

„Continuous Interaction with a Virtual Human“

eNTERFACE'10 MIDTERM

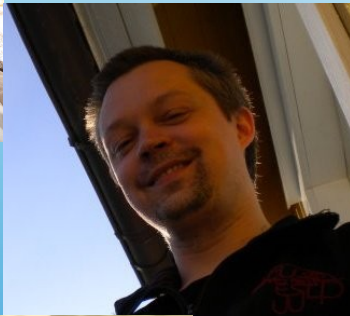
- Dennis Reidsma



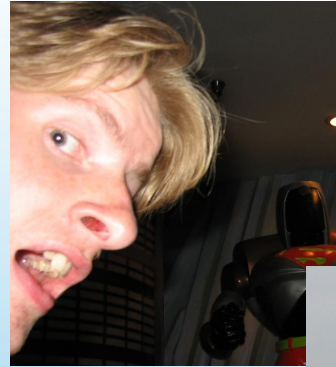
- Bart van Straalen



- Daniel Neiberg



- Iwan de Kok



- Herwin van Welbergen



- Sathish Pammi

- Khiet Truong



- Elckerlyc



e10CI TEAM

This eNTERFACE'10 project was kindly sponsored by:



Game research
for training and
entertainment



Social Signal Processing Network

e10CI SPONSORS

The project: goals, application, and approach

e10CI PROJECT

So far, VH systems tend to be developed using a push-to-talk paradigm (half duplex).



e10CI PROJECT

Examples of interaction between humans

- without overlap: this is what VHS can already do to a certain extent
- with overlap: this kind of behavior is the ultimate goal. Who is the Speaker? Who is the Listener here?

Long-term goal: Making a VH capable of Continuous Interaction.

- VH capable of listening while it is speaking
- VH capable of expressing itself while listening
- VH capable of the continuous mutual coordination that humans exhibit in conversation

e10CI PROJECT

Detailed goal:

Taking the first step towards the global goal by making a VH capable of actively dealing with Listener Responses from the user, while the VH is speaking.

- 1) Elicit Responses from Listener
- 2) Deal with them, timely and adequately

e10CI PROJECT

- Using the open source Virtual Human platform „Elckerlyc“



e10CI PROJECT

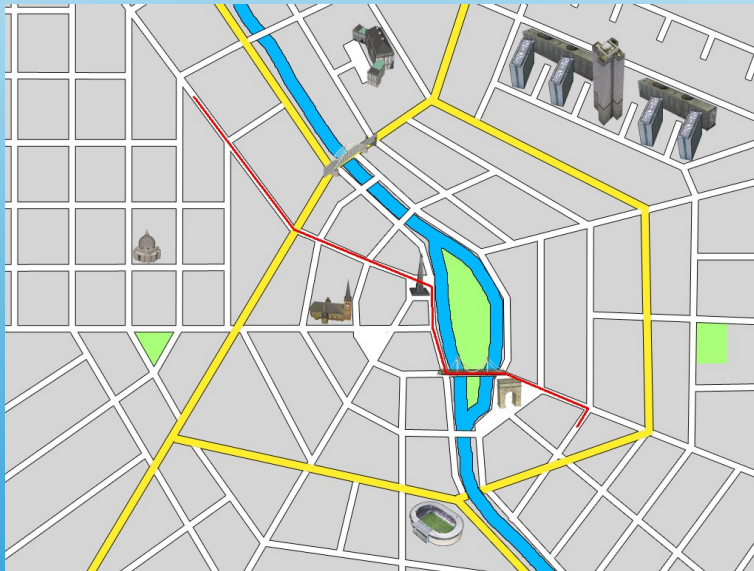
Eliciting Responses from the User

eLICITING RESPONSES

It only makes sense to have a Virtual Human that can deal with Listener Responses if the user actually gives such responses to the Virtual Human!

eLICITING RESPONSES

- We use a route-description application to elicit Listener Responses



eLICITING RESPONSES

At the end of each sub step in the route description, Responses are elicited using:

- vocal features (new „pitch contour“ markup in OpenMary)
- face and head (new repertoire of expressive behavior)
- both of the above
- none of the above

based on corpus and literature

eLICITING RESPONSES

Results

- Analysis to follow...
- ...but at the least, we did get a lot of Responses:
- only vocal, or only non-vocal, or both
- Understanding+, Understanding-, Interruptions, „Repeat instruction“, politeness („thank you!“),

eLICITING RESPONSES

Results

- Video of Virtual Human
- Video of User (10C#420, 102#514, 10A#515, 114#760-790)
- Recorded 10 sessions with eNTERFACE participants

eLICITING RESPONSES

- Analysis is ongoing, but....
- ...at least in one video we see Responses for the „combined“ condition, but not for the „no-elicitation“ condition.

eLICITING RESPONSES

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+500!

