

Proposal WYSIWYD Winter Integration Meeting

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Abstract

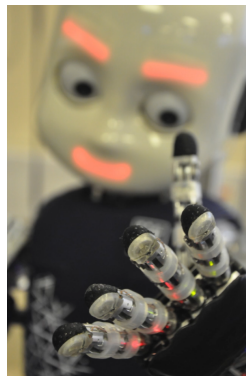
In this report we outline the aims of the WYSIWYD integration meeting to be held at Imperial College London from November 30, 2015 to December 4, 2015.

1 Integration Papers

As discussed in the Slack meetings, we are aiming to write two joint papers, one about the computational architecture of the WYSIWYD project, and another more related to the cognitive/psychological aspects of our recent works.

Prior to the integration meeting, we need to discuss the contents of the computational architecture paper in more detail, and find gaps which still need to be filled in order to be able to write a journal article. During the integration meeting, we will aim to fill these gaps accordingly.

For the cognitive/psychological paper, we can use the integration meeting to come up with a clear research question, which can subsequently be answered after the meeting.



2 Demo for Review Meeting

At the VVV¹ and BCBT² summer schools, we developed a framework for proactive tagging. We aim to extend the proactive tagging demo for the demo at the review meeting to be held probably in March 2016. Furthermore, we need to make the demo more robust. In particular, the modules which are involved need to be checked against the flaws of the *OPCClient* (see #opcclient in Slack).

¹<http://wiki.icub.org/summerschool/>, video available at <https://goo.gl/sD7hnv>

²<http://bcbt.upf.edu/bcvt15>, video available at <https://goo.gl/JAgkXg>

3 Module Integration

3.1 Action Recognition

The action recognition module developed at Lund is not yet part of the WYSIWYD repository. Foreseeing a common publication about the integration of modules within the WYSIWYD project, we hope to integrate a (preliminary) version of the action recognition module.

3.2 Synthetic Autobiographical Memory

Thus far, the SAM framework developed at Sheffield has not yet been integrated with the main software stack of the WYSIWYD project. We hope that the members of the Sheffield lab push (a preliminary version of) SAM to the repository, and write a documentation about the basic usage of the module prior to the integration meeting. During the integration meeting, we aim to integrate SAM within the context of proactive tagging.

3.3 Kinematic Structure and Body Schema Integration

We can extend the proactive tagging demo to incorporate a body schema of e.g. the arm. That would mean that the iCub is not only asking for his fingers, but also of the lower and upper arm. Again, we could use joint and skin information.

Then, the kinematic structure of the iCub and human can be computed, and employing the labeled parts of the iCub's body the iCub could infer about other parts of his own body, or infer about parts of the humans body (equivalency matching). This will then lead to kinematic equivalences based on proactively tagged body parts, combining various works within the WYSIWYD consortium.

3.4 Issues on WYSIWYD repository

There are four open issues on GitHub (see <https://github.com/robotology/wysiwyd/issues>), and we plan to resolve three of them in the integration meeting. For one of the issues, we depend on external input from IIT.

All other issues are related to the adaptations regarding the stereo vision system. Firstly, for pushing/grasping and other actions which need to be performed accurately, we need to change the *ARE* subsystem to employ the data provided by *depth2kin*. Otherwise, the actions are not performed with sufficiently high accuracy, potentially leading to e.g. a failed grasp.

Secondly, the object recognition could be made more robust by using the depth input for object segmentation rather than the luminosity of the objects as currently.

Thirdly, we still depend on the Reactable for the calibration from the Kinect coordinate frame to the robot coordinate frame. Relying only on stereo vision would be favorable.

4 Second Year Deliverable

The following is the list of deliverables that are due at month 24, and should be related as much as possible within the demo.

- **D 1.2) Body-schema equivalency metrics and learning algorithms:** Body-schema equivalency metrics and learning algorithms: This deliverable will report on the progress of the algorithms that anchor self-learned representations to those of other agents in the robot’s environments. This deliverable will include further progress on the learning of body schema and peripersonal space and specifically their validation on the real icub-reactable setup.
- **D 2.2) The emergence of the narrative self:** The emergence of the narrative self: This deliverable will report on the progress of integration of SAM with different modality-based sub-systems and on the development of parallel memory systems at different levels of abstraction. The report will also describe experiments on the emergence of a narrative self in the iCub robot platform.
- **D 3.2) Intentional Communication applied to Self:** Intentional Communication applied to Self: This deliverable will report on progress in development of the conceptual representation system applied to the internal structure of the WYSISYD representation itself, and the ability to learn and use grammatical constructions in the context of intentional communication with others about mental states.
- **D 4.2) Results of experiments concerning action categorization:** Results of experiments concerning action categorization: This deliverable will report on the experiments in categorizing human actions where real-time data is used as input. It will describe how data from motion capture systems (Kinect) are processed and how the A-SOM network performs its categorizations.
- **D 5.2) Use of social context and autobiographic memory:** Use of social context and autobiographic memory: This deliverable will report on the progress made toward the integration of social perception (perception of emotion, estimation of others internal state) and autobiographic memory so that the robot can demonstrate appropriate social behaviour in given contexts. Bypassing of the reactive layer and modulation of the overall interaction engine will be demonstrated.
- **D 6.2) Reaching with whole-body tactile information:** Reaching with whole-body tactile information: This deliverable will provide an overview of the algorithms developed in Task 6.2 and 6.3 – reaching while exploiting whole-body multisensory, in particular tactile, information. This will include scenarios where the robot has to reach in a cluttered scene, intelligently responding to contacts with the environment (avoiding or exploiting depending on context).

5 Schedule

5.1 Monday

- Welcoming WYSIWYD members to London, and getting familiar with the setup of ‘iCubLondon01’
- Discussions about the joint papers, and what work needs to be done so it can be written
- Bug reports for the proactive tagging demo, and fixing them

5.2 Tuesday

- Brief presentation about SAM and the action recognition module, focusing on the expected input and given output
- Discussion how SAM and the action recognition module can be integrated in the context of the proactive tagging demo
- Extending the proactive demo to a second year review demo, and making the demo more robust

5.3 Wednesday

- Brief presentation about Kinematic Structure and Body Schema Integration, and how it can be integrated in the demo
- Further work on the second year review demo

5.4 Thursday

- Further work on the second year review demo
- Work on the WYSIWYD repository issues
- Social dinner!

5.5 Friday

- Record video with the extended demo
- Prepare XML script for the extended demo
- Discuss work which needs to be done before the review