Demonstration of OPSORO's Grid System:
Design a Working Social Robot in Only 2 Hours

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ABSTRACT

One of the biggest obstacles to broader adoption of robotics is that only experienced roboticists can develop robotics applications. If we aim to have robots in our homes and offices, we need more tools and platforms that reduce the costs in both money and time. To address the current difficulties of designing custom social robots, we identify an open DIY platform that facilitates the design, construction and production of new custom social robot characters with a focus on face-to-face communication. With this demo with will show the power of the new OPSORO grid system that allows the exploration of social robot identities and interactions in only a few hours.

Keywords

social robotics; modular; personalization; embodiment; human-robot interaction; platform

1. INTRODUCTION

The OPSORO platform consists of (1) a set of modules, each of which implements a facial feature, (2) electronics to drive the modules and sensors, (3) a software environment to program and control the robots. Hardware-wise the platform will consist out of 'OPSORO.build', an expandable set of modular maker-kits that that can be assembled by any user (aged 10+). Based on the input of co-creation sessions with potential, we developed a new hardware concept for our platform named 'the grid system'. This new system allows users to very quickly (1-3 hours) design and build a variety of working social robots. 'OPSORO.play' will offer the software via an online digital platform serving both as development /educational community and as a cloud based controller to easily program (at different levels for different ages) any social robot that is constructed via OPSORO.build.

The current OPSORO.build platform consists of 3 different parts: (1) The Grid, (2) The Modules and (3) The Covers. Each robot can take a different form, but when using the OPSORO system, modules can be exchanged easily and are all controlled by similar electronics (OPSORO heart) and software system (OPSORO.play) on top of a Raspberry Pi. The first OPSORO.build kit has been made during a workshop in Kortrijk in august 2016.

OPSORO's Operating System (OS) is written in Python. It offers an open API for developers and a series of browser-based GUI apps (See fig 1.1) that run on a web-service (over WiFi). This allows end-users to gain easy access to the functionalities of the robot. We have also integrated online operating capabilities so that the robot can be controlled from the cloud when connected to the internet. The software currently also provides a virtual model that shows all the expressions of the robot in real-time on any connected device. OPSORO.play is the online environment, connected and part of our website, from where users/customers can control their robot. Besides the general GUI apps for control and programming (e.g. the social script in fig 1.7), we also offer a robot configurator (See fig 1.2) that allows you to virtually build and test new characters that can later be built with the OPSORO.play kits.

The new OPSORO platform is most commonly used in workshops that follow a fast and simple design process in which they design, build and play with their own custom robot in 2 hours. The covers that were created as a result of the workshop held at Frankfurter Buchmesse (19-21th of October 2016) are depicted in figure 2.

More updated information can be found on the website: www.opsoro.be

2. DEMO REQUIREMENTS

2 or 3 of the authors will demonstrate the OPSORO system with 3-5 robots on 2 tables. All the robots will require power (regular AC 220V).

3. ACKNOWLEDGMENTS

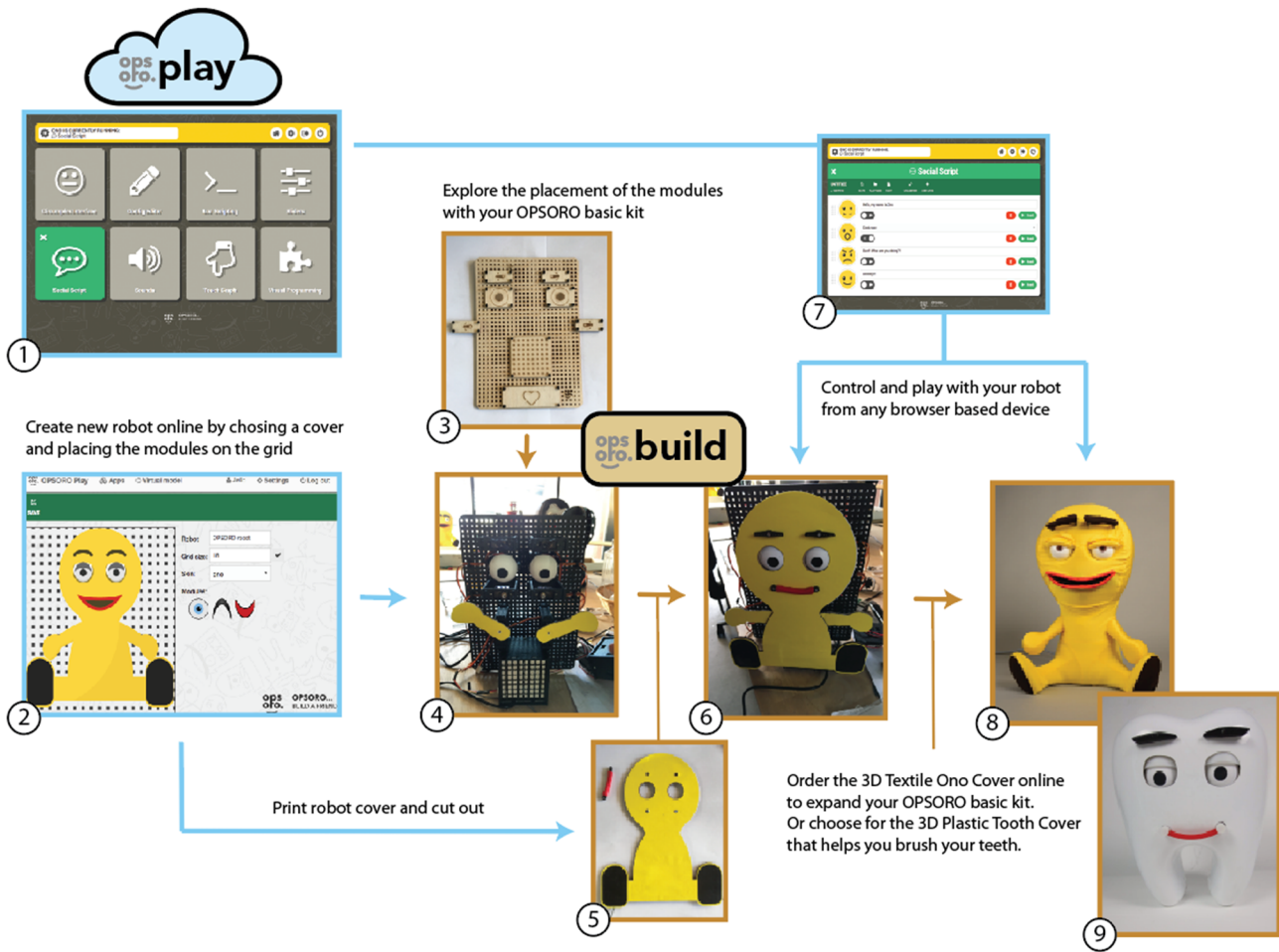**Figure 1. Overview of the OPSORO.build and OPSORO.play System**

Figure 2: Covers created during the OPSORO workshop at Franfurter Buchmesse 2016