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Citation: Westlund, Jacqueline Kory; Lee, Jin Joo; Plummer, Luke; Faridi, Fardad; Gray, Jesse; Berlin, Matt et al. "Tega: A Social Robot." 2016 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI) (March 2016. Christchurch, New Zealand, Institute of Electrical and Electronics Engineers (IEEE), April 2016 © 2016, Institute of Electrical and Electronics Engineers (IEEE)

As Published: <http://dx.doi.org/10.1109/HRI.2016.7451856>

Publisher: Institute of Electrical and Electronics Engineers (IEEE)

Persistent URL: <http://hdl.handle.net/1721.1/110311>

Version: Author's final manuscript: final author's manuscript post peer review, without publisher's formatting or copy editing

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Tega: A Social Robot

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Abstract—Tega is a new expressive “squash and stretch”, Android-based social robot platform, designed to enable long-term interactions with children.

I. A NEW SOCIAL ROBOT PLATFORM

Tega is the newest social robot platform designed and built by a diverse team of engineers, software developers, and artists at the Personal Robots Group at the MIT Media Lab. This robot, with its furry, brightly colored appearance, was developed specifically to enable long-term interactions with children.

Tega comes from a line of Android-based robots that leverage smartphones to drive computation and display an animated face [1]–[3]. The phone runs software for behavior control, motor control, and sensor processing. The phone’s abilities are augmented with an external high-definition camera mounted in the robot’s forehead and a set of on-board speakers.

Tega’s motion was inspired by “squash and stretch” principles of animation [4], creating natural and organic motion while keeping the actuator count low. Tega has five degrees of freedom: head up/down, waist-tilt left/right, waist-lean forward/back, full-body up/down, and full-body left/right. These joints are combinatorial and allow the robot to express behaviors consistently, rapidly, and reliably.

The robot can run autonomously or can be remote-operated by a person through a teleoperation interface. The robot can operate on battery power for up to six hours before needing to be recharged, which allows for easier testing in the field. To that end, Tega was the robot platform used in a recent two-month study on second language learning conducted in three public school classrooms [5], [6].

A variety of facial expressions and body motions can be triggered on the robot, such as laughter, excitement, and frustration. Additional animations can be developed on a computer model of the robot and exported via a software pipeline to a set of motor commands that can be executed on the physical robot, thus enabling rapid development of new expressive behaviors. Speech can be played back from pre-recorded audio tracks, generated on the fly with a text-to-speech system, or streamed to the robot via a real-time voice streaming and pitch-shifting interface.

This video showcases the Tega robot’s design and implementation. It is a first look at the robot’s capabilities as a research platform. The video highlights the robot’s motion, expressive capabilities, and its use in ongoing studies of child-robot interaction.

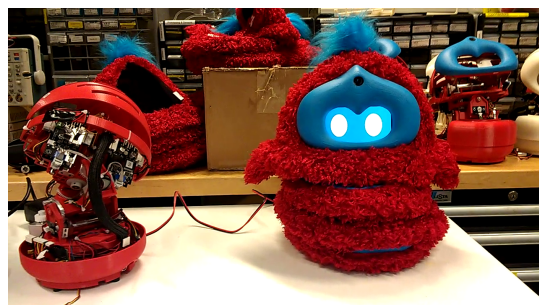


Fig. 1. The robot Tega was designed for interactions with young children.

ACKNOWLEDGEMENTS

Thanks to all the members of the Personal Robots Group, past and present, for their work on the ideas and objects shown in the video. This research was supported by the National Science Foundation (NSF) under Grant CCF-1138986 and Graduate Research Fellowship Grant No. 1122374. Any opinions, findings and conclusions, or recommendations expressed in this paper are those of the authors and do not represent the views of the NSF.

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