eLICITING RESPONSES

Dealing with Responses, in an adequate and
timely manner

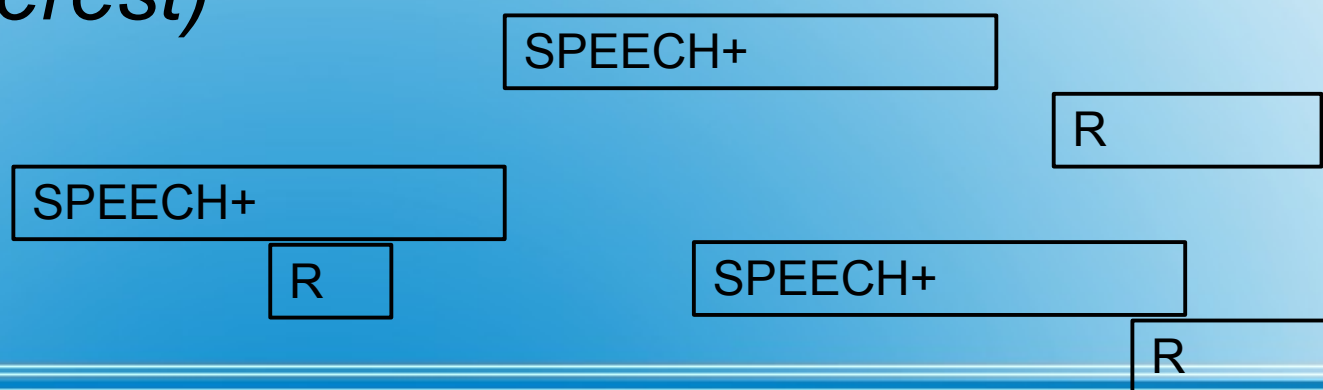
dEALING WITH RESPONSES

- What responses do humans give?
- How do human speakers deal with responses?
- Can we classify the responses automatically?
- Can we deal with them automatically?

dEALING WITH RESPONSES

Descriptions for Responses

- Cooperative / Competitive
- Understanding / Nonunderstanding
- (*Agreement / Disagreement*)
- (*Attentiveness*)
- (*Interest*)
- ...



dEALING WITH RESPONSES

Corpus and annotation

- HCRC Maptask
- Official annotations (Acknowledgement vs the rest)
- Additional eNTERFACE'10 annotations (Cooperative / Competitive for the *overlapping listener utterances*)

Classification of Listener Response with a series of classifiers

- Each solving a subset of the task
- First focusing on Competitive / Cooperative, as that is very important in the scenarios
- Enough result that we should be able to use it in the second (online) experiment

dEALING WITH RESPONSES

Feature(s)	300 ms	500 ms
F0	0.55	0.59
Intensity	0.60	0.62
mfcc with 0th	0.72	0.75
mfcc without 0th	0.74	0.75
duration	0.55	0.71
spectral flux	0.66	0.67
Intensity flux mfcc with 0th	0.73	0.76
Intensity flux mfcc with 0th dur	0.75	0.76
Intensity flux mfcc without 0th	0.74	0.76
Intensity flux mfcc without 0th dur	0.73	0.76

