Artificial emotions

Mini-Challenge Research Manifesto

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Why Spock couldn't evolve

- The negative view of emotion (Plato)
- The positive view of emotion
- Functions of emotions:
  - communication / signalling
  - cognitive:
    - focusing attention
    - prioritising goals
    - shaping memory
    - influencing decision-making

Why give machines emotions?

- Intelligent autonomous robots, monitors (security, health), environments & tutors
- Entertainment (movies, games)
- Artificial companions & caregivers
- Modelling:
  - Personality & psychopathology (individuals)
  - Evolutionary psychology (societies)

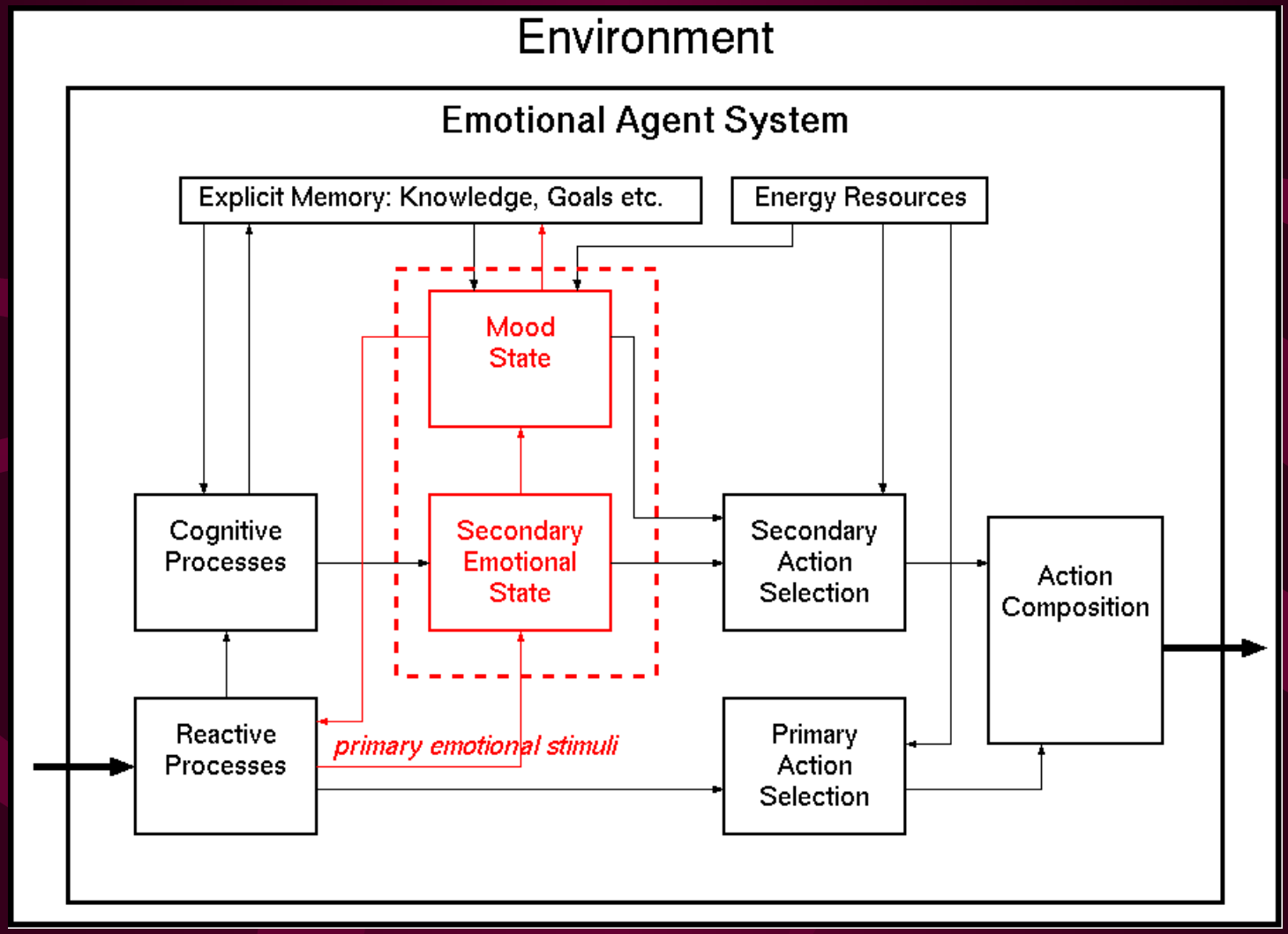
Other applications of affective computing

