30</td>
<td>Presentation session&lt;br&gt;6 presentations (15min. each, accepted position papers see below)&lt;br&gt;Session chair: Andreas Riener</td>
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<td>11:30-11:45</td>
<td>Coffee break</td>
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<td>11:45-12:35</td>
<td>Group work I&lt;br&gt;(2 parallel groups 40min., short presentations à 5min., discussion round 5min.)&lt;br&gt;Group leaders/presenters: assigned during workshop</td>
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<td>11:35-13:25</td>
<td>Group work II&lt;br&gt;(2 parallel groups 40min., short presentations à 5min., discussion round 5min.)&lt;br&gt;Group leaders/presenters: assigned during workshop</td>
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<td>13:24-13:40</td>
<td>Closing&lt;br&gt;(wrap-up, ident. of key points, next steps, follow-up Journal Special Issue, conclusion)</td>
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<td>13:40-15:15</td>
<td>Joint lunch</td>
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<td>afternoon</td>
<td>Poster preparation for the Conference poster session (Organizers)</td>
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Passive participants: Stand up and join in the conversation
Organizational: **Presentation Session**

**Presentation order**

- Andreas Riener, *Information injection below conscious awareness: Potential of sensory channels*, JKU Linz, Austria
- Peter Sinclair, *Road Music – Music for your drive from your drive*, ESAA, UAL, University of Newcastle, France
- Angela Mahr, *From Spearcons towards ‘Semanticons’: Transferring Crossmodal Speech Priming of Visual Objects to the Driving Context*, German Research Center for Artificial Intelligence (DFKI), Germany
- Joseph Fellner, *Subliminal Perception in Cars from the Automotive Industry’s Perspective*, AUDIO MOBIL, Ranshofen, Austria
- Marco Pasetto, *Experimental investigation on speed control using a driving simulator*, DCT - University of Padua, Italy

*We invite passive participants to briefly (3-5min.) talk about their research interests in the field of subliminal perception/the reason for attending the workshop*
Organizational: **Coffee Break**

11:30 – 11:45
Organizational: **Group work I**

2 parallel groups

Peter Sinclair
Hackenberg Linn
Wybranski Bernhard
Joseph Fellner

Angela Mahr
McCall Rod
Erik Borg
Stefano Barbati
Kluckner Patricia

(Myounghoon Jeon*) (Andreas Riener*)

**Organizational**

- 40min. discussion time; summary on a poster/PPT slide
- 5min. short presentations by the group (one dedicated person)
- 5min. joint discussion
Organizational: **Group work I**

Explore possible **application domains in cars**

Please discuss and summarize your group's position:

- Why subliminal perception in the car?
  - potential to increase safety and decrease workload and what…?
  - does it add values to driving itself, infotainment/entertainment/human factors such as emotions, fatigue, stress, etc. (or in general primary/secondary/tertiary tasks)?
Def: Subliminal
- unconscious
- not recognized (yet)
- not possible to verbalize

Applications
Use Cases

- Keep the drivers in the reality loop
- Well-being/ Hygiene factors
- UX Attractive
  - User experience
  - Entertaining
- Suggestions
- Information
  - Which might get dangerous
- Pre-warning
  - To enhance reaction
- Pre-alert
SUBCUMINAR

CONTINUOUS

CONTEXT RELATED

RESPONSE

INFLUENCES BEHAVIOR

AFFECTS REACTION

ONE DIMENSIONAL

LIFE THREATENING

USUAL

SUBCUMINAR IN A CAR CONTEXT

YES, WE HOPewe CAN OVEU'S INFO WITH LESS COST. MENTAL COST.
Question: What is subliminal (definition required before discussion)?
- unconscious, not recognized, not possible to verbalize
- can we differentiate levels of subliminal stimuli?

Example of subliminal perception in the car
- the moment you seat down on the seat you feel the contact with the chair; if everything is ok/perfect (temperature, seat cushion, etc.) you stop thinking about the seat; you perceive it further only subliminally as long as there is no critical aspect emerging…

Subliminal perception/effects is/are extremely different to documentate, to test, to repeat…

The border between conscious and un-(sub- )consciousness is very vague…
- large spectrum, continuum, …

Subliminal effects in a real driving situation are always different to a lab situation
- test on subliminality should include driving in the wild!
Organizational: **Group work II**

2 parallel groups (composition changed!)

