Feeling and Reasoning: a Computational Model for Emotional Agents

João Dias, Ana Paiva
Motivation

- Interactive Virtual Environments
  - immersive and motivating
  - “safe” learning environment
  - can facilitate social learning

- How to create autonomous characters for IVEs that:
  - Are believable and allow the establishment of emphatic relations by the users
  - Have reactive/cognitive capabilities
  - Allow the user to interact with them (by receiving suggestions)
Emotions and Personality

- Emotions and personality as the key to believability (traditional animators):
  - Clearly perceivable emotions and personality
  - The character’s behaviour must be influenced by it’s emotional state and personality

- Emotion defined as a valenced reaction to an event (OCC)

- Personality
  - Goals
  - Action tendencies
  - Emotional Reaction Rules
  - Emotion thresholds and decay rates
Proposed Model
Deliberative Appraisal

- Prospect based emotions generated by the state of plans in memory (Gratch)
- When a event is perceived:
  - Plans are updated accordingly
  - Active pursuit goals are checked for activation
    - Trigger initial hope/fear emotions
- The process of plan focus also generates emotions
Reasoning (Focus)

In each reasoning cycle:

- A goal is selected as the focus of attention
  - The one that generates the strongest emotions (Sloman)
- The goal’s best plan is brought into focus
- The plan generates emotions:
  - Hope for achieving the goal
  - Fear for not achieving the goal
  - Fear for not preserving an interest goal
Reasoning (Coping)

- Coping strategies applied to the plan depend on the emotional state

- Problem-focused Strategies
  - Planning (by adding actions, ordering constraints)
  - Execution

- Emotion-focused Strategies (Marsella)
  - Accepting a plan’s failure
  - Accepting a goal’s failure
  - Lower a goal’s importance
  - Lower an effect’s probability
User Influence

- Indirect user interaction
  - User suggests a particular goal (advice)
  - Character raises the importance of that goal
  - The goal will generate distinct emotions which will lead to different coping strategies
Results

- Did you feel sorry for any character? (yes:11; no:0) Whom did you feel sorry for? (John:9; Paul:2, Luke:0)
Results

- 1) Did the conversations seem real? (yes-1; no-5)
- 2) Were the conversations (interesting-1; boring-5)
- 3) Did the victim follow the advice? (yes-1; no-5)
- 4) Did you help the victim? (helped a lot-1; no-5)
Achievements

- Emotional Based Architecture
  - Influence of emotions and personality in reasoning and action selection
- Characters are designed by specifying personality
- Believable Autonomous Characters
- Combines Reactive and Cognitive capabilities (both related to emotions)
Problems

- Confusion about concepts in literature (quoting Rene “the notion of emotion is murky”)
- Interpreting theories and concepts is “hard” for computer scientists
- OCC theory does not specify effects of emotions in behaviour
- Interaction between low level – high level
  - Deliberative layer allowed to create reactive rules
  - Action expansion
  - Reactive emotions as elicitors of attention