TABLE II

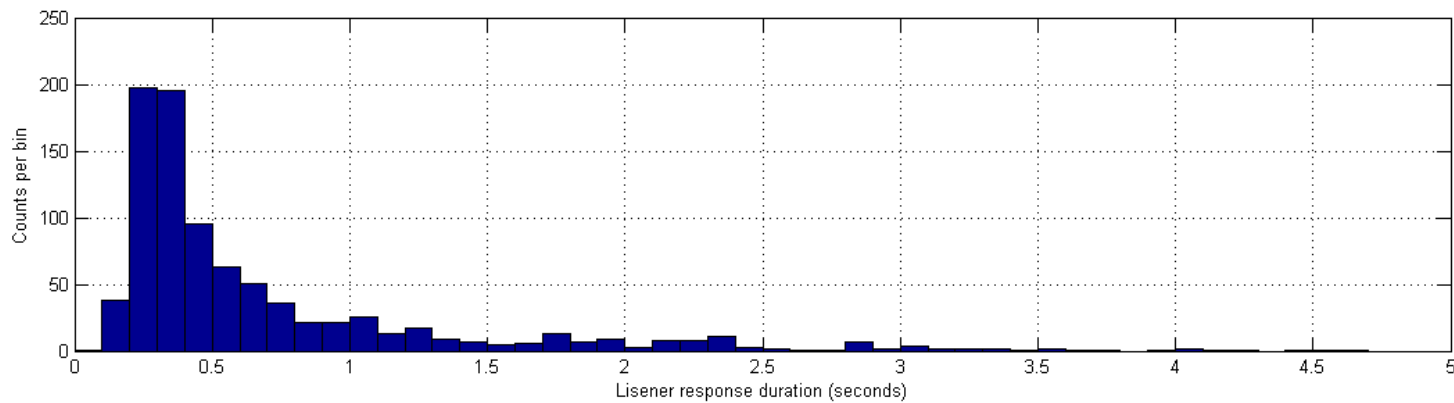
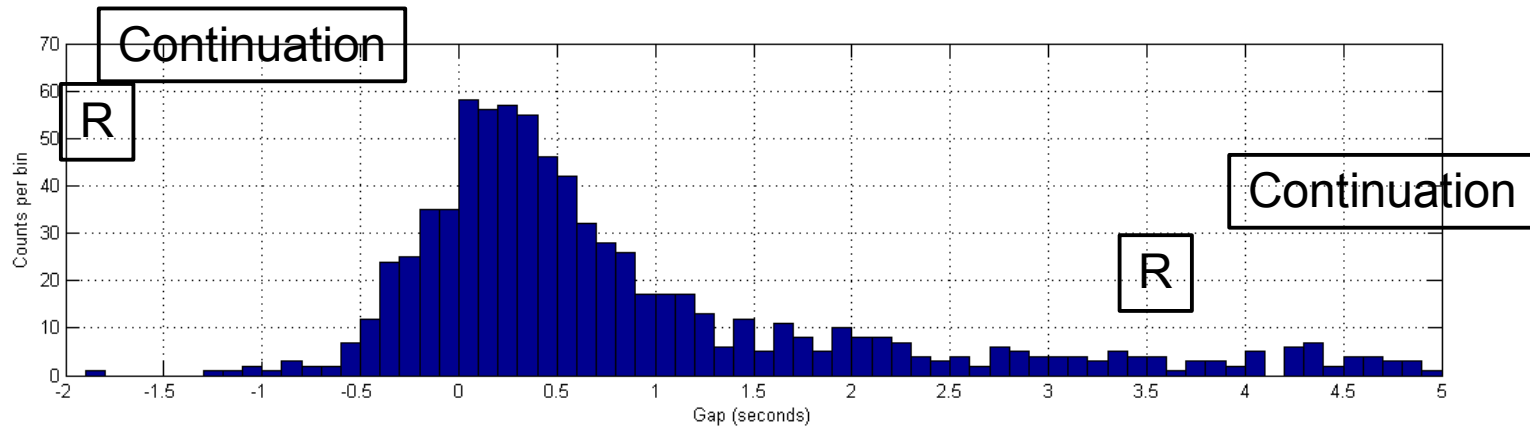
RESULTS FOR LISTENER RESPONSE VS ELSE CLASSIFICATION FOR DEVELOPMENT SET. TALKSPURTS ARE CREATED FROM CORPUS. SEGMENTATION

max latency (ms)	Features	Avg. F-score
300	Intensity flux mfcc without 0th	73
500	Intensity flux mfcc without 0th dur	76

