

WoZ4U: An Open Source Wizard-of-Oz Interface for the Pepper robot

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Wizard-of-Oz experiments play a vital role in Affective Perception and Human-Robot Interaction research, as they allow for the investigation of hypothesis regarding highly social-emotional behavior emitted or understood by robots, without relying on advanced robot functionality. Softbank’s Pepper robot, as one of the most commonly used social robots, is an attractive platform for Affective Perception and HRI research, due to features like control over stimuli responses, lifelike gestures, eye LEDs, and basic emotion recognition capabilities.

However, a dedicated tool for general Wizard-of-Oz like experiments is currently not available in the community, and researchers either rely on the general-purpose graphical programming environment Choregraphe, or create their own tools. However, Choregraphe is not meant to be an interactive real-time controller for Pepper, which makes interaction cumbersome for the wizard, and also imposes restrictions that affect the robot’s behavior and thereby the interacting test participant. Several research groups reinventing and developing very similar tools is also not a very satisfying situation.

In this paper, we present WoZ4U, a fully configurable interface for Wizard-of-Oz experiments with Pepper robots. WoZ4U offers control over a large part of the Pepper’s functionality, with a special focus on functionality crucial for Human-Robot Interaction and Affective Perception experiments. The main supported features are: full control over Pepper’s autonomy settings, gesture control, animated text to speech, monitoring and control over Pepper’s tablet, real-time monitoring and recording of Pepper’s cameras and microphones, navigation, and LED control.

All context or experiment specific elements, e.g. keyboard shortcuts for gestures and spoken messages, are configurable via a text (YAML) file, thereby reducing the work for setting up an experiment, from programming a dedicated control system for Pepper, to editing items in a configuration file.

WoZ4U IS implemented as a Flask HTTP server, and the technical requirements on the computer side are kept to a minimum.

Initial tests have confirmed that the system is functional, flexible, and easy to use. A study is planned to investigate how WoZ4U compares to Choregraphe as a tool for conducting Wizard-of-Oz experiments.

WoZ4U is open-source available under the GNU General Public v3.0 license, and it is our hope that it will be useful for, not only the HRI community but also for non-technical communities within the social sciences.