

# Methodology for Engineering Affective Social Applications

Derek Sollenberger and Munindar P. Singh

North Carolina State University

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# Contributions

**Koko-ASM:** A methodology for engineering affective (i.e. emotional) social applications

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**Koko-ASM:** A methodology for engineering affective (i.e. emotional) social applications

## Key Features

- ▶ generates the artifacts needed to configure our affect modeling tool (Koko)
- ▶ focuses on the interaction among agents
- ▶ supports **expressive** communicative acts

# Outline

## Background

### Appraisal Theory

## Koko-ASM

Koko

Expressives

Methodology

## Evaluation

booST

User Study

# Appraisal Theory for Modeling Affect

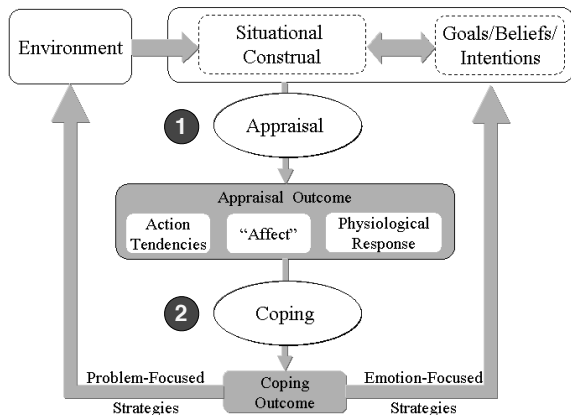


Figure: Smith and Lazarus' cognitive-motivational-emotive model (1990)

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# Koko Overview

## Purpose

Koko enables application developers to focus on the functional and creative aspects of their program instead of the affect model

## How?

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Koko enables application developers to focus on the functional and creative aspects of their program instead of the affect model

## How?

Koko maintains the affect model for the application

The developer provides Koko with...

- ▶ The emotions to model
- ▶ Details about the application's state



# The Expressive Communicative Act

**Expressives** are one of the four major illocutionary communicative acts (Searle, 1970), but have largely been ignored.

## Searle's Communicative Acts

- ▶ Assertives - attempt to inform
- ▶ Directives - attempt to get the hearer to do something
- ▶ Commissives - commits the speaker to some future action(s)
- ▶ Expressives - enable the speaker to express attitudes or emotions

# The Expressive Communicative Act

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## Searle's Communicative Acts

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  - ▶ Commissives - commits the speaker to some future action(s)
  - ▶ Expressives - enable the speaker to express attitudes or emotions
- 
- ▶ AOSE methodologies are too high level
  - ▶ ACL's specify messages at appropriate level of detail, but omit expressives or treat them as assertives

# Koko-ASM

## Main Steps

*Koko-ASM* is a six step methodology with the top 4 steps listed below.

Step	Description	Artifacts Produced
1	Define the set of possible roles an agent may assume	Agent Roles
2	Describe the expressives exchanged between roles	Expressive Messages
3	Derive the emotions to be modeled from the expressives	Emotions
4	Describe the set of possible application events	Application Events

# Koko-ASM

## Defining Roles

Step	Description	Artifacts Produced
1	Define the set of possible roles an agent may assume	Agent Roles

## Example Roles

- ▶ employee, boss, coworker, engineer (Office Domain)
- ▶ player, coach, fan, rival (Sports Domain)
- ▶ teacher, student, principle, nurse (School Domain)

# Koko-ASM

## Identify Expressives

Step	Description	Artifacts Produced
1	Define the set of possible roles an agent may assume	Agent Roles
2	Describe the expressives exchanged between roles	Expressive Messages

An expressive is defined as  $\langle \textit{sender}, \textit{receiver}, \textit{type}, \textit{proposition} \rangle$

### Example Expressives

- ▶  $\langle \textit{coworker}, \textit{coworker}, \textit{hate}, \textit{my job} \rangle$
- ▶  $\langle \textit{coach}, \textit{player}, \textit{congratulations}, \textit{on scoring the goal} \rangle$
- ▶  $\langle \textit{nurse}, \textit{student}, \textit{sorry}, \textit{that you hurt your knee} \rangle$

# Koko-ASM

## Derive Emotions

Step	Description	Artifacts Produced
1	Define the set of possible roles an agent may assume	Agent Roles
2	Describe the expressives exchanged between roles	Expressive Messages
3	Derive the emotions to be modeled from the expressives	Emotions