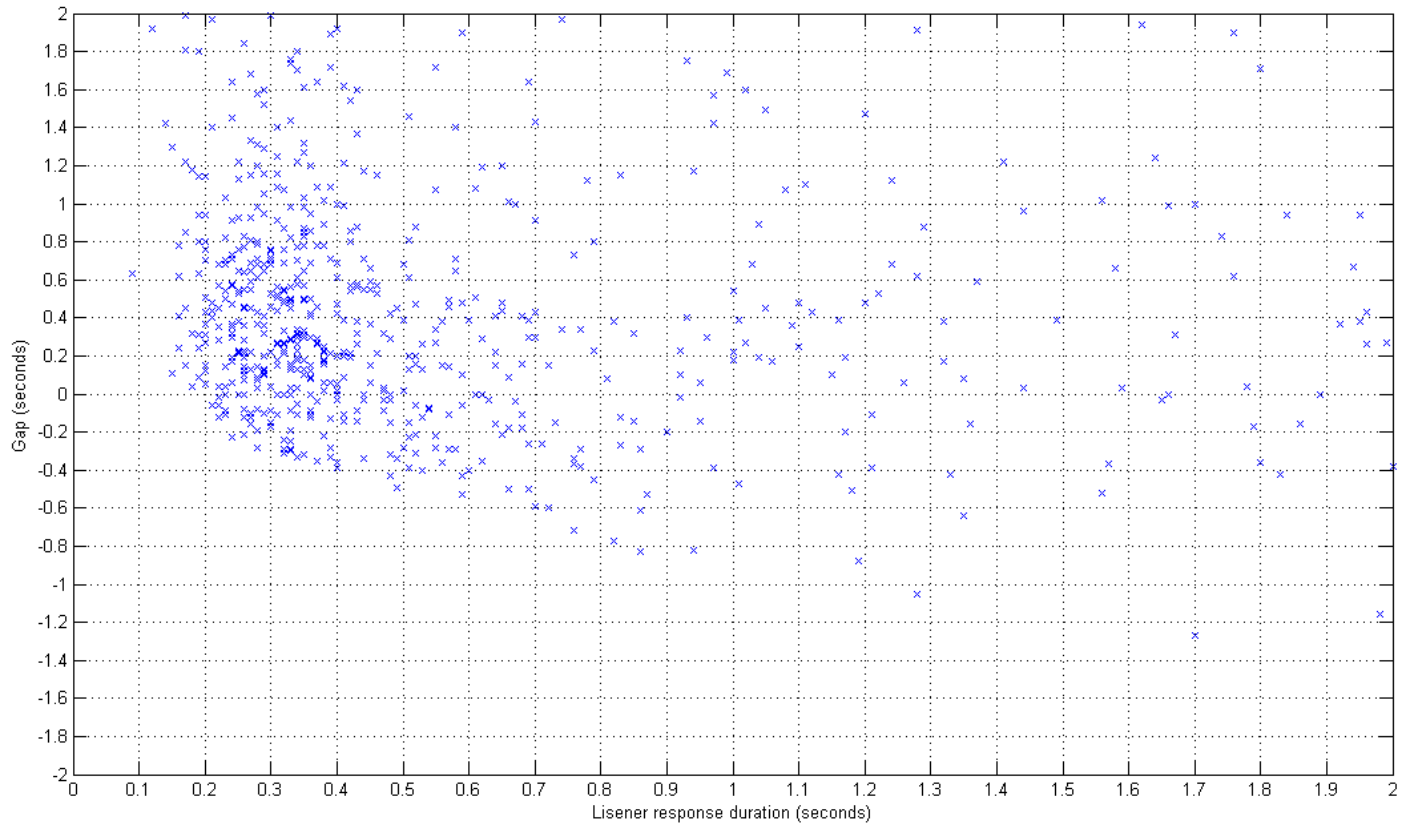
TABLE III

RESULTS FOR LISTENER RESPONSE VS ELSE CLASSIFICATION FOR EVAL-SET. TALKSPURTS ARE CREATED FROM CORPUS SEGMENTATION

- Given that we can detect and classify Resonances, how shall we deal with them, in an adequate and timely manner?
- What do humans do?



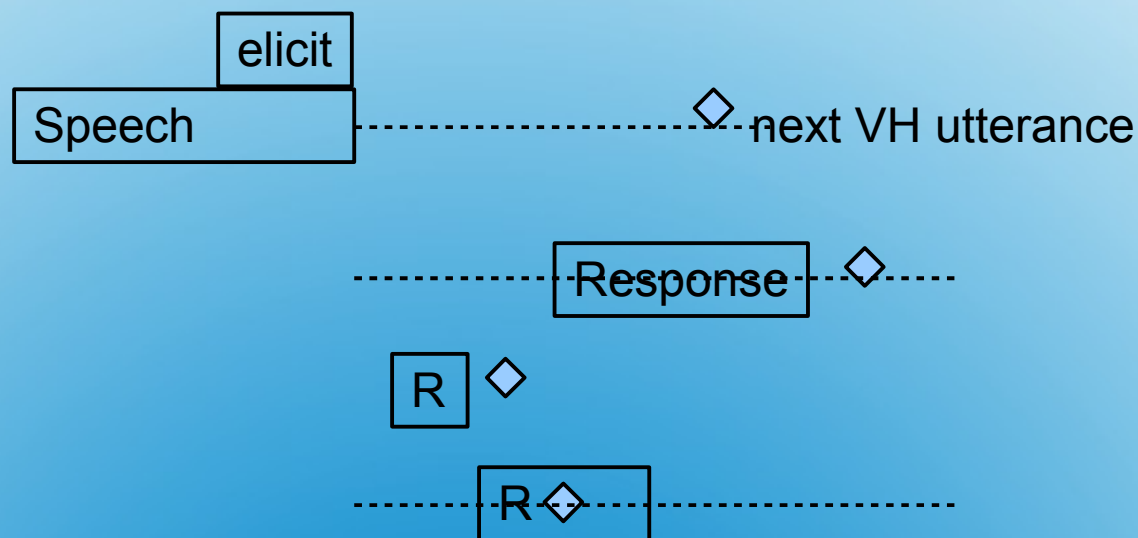
dEALING WITH RESPONSES



dEALING WITH RESPONSES

The second experiment

- Involves several ways of dealing with responses, with and without overlap being generated in the Virtual Human's speech.



dEALING WITH RESPONSES

- The system capabilities are there, but the dialog management rules still need to be quantified.

dEALING WITH RESPONSES

- <setup on paper>

dEALING WITH RESPONSES

SSPNet, GATE, Project team, Experiment
Participants, other eNTERFACERs, Senior Project
Advisors, Mark&Ronald, Albert

Thank you!

tHE END