

MAHNOB

**(Multimodal Analysis of Human Nonverbal Behaviour in
Real-World Settings)**

Maja Pantic

Imperial College London, Computing, UK
University of Twente, Computer Science, NL

Career: Important Milestones

➤ Education:

- Oct. 2001 -- PhD in Computer Science, TU Delft, NL
- Feb. 1997 -- MSc in Computer Science, TU Delft, NL

➤ Positions held:

- 2006 -- now: Reader in Multimodal HCI, Imperial College London, UK
- 2006 -- now: Professor in Affective Computing, University of Twente, NL
- 2005 --2005: Visiting Associate Prof. in Multimodal HCI, CMU, USA
- 2001 -- 2006: Assistant and later Associate Prof. in HCI, TU Delft, NL

➤ PI of externally funded research projects:

- 2008 -- : Semaine (FP7 STREP), MAHNOB (ERC StG), SSPNet (FP7 NoE)
- 2004 -- 2006: MultiMediaN Project on Multimodal HCI (NL Sci. Ministry)
- 2002 -- 2006: Innovation Grant (NL Research Council; 1 of 7 best in NL)

Career: Collaborations & Visibility

➤ Editorial Boards:

- 2004 -- now: IEEE Trans. Systems, Man & Cybernetics - Part B
- 2006 -- now: Int'l J. Image & Vision Computing

➤ Conference Organisation & Program Committees:

- General Chair: IEEE Face & Gesture Recognition 2008, BNAIC 2008
- Organisation: IEEE SMC'04, AI4HC at IJCAI'07, IEEE CVPR4HB'08
- PC: ACM Multimedia, ACM IVA, IEEE CVPR, IEEE SMC, IEEE ICME,...

➤ Collaborators:

- University of Illinois, Urbana Champaign, USA (7x paper, until 2008)
- MIT, USA (5x paper, until 2008)
- CMU, USA; TU Sydney, Australia; QMUL, UK; ... (2x paper, until 2008)

Career: Publications & Talks

➤ Publications:

- 2000: Pantic & Rothkrantz, IEEE TPAMI paper, 397 citations
- 2000: Pantic & Rothkrantz, Int'l J. IVCJ paper, 122 citations
- 2003: Pantic & Rothkrantz, Proceedings of the IEEE paper, 161 citations
- ...
- 2007: Valstar & Pantic, ICCV'07 HCIW, Best Paper Award

➤ Talks, Media Coverage, Prizes, etc.:

- Invited Talks (32 in total) including Key Note at AIAI'06, ICT Delta'07, ...
- Media Coverage (34 in total) including NL TV Channel 1 (2005), NL TV Channel 3 (2006), New Scientist (2007), ...
- Microsoft MSc Thesis Award in CS: M. McCormack (supervised by Pantic), BCS Award for the Best AI Demo (2007), ...

➤ PI -- Final Marks: 4,86 / 5

MAHNOB: Humans & Computers (HHI & HCI)



Humans & Computers: Present → Future

Human-Computer Interaction:



keyboard

mouse



touch screen



joystick

Direct
manipulation

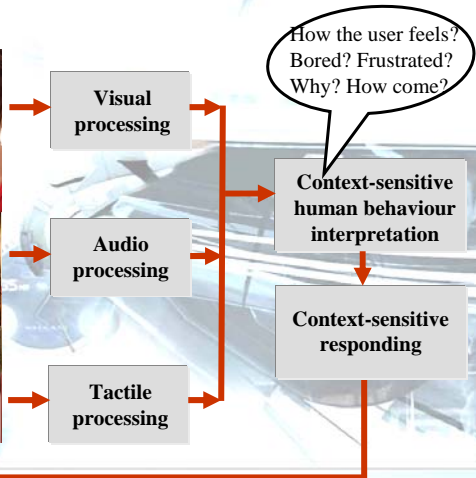
Current HCI-designs are single-modal and context-insensitive

Human-Human Interaction:



Simultaneous employment of sight, sound and touch

HCI Future: Human Behaviour Sensitive HCI



MAHNOB: Machine Analysis of Human Behaviour

The expected result after 5 years is MAHNOB technology that can:

- analyse human naturalistic behaviour from facial expression, gaze, body/ hand gestures, vocal intonation, vocal outbursts
- interpret human behaviour in terms of mental states (fatigue, confusion, distress), social signals (mirroring, agreeing)
- perform robustly, in (near) real time, and (possibly) in a person-profiled manner (using robust observation models, learning person-specific behaviour, etc.)
- supply a large, annotated dataset of audiovisual recordings to the community (basis for benchmarking the efforts in the field)

MAHNOB: Proof of Concept

Office Scenarios **HCI:**



audiovisual analysis of mental states
(fatigue, confusion, distress)

Deception Detection in **HHI:**



audiovisual analysis of deceit/ veracity
(based on facial/body gestures, social
signals, vocal outbursts, prosodic cues)

MAHNOB: Innovation

➤ **Application Level:**

multimodal analysis of human natural/spontaneous behaviour

- analysis of volatile affective behaviour in HCI office scenarios
- analysis of deceptive and truthful behaviour in HHI interview settings

➤ **Methodology Level:**

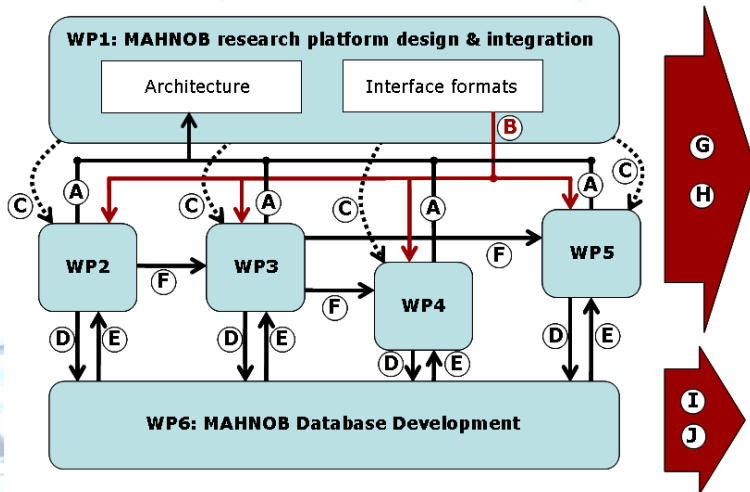
multimodal data fusion, behavioural dynamics analysis, benchmarking, etc.

- at which data-abstraction level should multi-sensorial data be fused?
- how to model temporal correlations across different modalities?
- how to define the relationship between a datum and the system performance?
- ...

➤ **Technology Level:**

- (near) real-time, robust, adaptive processing of audiovisual behavioural data
- MAHNOB research platform, MAHNOB database

MAHNOB: Work Plan



Conclusion

- **MAHNOB budget:** 1.78 M€
- **Research Project -- Final Marks:** 4,61 / 5
- **ERC StG Program overall:**
 - very prestigious, not really easy to get (2,5% - 3% success rate)
 - fantastic career boost, possibility for long-term independent research
 - a bit long bureaucratic process but no bad experiences overall