## Select emotions from Koko's ontology based on the expressives

### Example of Emotion Selection

*< coach, player, congratulations, on scoring the goal >*

- ▶ coach – admiration, happiness-for
- ▶ player – pride, joy

# Koko-ASM

## Describe Application Events

Step	Description	Artifacts Produced
1	Define the set of possible roles an agent may assume	Agent Roles
2	Describe the expressives exchanged between roles	Expressive Messages
3	Derive the emotions to be modeled from the expressives	Emotions
4	Describe the set of possible application events	Application Events

## Describe the expressive events and other relevant events

### Example Events

- ▶ Each expressive is encoded as 2 events (receiving & sending)
- ▶ Time remaining on current task
- ▶ Location of the user within the game

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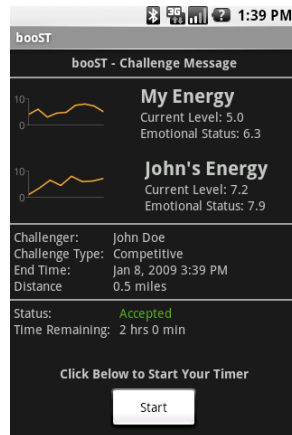
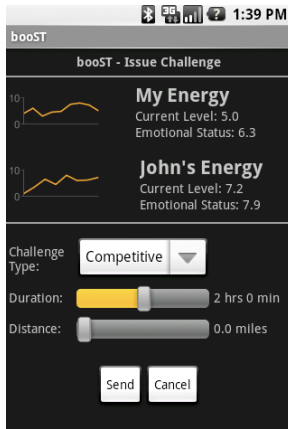
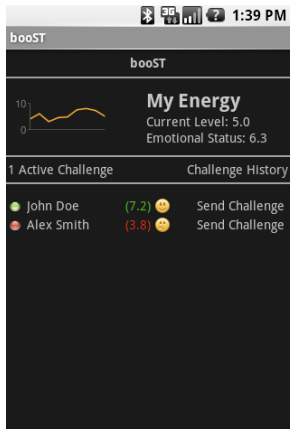
# booST

An affect-aware mobile/social game

booST has following properties...

- ▶ A mobile physical health game
- ▶ Utilizes existing social networks
- ▶ Utilizes Koko (configured via Koko-ASM)
- ▶ Participants can see their emotional state as well as their friends

# booST Screenshots



# User Study

The study consisted of

- ▶ 12 undergraduate students (teams of 2)
- ▶ 1 graduate student
- ▶ All students had no previous knowledge of affective-computing

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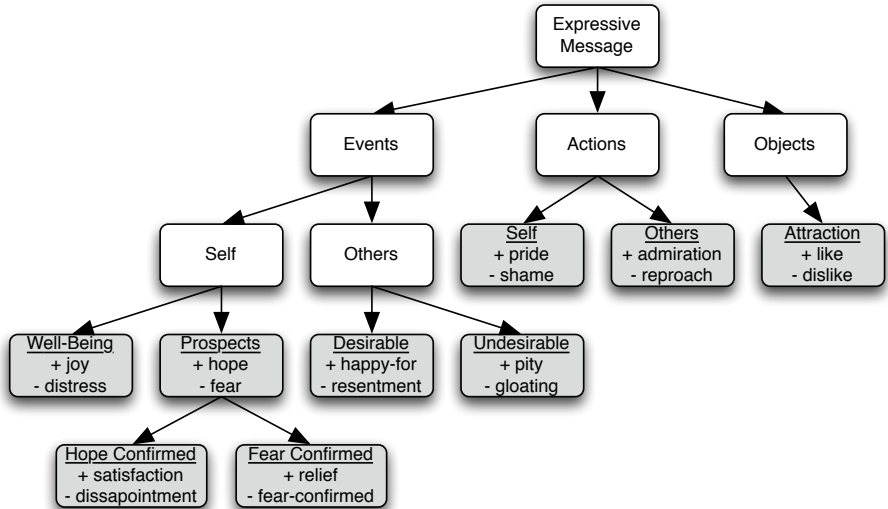
The study consisted of 3 phases with each phase revealed after completion of the previous phase

1. build mobile social application
2. follow Koko-ASM and document steps
3. reconfigure application to use Koko

**The results are under analysis, but should be completed shortly!**

# Questions?

# Emotion Hierarchy



# Emotion Hierarchy

