



# The 'Magic Paradigm' for Programming Smart Connected Devices

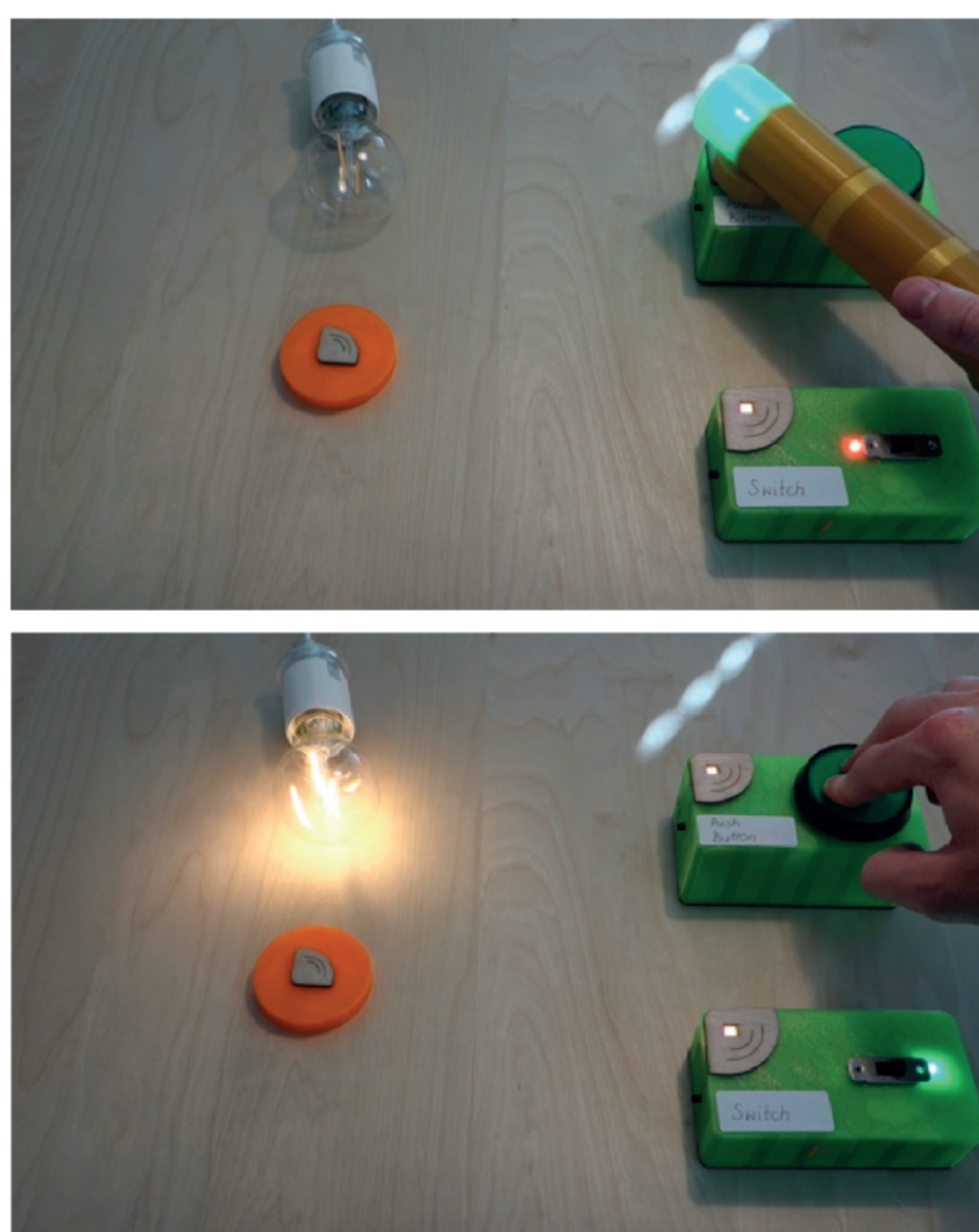
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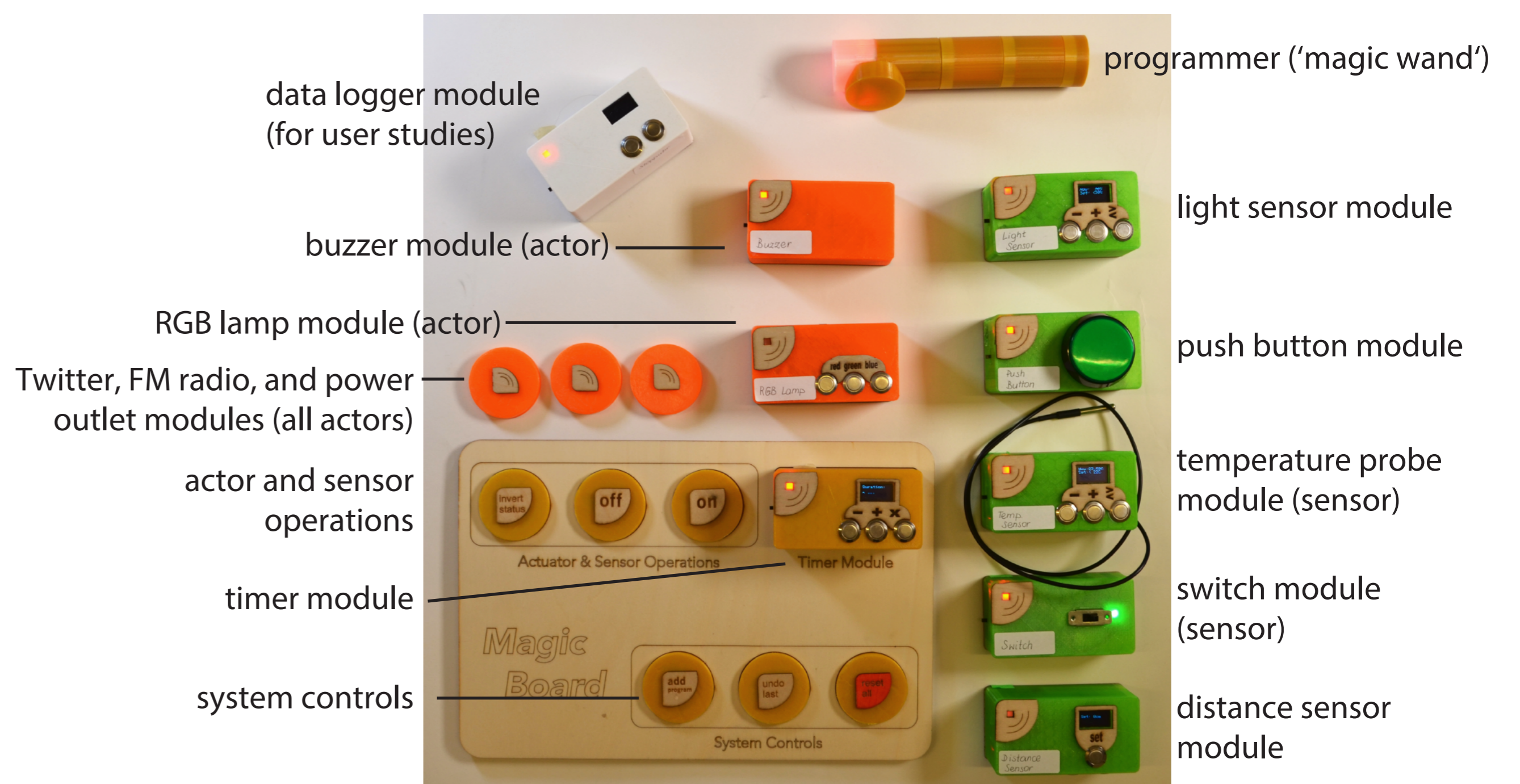
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We are surrounded by an increasing number of smart and networked devices. Today much of this technology is enjoyed by gadget enthusiasts and early adopters, but in the foreseeable future many people will become dependent on smart devices and Internet of Things (IoT) applications, desired or not. To support people with various levels of computer skills in mastering smart appliances as found, for example, in smart homes, we propose the 'magic paradigm' for programming networked devices. Our work can be regarded as a playful 'experiment' towards democratizing IoT technology. It explores how we can program interactive behavior by simple pointing gestures using a tangible 'magic wand'. While the 'magic paradigm' removes barriers in programming by waiving conventional coding, it simultaneously raises questions about complexity: what kind of tasks can be addressed by this kind of 'tangible programming', and can people handle it as tasks become complex?