- Angela Mahr
- Hackenberg Linn
- Wybranski Bernhard
- Joseph Fellner
- Stefano Barbati
- Peter Sinclair
- McColl Rod
- Erik Borg
- Kluckner Patricia

(Myounghoon Jeon*)

(Andreas Riener*)

**Organizational**

- **40min.** discussion time; summary on a poster/PPT slide
- **5min.** short presentations by the group (one dedicated person)
- **5min.** joint discussion
Organizational: **Group work II**

**Design a novel interface/application** based on / using subliminal perception

Please discuss and summarize your group's position:

- **Title**
- **Goal/mission statement**
- **Modalities (I/O)**
  - using technologies available within 5-7 years
- **Who/what situation/When**
  - e.g. restriction in time of use (day, night), situation (highway driving, city traffic, in a traffic jam)
Effortless ECO

- Visual
  - ambient lighting
  - green & brown grass & plants

- Auditory
  - speed up/more fast
  - environmental noise
  - drive electrically
  - silence / music

- Tactile
  - seat vibrations (speed ⇐)
    ⇐ ➔ soft / hard
  - tiny movement
  - tightens & "embraces"
  - kick-down feedback (4/13/12/11)

- Olfactory
  - good smell for ecological driving
    - "fresh air"
    - punishment ↓
1. 

2. ATTENTION IS GOING DOWN.
   - COGNITIVE UNDERLOAD.

3. 

4. BACKGROUND COGNITIVE STIMULATION.
   - WAVES UP
   - SHAKES YOU UP WITHOUT BEING TO PUSH
Group Work II (Novel Applications based on Subliminals): Lessons learned

- Group 1 - "Effortless ECO"
  - visual: ambient lighting (light changes from red to green) / if driving ecologically plants get green (environment looks nicer...)
  - auditory: if driving unecologically environmental noise becomes louder and music fades out (disturbing the driver)
  - tactile: kick-down feedback (e-vehicles) // seat vibrations (speed, frequency) inflating seat to adapt the driving behavior (from soft to hard) // seat moves front and back
  - olfactory: "good smell" for ecologic driving; what for punishment?

- Group 2 – "Shake you up without being to push"
  - when driving on a straight road for a long time (highway) attention is expected to go down → cognitive underload (how to detect, react on), "coffee required to wake up..."
  - how to stimulate your cognition?
  - gradually increasing transition from unconscious to conscious...
Organizational: Closing

Wrap-up

- Identification of key points
  - from group discussions (posters)
  - automotive industry perspective

- Issues/ideas brought up during the workshop will be further discussed after the event → post-conference conclusive paper…
  - email list, Wiki on the workshop web page to facilitate continuing activities
  - follow-up workshop planned for
    > general HCI related conference
    > AutomotiveUI 2012

- Publication of workshop contributions (papers)
  - propose a special issue (MIT Presence, etc.), invite participants to submit extended versions of the papers in the follow-up journal special issue

- Conclusive remarks: thanks to reviewers…
Organizational: Closing

Thanks to all the Reviewers/TPC

- Miriam Reiner, Technion, Israel Institute of Technology, Israel
- Bruce Walker, Georgia Tech, USA
- Michael Nees, Lafayette College, USA
- Pierre Chalfoun, University of Montreal, Canada
- Alexei Sharpanskykh, VU University, Amsterdam, The Netherlands
- Duncan Brumby, University College London (UCL), Great Britain
- Linn Hackenberg, Volkswagen AG, Germany
- Matthew Fullerton, Technical University Munich (TUM), Germany
- SeungJun Kim, Carnegie Mellon University (CMU), HCII, USA
- Ignacio Alvarez, Clemson University, USA
- Nicholas Kelling, University of South Florida, Polytechnic, USA
- Helen Harris, Stanford University, Virtual Human Interaction Lab USA
- Bastian Pfleging, University of Stuttgart, Germany
- Gerold Hözl, University of Linz, Austria
- Marc Kurz, University of Linz, Austria
- Dagmar Kern, Bertrandt AG, Germany
- Christina Dicke, Relevantive AG, Germany
- Joseph Fellner, AUDIO MOBIL Elektronik GmbH, Austria
Organizational: **Hungry?**

Last but not least... lunch options

- **Mensa Toskanatrakt**, Churfürstenstraße 1
  - [http://www.mensen.at/](http://www.mensen.at/)
- **Universum**, Hofstallgasse 2-4
  - [http://www.uni-salzburg.at/portal/page?_pageid=1425,523050&_dad=portal&_schema=PORTAL](http://www.uni-salzburg.at/portal/page?_pageid=1425,523050&_dad=portal&_schema=PORTAL)
- **Sarastro**, Wiener-Philharmoniker-Gasse 9
  - [http://www.sarastro.co.at/](http://www.sarastro.co.at/)
- **Triangle**, Wiener-Philharmoniker-Gasse 7
  - [http://www.triangel-salzburg.co.at/](http://www.triangel-salzburg.co.at/)
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