
Emotion

Paul S. Rosenbloom

University of Southern California

June 29, 1997

A Model of Emotion for Soar

- ◆ Provide Soar agents with real emotions
 - Not just ability to understand others' emotions
 - Not just tools for emulation of emotions
- ◆ Listen to Soar as much as possible
 - But also extensively review the literature
- ◆ Only at early stage
 - Reviewing literature
 - Devising initial fragmentary models

Core Hypotheses

- ◆ Key aspects of emotions are architectural
 - They affect behavior without volitional choice
 - They modulate architectural processes
- ◆ Emotions are functional
 - They have to do with survival
 - Some functions similar to old default rules

Components of Emotions

- ◆ Situation assessment
 - Evaluate situation with respect to self
 - Both deliberate and automatic processes
- ◆ Body state (“visceral”) involvement
 - Assessment leads to changes in body state
 - Sensing of body state produces feelings
- ◆ Action consequences
 - Triggered off of assessment and/or viscera
 - Action and/or preparation for action
 - Changes in focus of attention

Some Dimensions of Emotions

- ◆ Intrapersonal versus interpersonal
- ◆ About events versus agents versus objects
 - Based on goals vs. standards vs. attitudes
- ◆ Positive versus negative
- ◆ Intense versus mild

Emotions Related to Goals

- ◆ Happy/**Sad**: Goals **achieved/fail**
- ◆ Content/**Discontent**: Goals **avoided/arise**
- ◆ Gratitude/**Anger**: Goals **aided/thwarted**
- ◆ Like/**Dislike**: Goals **aligned/contrary**
- ◆ **Fear**: Goals **threatened**

Some Functions of Emotions

- ◆ Communication
 - Internal: Primitive and global (across modules)
 - External: Nonvolitional (expressions)
- ◆ Focus of attention
 - Internal: Cognitive
 - External: Perceptual
- ◆ Prepares body (and mind) for action
 - Also automatically generates some actions
- ◆ Reinforcement, evaluation, assessment

What Does Soar Have Now?

- ◆ Impasses/subgoals
 - Potential architectural sources of emotion
 - Primitive, global internal communication
 - Cognitive focus of attention
- ◆ Watch
 - Nonvolitional external communication
- ◆ Default rules, evaluation functions, RESC
 - Non-architectural behavior related to emotions

What is Needed (1)?

- ◆ Assessment
 - Constant assessment of impact of world on self
 - Impact of assessment on architectural state
- ◆ Body state
 - Key correlates of assessment
 - System status (at several temporal granularities)
- ◆ Action consequences
 - Modulatable architectural components
 - External display of emotional levels

What is Needed (2)?

- ◆ Models of specific emotions
 - Including architectural interactions
 - Including functional explanations

Sample Proposal 1: (Dis)content

- ◆ Function of average goal depth over time
 - The lower the average, the more contented
- ◆ Discontentment \implies shrink hierarchy
 - Reject operators that have no-changed
 - Select arbitrarily among tied operators
- ◆ Functions:
 - Keep depth of goal hierarchy within bounds
 - » Broader but blinder version of some default rules
 - Help avoid getting lost in depths of problems
- ◆ *Is meditation “wait”ing at the top-level?*

Sample Proposal 2: Fear

- ◆ Function of world's threat to system's goals
 - May need notion of how important goals are and how threatened they are
 - Need an architectural reflection of this measure
- ◆ Focus attention on escaping threat
 - Narrow perceptual and cognitive attention
 - » e.g., require “escape” operator or have fear impasse
 - » Forces dealing with problem before moving on
- ◆ Alter understanding/evaluation of events
 - With chunking, acts as a negative reinforcer

Summary

- ◆ Emotion/architecture interaction is key
- ◆ May make Soar even harder to use