

The sunny dishwasher – a tale of understanding

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IoT Hackathon sounds good. IoT Hackathon sponsored by B/S/H sounds even better, but if you put in Relayr, NEST, a lot of Arduinos, Phillips Hue, Tons of Grove sensors and forty motivated hackers that like to play, you get HackTheHouse! A report of the events.

Christian Heger, Fahed Jibril and I went to Berlin to represent Zuehlke at this awesome competition, sponsored by German Household appliances manufacturer Bosch Siemens Hausgeraete, short B/S/H. The winner was to take away €10.000 in prize money. No, we did not go home with the check. But let's put first things first. We arrived in Berlin Friday evening with the other hackers ready to pitch our initial idea: a smart fridge that manages your groceries and makes sure no goods get spoiled. This idea lasted about three hours. When we got in touch with some members of other teams we've heard that same idea more than once. At that point we decided that we need to start over if we want to end up with something unique and fun and something that is worthy of Zuehlke.

Our Idea

Having Christian on board was a big asset. He loves the sun and cares about energy saving. But his ability to sketch ideas in seconds to show you how they might come to life made a big difference. He came up with a wonderful plan to integrate most of the devices provided by the sponsor. The sunny dishwasher was born! The essence is that if you're fortunate enough to having your own power generating device, e.g. a solar panel, you really want to make use of that power to run your home appliances. In addition, you're usually at work most of the day time, so you do not care about appliances running at that time. We saw this as a good opportunity to put in some intelligence.

We wanted to achieve this by combining the Relayr light sensor with the context information about your presence at home provided by NEST. Our scenario was quite simple: in the evening you load the B/S/H connected dishwasher and set it to 'remote start'. Our smart service, which is wired to the dishwasher events via the Relayr cloud, receives this event. The next day you leave for work. The NEST thermostat sends out a notification based on its processing of your usual behavior and. Our service reads it and is then ready to start the dishwasher. The only component missing: sunlight. Though the service idles until the reading of the Relayr light sensor promises a maximum usage of self-produced solar energy before it starts the dishwasher. In case the weather prohibits the use of self-produced energy, the service uses the presence reading from NEST to force the dishwasher to finish right before you get home.

With this scenario in mind and stuffed with the exquisite burgers from the Hackthehouse-Chef Jens we went to sleep with a good feeling that our idea would help us to exploit the most of the hardware provided.

Saturday

The next morning we set up our backlog, fired up the code editor and got lost in the coding zone. Without any major blocker and only minor obstructions – excellent meals and a broken Wunderbar – we had our first version up and running before dinner. It did not have any visualization yet but we could control the dishwasher, get sensor data from relayr and communicate with NEST. Thus, we decided to go for some stars and bring them to our well paved road (Zuehlke's very own innovation process is called Stars to Road).

Our colleague Fahed Jibril began bootstrapping a visualization of the system state. I went through the Hardware and dug out a PIR-Sensor, an Arduino and a button. PIR-Sensors detects changes in thermal infrared radiation and are usually build into motion detectors, which work on the principle that living objects usually differ in temperature from their surroundings. Combined, these components made our very own door entry detection system. Since the NEST does not have any sensory attached to detect human presence, our door entry system was designed to help out and set the presence via the NEST api if it were to detect a change. The setup is quite simple: if the system does not detect any movement inside the building after you've opened the door, you probably went out. Connecting the sensory to the Arduino took about 30 minutes, testing and refinement about the same time. Next, we happily went to bed (it was already 1:30 am) knowing we were only left with some minor refinements in the morning to get everything working.

Sunday

Sunday morning was as effective as we've hoped. Christian drew some very neat graphics that were used by Fahed to improve the look of our visualization. At the same time I busied myself with connecting our door entry system to NEST. Before lunch we had our final set-up running and where happy that everything worked out well.

Nevertheless, a Hackathon without any problems would be boring. Right after lunch we were in shock: our complete NEST based presence detection system broke down. Since the NEST thermostat could not connect to the cloud due to a reboot of the WLAN, we could not use the NEST service anymore. As a consequence we took out our phones and set up our own private network which made all devices communicate smooth with each other again. Note: if you let 40 people work with cloud based sensory you might want to consider a network for just that.

The verdict

At last we presented our idea to the judges. Everything worked flawlessly and we got home with a special price for the best NEST integration. The first price went to a team that set up

guided cooking using a retrofit mixer and a speech controlled android application. The second price was won by a team that gamified their shared accommodation. The trick: whenever a flat mate does unloved housework such as taking out garbage, moping the floor or emptying the dishwasher he is awarded with a certain number of bonus points. The third price went to a team that build retrofit for a washing machine and set up an application that allows you to provide your device for community service.

Final thoughts

So, we had an amazing weekend with in an environment where we really could feel the flow and excitement of free flowing ideas. In addition, we are quite impressed what is possible to build in bit more than a day. Nevertheless, we learned that it is sound advice to keeping an open mind about the vision you want to realize when taking part in such an event. We are glad that we switched our initial idea after we've learned that it was not as unique as we thought it was.