

## **The Boonty Project**

### **What was our idea?**

Our basic idea was to create a plantation that can take care of itself without the interference of humans. The way we wanted to do it was by creating sensor nodes that would measure the temperature, light intensity, air pollution and humidity. Then, when you have installed several sensor nodes they would send their data to a central point in the wireless network. The data is then going through some calculations to check if the value that was measured is valid or not. For example the light sensor might suddenly detect a lightning bolt in the sky that generates a lot of light, but that is only for a short moment and should not be taken into account. After all the calculations are made the values from each node are compared with each other and based on the outcome an event might take place, such as a sprinkler that turns on when sensors near each other sense that the humidity of the soil is getting a bit low. So the sensors are negotiating with each other to see what actions would benefit the plantation. This way a more specific climate for each segment within one plantation will be created. We also wanted to measure the growth of the plants so we could see in which segment the plants are growing the best and based on that we wanted the system to automatically adjust to copy that climate all over the plantation. So basically the system is learning how to create the best climate for a certain plant and will keep it up to date by itself. What we would have in the end is a wireless sensor network in a plantation that sends the conditions within the plantation to a central point that determines what should happen to optimize the climate for the plants and learn from itself by measuring the growth of plants.

### **What did we do?**

We made 1 real sensor (kokos)node that can measure the temperature, the air pollution, the light intensity and the humidity. That was basically what we wanted to measure in the first place, but after some research plants need a lot more than that. Of course we already expected this, but we thought it would be best to keep it somewhat simple and not go all out on the complexity of maintaining a plantation when we have so little time. So in the end we got 1 node that can collect data and send it to the 'central point' where we also simulated multiple nodes. Then at the central point we determine whether the incoming values are valid and if they are we compare them with other values and activate a feature, which is represented in the prototype by a simple LED. So what we left out in the end was basically measuring the more complicated conditions in a plantation and checking in what segment the plant grows best and adjust the system to that.

### **Is this UbiComp (Ubiquitous Computing, which was a requirement for this project)?**

Definitely, it is self-governed, because it requires no human input. It will take action on itself based on the measurements it does. However it is possible to intervene, because we don't want some 'airbus that won't take off problem', which in this case would be someone entering the plantation when there are many gasses in the plantation that are not human friendly. Even opening the door could trigger some effects that would harm any human inside. Next to that, it is also context-aware due to the sensors that detect important things going on in the climate inside in the plantation. It measures humidity, temperature, light intensity and the air quality.

It is intelligent since it will compare measurements with each other and based on that it will determine by itself what is best course of action for the plantation, and if more of our ideas would be implemented it would also see what climate is best for the individual plants by checking different segments and comparing the growth of plants in those regions.

Furthermore, it is also barely noticeable, only when you want to, because the sensors are hidden in the plantation and there will only be a monitor, just to allow a human to control the system if that is required for some reason, although a human would not have to go to the plantation at all. So actually, the human could just forget about the plantation, except for the harvest of course which could eventually also be automated.

The system is also distributed since the data will be compared to the data from nearby nodes, even though it is processed at a central node first. So the network is linked together by all the nodes and the measurements they do.