- Human-Computer Interaction
- Richer and more appropriate intonation patterns for voice synthesisers
- ‘Sensitive clothing’ – accessories with embedded sensors for monitoring and reflecting emotional states
- Cognitive-emotional rehabilitation for people with emotional disorders

Emotions in Agent Control

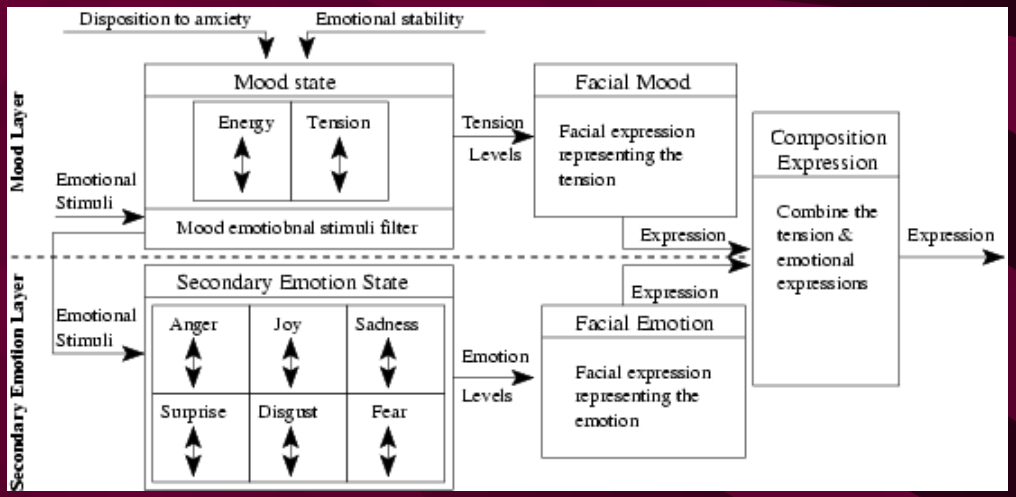
- Emotions evolved as an integral part of animal intelligence
- *Hypothesis: provide durative state for adaptive coherence in action selection.*
- No existing code library supports this.
  - Sloman (1999) – CogAff
  - Canamero (1998)
  - Breazeal (MIT) – *Kismet*

Emotions and intelligent control



We Aren't Trying to Build Souls!

- Emotions' role in Intelligent Control



- Recognition of Emotions in Others
- What Emotions Feel Like

Research Programme

- First Five Years: Build Interactions
  - Tools, Vocabularies, Perspectives, Constraints
  - Life Sciences and Artificial Life Models
  - Psychology, Neuroscience, Anthropology
    Philosophy
- Next FiveYears: Build Applications
  - Control Systems to Industry
  - Tools and Science to Clinical Psychology

Challenges for the 1st Five Years

- Understanding the individual origins and utility of primary emotions.
  - Associated cognitive (learning, control, reasoning) impairments with emotional deficits?
  - ALife models of their adaptive advantage?
- Counting / Naming `primary' emotions.
- Developing accessable tools for simulating different emotional agents.

Examples of UK Expertise
(our collaborators)

- Professor Ray Dolan, Institute of Cognitive Neurology, University College London
- Professor Simon Baron-Cohen, Experimental Psychology and Autism Research Centre, University of Cambridge
- Professor Aaron Sloman, Computer Science, University of Birmingham
- Professor Chris Melhuish, Intelligent Autonomous Systems Lab, University of the West of England
- Dr Lola Cañamero, Computer Science, University of Hertfordshire

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Integrating research in the UK

- Interdisciplinary research: involves AI, Psychology, Neuroscience, Anthropology.
- Sufficient existing expertise in the UK to enable development of a significant research program in affective computing.
- The expertise is currently fragmented and needs to be brought together and focused.
- UK should be competitive with the US and Japan in this field.