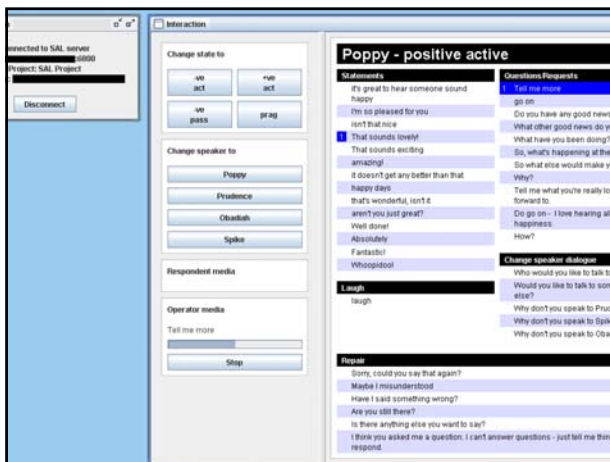


# Sensitive Artificial Listener Agents

Dirk Heylen  
Human Media Interaction

# SAL

- SAL-WOZ
- Embodied-SAL
  - Human-human: analysis and resynthesis
  - Paris – Twente exchange
    - Feedback lexicon
    - Perception experiment
  - Twente – LA exchange
    - Software exchange
    - Data analysis



Hello everyone,

I've completed a new version of the SAL system and created a website at this address:

<http://wwwhome.ewi.utwente.nl/~hofs/sal/>

Apart from bug fixes, better documentation of the source code and many minor changes, the biggest change is the support for plugins. Four plugins are available now. The simple audio visualisation which already existed in the previous version, has been converted to a plugin. The three other plugins write log files at the respondent interface. When a session ends, there should be three log files:

respondent.wav contains audio of the respondent session.avi contains all recorded video and audio session.xml contains the session script

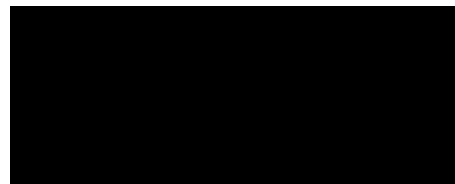
The respondent interface is now available as a Webstart.

Dennis

# SAL Agents

- Insight
  - Data collection and analysis
  - Theory and models
- Modeling and Implementation
  - Recognition
  - Decision
  - Generation
- Testing and evaluation

# Ronald & Rutger



## AMI



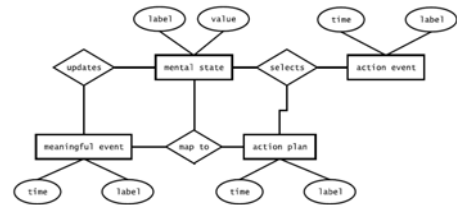
## Analysis

- Prosodic features
- Head movements
  - tracking (adopting off the shelf)
  - classification
- Facial expressions
  - brows
  - gaze

## Head Tracking



## Decision making



## Decision Making

```
check_pattern ( sensor_input(HYAW_DIR), '([-1]+[1]+) | ([1]+[-1]+) ' )
evaluate_to
meaningful_event(SHAKE)
...
meaningful_event(SHAKE) AND
mental_state(MIRROR)
map_to
action_plan(SHAKE)
...
action_plan(SHAKE)
select
action_event(SHAKE)
```

## Evaluation

- Samples for subjects to judge
  - questionnaires (semantic scales)
  - ask to label things
- Ask subjects to create something.
  - Set the values or the parameters or
  - Select a backchannel.
- Questions:
  - What qualities do we want to be evaluated?
  - What kinds of parameters should a subject be able to manipulate?

## Aspects to Evaluate

- Can the meaning be recognized?
- Does it fit into the context?
- Is of our theory of what triggers which backchannel correct?
- Predictive model: How good is the model?
- Are the behaviours implemented well?

## Versions

- Hand made versions
- Rule based versions
  - Statistics
  - Using input
- Instead of off-line generation one could try to go for real-life interaction.
  - This could be a Wizard-of-Oz set up or
  - a real-time interaction with an autonomous character.
- Different types of backchannels

## Variables

- Difference in the personality of the characters
  - attitudes are different
  - assessments (it's good...)
  - no comments on understanding /
  - agreement
  - stylistic parameters: intensity,
  - number of backchannels
  - supportive / antagonistic
  - interested (low, high)
  - practical / philosophical does not reflect on the backchannel (thoughtful, spontaneous...)
- Dialogue state (topic, turns, ...)
- Individual differences between the real people: this should show in for instance the mimicry behaviour

## What kind of Feedback

- Selected on the basis of the application.
- Backchannels that are relevant to the video-fragment of SAL.
- Also looking at some of the emotions expressed in there and copying some of the expressivity parameters.
- In AMI data the attitude that occurs the most is disbelief (depends on character).

## Feedback types

- Typical backchannels that relate to perception and contact. Mainly using simple nod and gaze algorithms.
- Understanding, belief, doubt, etc, but with a higher impact (more expressive and more emotion).
- Mimicry, personal reactions

## Impressions (probabilistic model)



## Use APML / Library

- We have *definitions in the library* that we might use.
- The following classes seem to be relevant.
  - performative: agree, disagree, criticize, refuse, accept, approve, confirm, refuse, question, ask
  - affect/emotion: liking, disliking, disgust, sorry-for, surprise, fear, anger, reproach, gratitude...
  - believe class: {not much in the face-library}
  - certain class: certain and uncertain, doubt;
  - meta-cognitive: (for these functions thinking, planning (problem with manipulating the gaze), remembering
- *Gesture library*: has head movements

## Samples



## Experiment

[ruth & roddy](#)

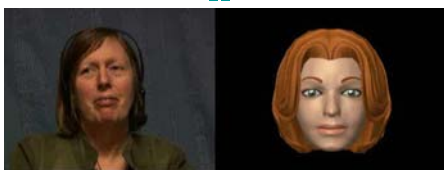
## Ruth and Roddy



## Ellen and Greta



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## Actions

- Analyze the AMI data
- Build the model (In part: statistics + literature)
- Library construction
- Look for the good fragments in the SAL data.
- Experimental set-up
- Build the animations: make the samples
- Head movement detection and classification
- Hand-made versions and rule-based versions

## Coming Soon

- Results from first experiments
- Rule generated feedback
- Analysis Virtual Rapport videos (from ICT)

## Some Time Later

- Integrate SAL-agents into SAL-WOZ  
(semi-automatic: automatic/intentional)

## Joint work (in alphabetic order)

- Elisabetta Bevacqua
- Ruben Kooijman
- Catherine Pelachaud

Also:

- Jens Allwood, Elisabeth Ahlsen, Isabella Poggi

And:

- Dennis Hofs, Mannes Poel, Dennis Reidsma,  
Herwin van Welbergen