Programming a lamp to light up when a button is pressed



The 'magic programming kit'

## PRELIMINARY USER STUDY

Task 1-5 were given to a first group of ten participants. These tasks were carefully designed to feature different degrees of complexity/difficulty and to involve all essential features of the 'magic programming kit'. The tasks start with simple sensor/actor combinations, but later required further modules like the timer module for Tasks 3 and 4.

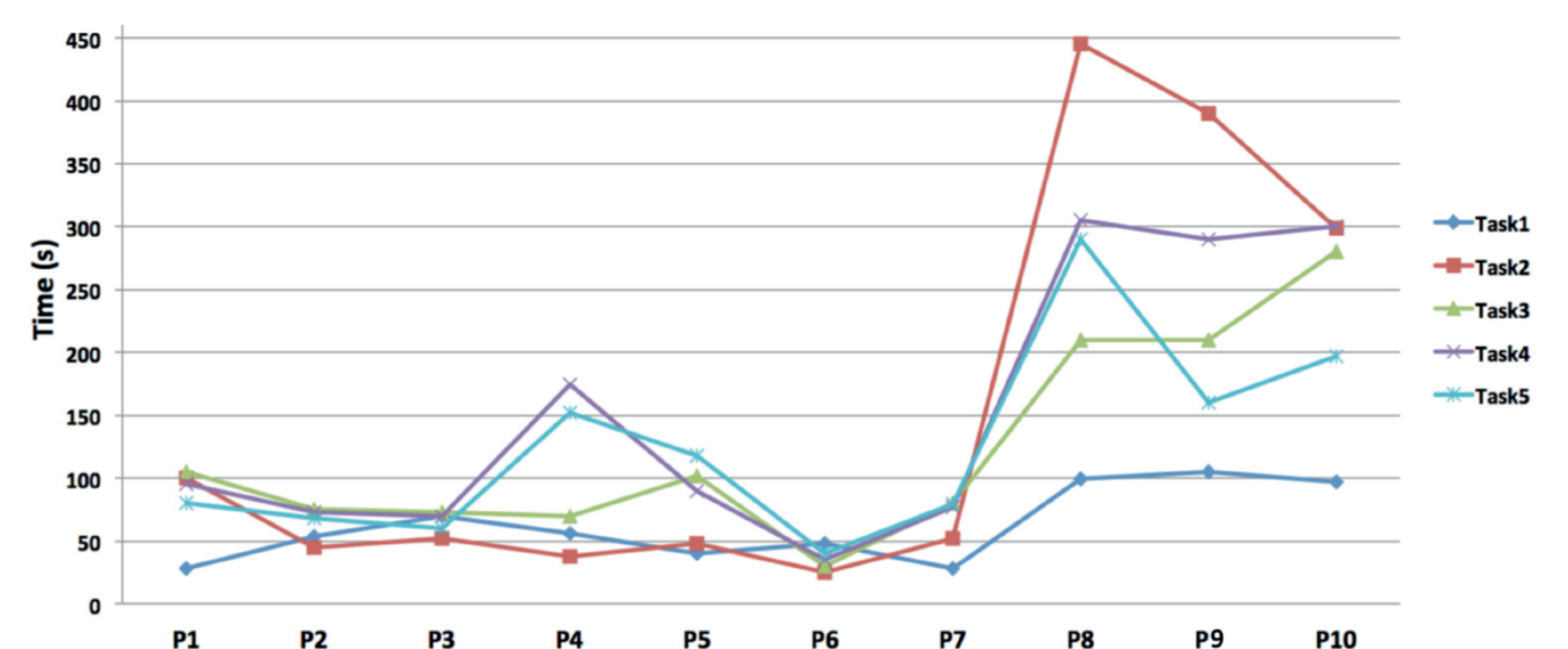
TASK 1: Post current temperature on Twitter IF above 23 degrees.

TASK 2: Turn on/off lamp with the switch OR turn on/off buzzer with the push button

TASK 3: IF room is dark, turn on lamp for 6s.

TASK 4: IF the button was pushed, wait for 4s then turn on the buzzer for the duration of 4s. In addition, turn on lamp WHILE the button is NOT pushed.

TASK 5: Turn on/off the power outlet with the switch AND add an "emergency button". I.e., IF the button is pressed, the power outlet should be turned off regardless of the switch state.



Performance (time until task completed in seconds). Participants P1-P7: skilled computer users. P8-P10: little prior experience with computers

## PHOTO-DOCUMENTATION OF THE PROTOTYPING-PROCESS



More information about our research on 'tangible programming' is available at <http://guelden.info/tp.html>  
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Short teaser



Longer demo