

# Emotions for user friendly multimodal interfaces

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**humaine**

<http://emotion-research.net>

# Emotion, computing and HUMAINE

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## HUMAINE (2004-2007) reflects

### ◆ consensus

- ➔ that IT should be addressing issues related to emotion

### ◆ judgment

- ➔ that a strategy is needed – tactics are not enough
- ➔ key parts of the strategy lie outside IT

# Emotion, computing and HUMAINE

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## Aims of this talk:

- ◆ convey what we are doing that might interest you
- ◆ invite ideas about common causes
- ◆ Selective – priority on less familiar areas
- ◆ for detail, see our portal

**<http://emotion-research.net>**

# 1. Thinking through the subject matter

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## The word emotion covers

### ◆ 'episodic' emotions

- ➔ distinctive, short-lived states where emotion dominates person's perceptions, feelings, inclinations

### ◆ 'pervasive' emotion

- ➔ 'colouring' that is an integral part of any state, central to way we prioritise people & things, value, react to them

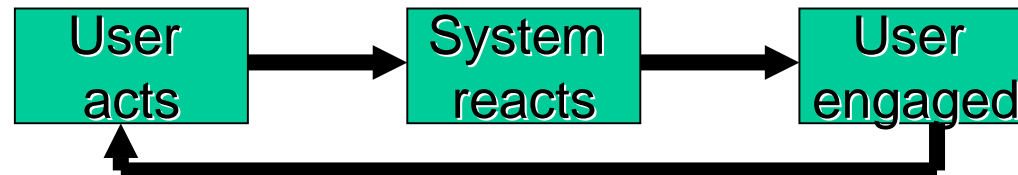
HUMAINE is explicitly committed to look beyond episodic and study emotion in a broader sense – partly because that seems the key to widespread application

## 2. Thinking through the applications

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### Short term

- ➔ Trouble shooting
  - call centres; stress, lying; bad attitude?
- ➔ Affective selection
  - music to suit your mood, types of holiday, segments of meetings
- ➔ Affective loops
  - museum guides, chatbots



## 2. Thinking through the applications

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**Watershed** – ‘*really natural language processing*’

- ➔ Emotional colouring is integral to spoken exchanges
- ➔ People react badly if discourse follows other rules, but ignores the emotional ones
  - match general tone
  - pick up topics that interest the other
  - avoid topics that cause distress or boredom
  - repair ill feeling ...

Handling enough emotional colouring to be acceptable is unspectacular – but very hard.

## 2. Thinking through the applications

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### Long term (beyond the watershed)

- ➔ Uncovering feelings
  - key to market & political research; careers advice; non-directive counselling; personalised entertainment
- ➔ Facilitating learning
  - taking account of emotional issues that affect absorption (multiplication or manuals)
- ➔ Moulding
  - changing user's outlook, values, priorities ...

(but do we really want emotionally sophisticated persuaders with infinite patience and no conscience?)

### 3. Thinking through the ethics

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People are intensely sensitive about things that touch their emotions –

If we ignore that, we will get lawyers and/or protestors.

So, research incorporates an ethical strand.



## 4. Acquiring an empirical base

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### Why we need samples of behaviour

#### ◆ Supportive

- fill in / check details of processes we 'understand'

#### ◆ Provocative

- collect examples that help people to expand and restructure their thinking about the area

Not least, clarifying what pervasive emotion looks and sounds like

## 4. Acquiring an empirical base – samples of behaviour

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### ◆ Acted data?

- convenient, but usually episodic
- and techniques based on it don't generalise

### ◆ Call centre data?

- limited relevance (emotions as trouble)
- low data rate

### ◆ Opportunistic

- 'gold standard', but quality and data protection issues

### ◆ Elicited

- techniques to tap emotion in action & interaction

## 4. Acquiring an empirical base – samples of behaviour

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### Elicitation

- ◆ "sensitive artificial listener" chatbot
- ◆ driving simulator
- ◆ computer games
- ◆ ...

We are committed to making data available to community

## 5. Techniques for describing emotional content

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### ◆ Categorical

- familiar, but can it capture everyday colouring?

### ◆ Dimensional

- evaluation (how +ve or –ve does the agent feel?)
- activation (how dynamic or inert is the agent?)
- power (the agent feels in control or at risk?)

### ◆ Appraisal – perceived attributes of situation

- suddenness                      high
- relevant to                      body
- anticipation                      dissonant
- urgency                          very high

- (these values = fear)

## 6. From signals to emotion labellings & back

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### ❖ Five main channels

- ➔ Visual – face
- ➔ Visual – body movement
- ➔ Acoustic – verbal content
- ➔ Acoustic – paralinguistic
- ➔ Physiological – heart rate, blood pressure, temperature, GSR, EMG

## 6. Multimodal signals to emotion labellings

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### ◆ Associating emotion descriptors

- ➔ A machine learning problem – SVM's, HMMs, ANNs?
- ➔ With what units?
- ➔ Before or after integrating modalities?

### ◆ Integrating modalities

- ➔ additive?
- ➔ some have priority?
- ➔ priority attention-driven?
- ➔ time interval for integration?

## 6. Emotion labellings to multimodal signals

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### ❖ Generation=inverse of recognition?

➔ Sadly, no

### ❖ Core issues at this stage:

➔ believability

➔ dynamicity

➔ multimodal coordination

## 7. Modelling emotional states

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- ◆ The useful information is not labels per se, but what it means to be in a particular state:
  - ➔ how **A** perceives the current situation
  - ➔ what **A**'s priorities might be
  - ➔ what **A** might do next
  - ➔ how **A** might regard system responses
  - ➔ reasons for **A**'s current state

= “empathy” – a simulation of **A**'s emotional world



## 7. Modelling emotional states

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- ◆ How to achieve “empathy”?
- ◆ Model different facets of emotion
  - ➔ selective, evaluative, linked to potential actions
- ◆ How to implement?
  - ➔ traditional AI (purposeful representation);
  - ➔ neural nets (subsymbolic);
  - ➔ artificial life (link to action and survival)

We aim to develop a ‘blueprint’ specifying capabilities needed in an agent that simulates emotion

# Conclusion

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- ◆ Every slide represents a research specialism
  - ➔ for more, deliverables on [emotion-research.net](http://emotion-research.net)
- ◆ The challenge:
  - ➔ to get the areas established & developing within a shared framework
  - ➔ and linking effectively with other groupings

If we can achieve that, we will celebrate  
(and so will our computers)