Making Things Talk in the Physical World with the Use of Augmented Reality

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Research

Title: Making Things Talk in the Physical World with the Use of Augmented Reality

Our research focused on creating interactions of physical things with the help of augmented reality. By using augmented reality we created functionality at the physical level between things that otherwise would communicate independent of each other. In our experiment, a regular LED, an RGB-LED, a flex sensor, and a temperature sensor communicated according to user-designed interactions on an app. We used two Arduino Yun microcontrollers as hybrid objects to communicate with a server and our iOS app. We customized a virtual user-interface for the user to interact with the app and connect the interface with physical objects that we had interfaced with and programmed using Arduino. To accomplish our goals, we used a computer, Wifi, Arduino Yun, a microSD card, a micro USB cable, breadboard, various sensors and actuators, and jumper wires. On the software side, we used the Open Hybrid platform, Hybrid Editor software on IOS, HTML editor, and Arduino software.

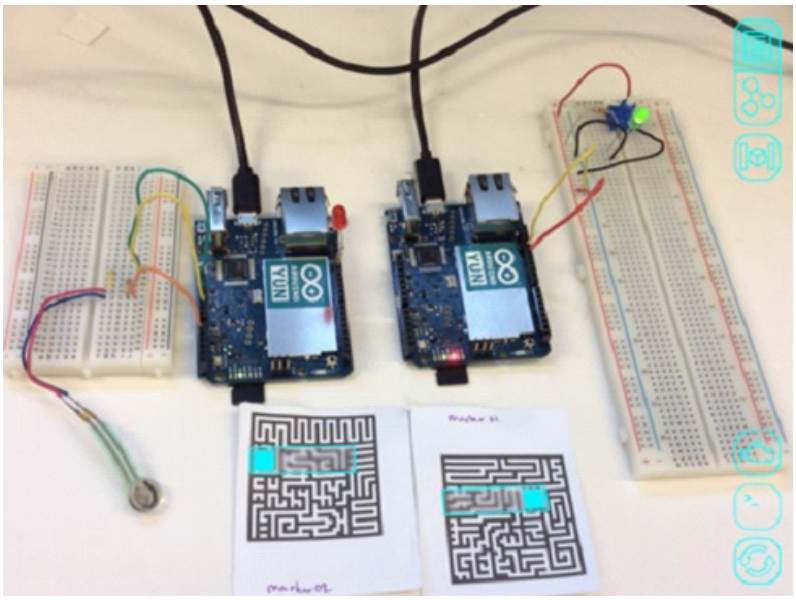

Figure: Illustrative test-bed for augmented reality based interaction with physical objects

Lesson Plan

Title: Developing and Testing a Conductivity Probe with Arduino

In this activity, students construct a simple conductivity probe and then integrate the probe into two different circuits to test the behavior of the probe in solutions of varying conductivity. The focus is to introduce students to the construction of a conductivity probe and expose them to several different ways of integrating the probe to obtain qualitative and quantitative measurements.

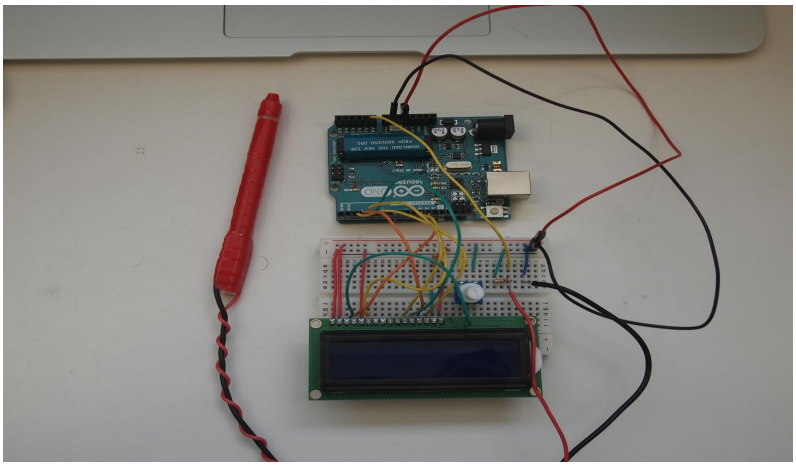

Figure: Conductivity probe connected to the Arduino

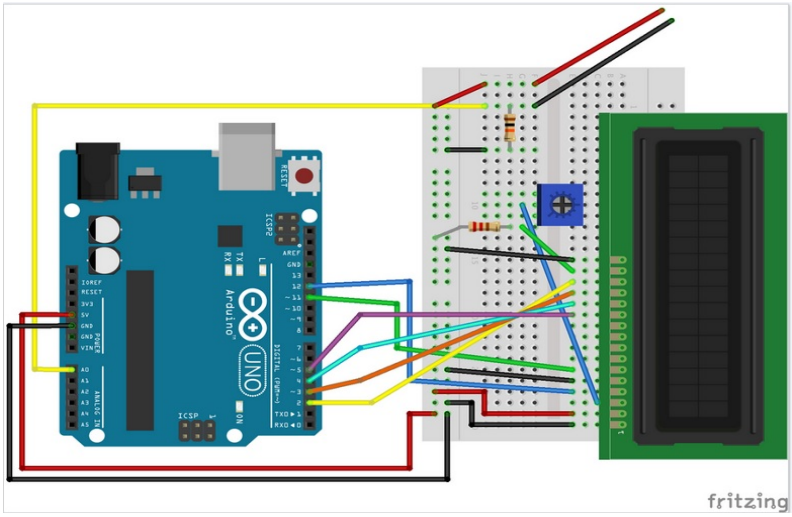

Figure: The LCD is attached to the Arduino to show the values of the experiment