AKDENIZ UNIVERSITY

INTERNET OF THINGS

FINAL PRESENTATION REPORT

SMART PLANT IRRIGATION PROJECT

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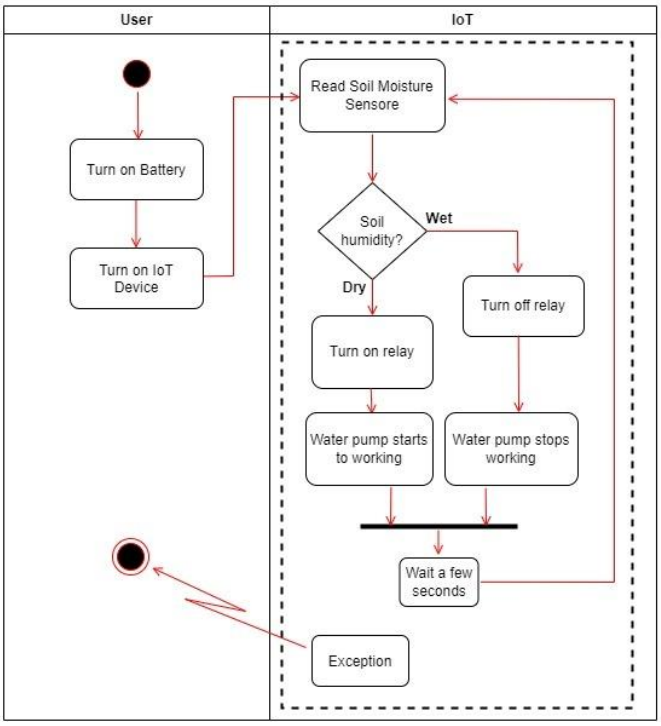
THE GOAL OF THE PROJECT

As everyone knows, the human population is growing rapidly and we cannot efficiently consume the resources our Earth offers us. With the Smart Irrigation System, we aim to alleviate the burden of responsibility of the people responsible for agriculture, contribute to the rate of usable water on earth by using our water resources efficiently, and be practical in production. We will design a small sample for you. However, our goal is to use this project in large greenhouses and fields. What needs to be done for this is to use a larger energy source, water tank, and hose. Thanks to our project, it will be possible to easily cultivate on lands where access to water is difficult but the soil is fertile. The project has two main parts. The first is to create the physical, that is, the hardware structure of the irrigation system. The other is to code the website part. The website part is important because, with this site, the working status of the system can be followed. We all know that growing plants in our homes entails great responsibility. If you are going on a long vacation, we must either give our neighbor the key to our house or find a place to entrust our plants. We thought that this irrigation system could be used as a solution. The person puts the amount of water that the plant may need in a suitable container. Then, it places the mini submersible water pump in the system we prepared into the water. He then fixes the moisture meter and the water pipe to the soil in a suitable way. For the raspberry pi used in the system to be operational, it must receive electrical power. For this, a plug can be preferred. Another situation that requires energy is the water pump. We can get the energy of the water pump from the battery. In our system that is always open, we can perform the irrigation process in two different ways. First, the system is started with the instruction given by the user on the server and is stopped by the instruction given by the user. Secondly, the system performs automatic irrigation according to the humidity rate determined by the moisture meter sensor, which is stuck in the soil, and when the humidity reaches sufficient saturation, the system is stopped by the command given to the system. During automatic operation, the user can determine how the system will work, that is, how many seconds of water to be given and how many seconds to wait, from the code section. When a problem occurs in the system, the amount of water in the tank decreases, or the irrigation process is successful, the last status is sent to the user as a notification.

What I have told so far are the plans we made at the very beginning of our project when we set out on this road. Well, I will talk about what we did in this project. First of all, as a result of our research, we ordered the equipment needed for the project from an affordable site. We had the raspberry pi and the necessary cables. Then we set up the system's connections step by step. Contrary to our expectations, we achieved functional results with the code we wrote in fewer lines. Of course, there were points where we got stuck in this process, but I will talk about them in the issues section. When we came to the last stage of connecting with the system through the server, we realized that for now, we only have the competence to establish a connection within the same local network. We are planning to develop our project in the future, but we have decided to leave it at this stage as we do not have time in the current process. As a result, our remote irrigation system can be controlled voluntarily if a user in the same local network connects to the server. We have also been able to code the automatic working status of the humidity sensor, which is the main purpose of the project. We have achieved most of our goals, if not completely.

ALGORITHM



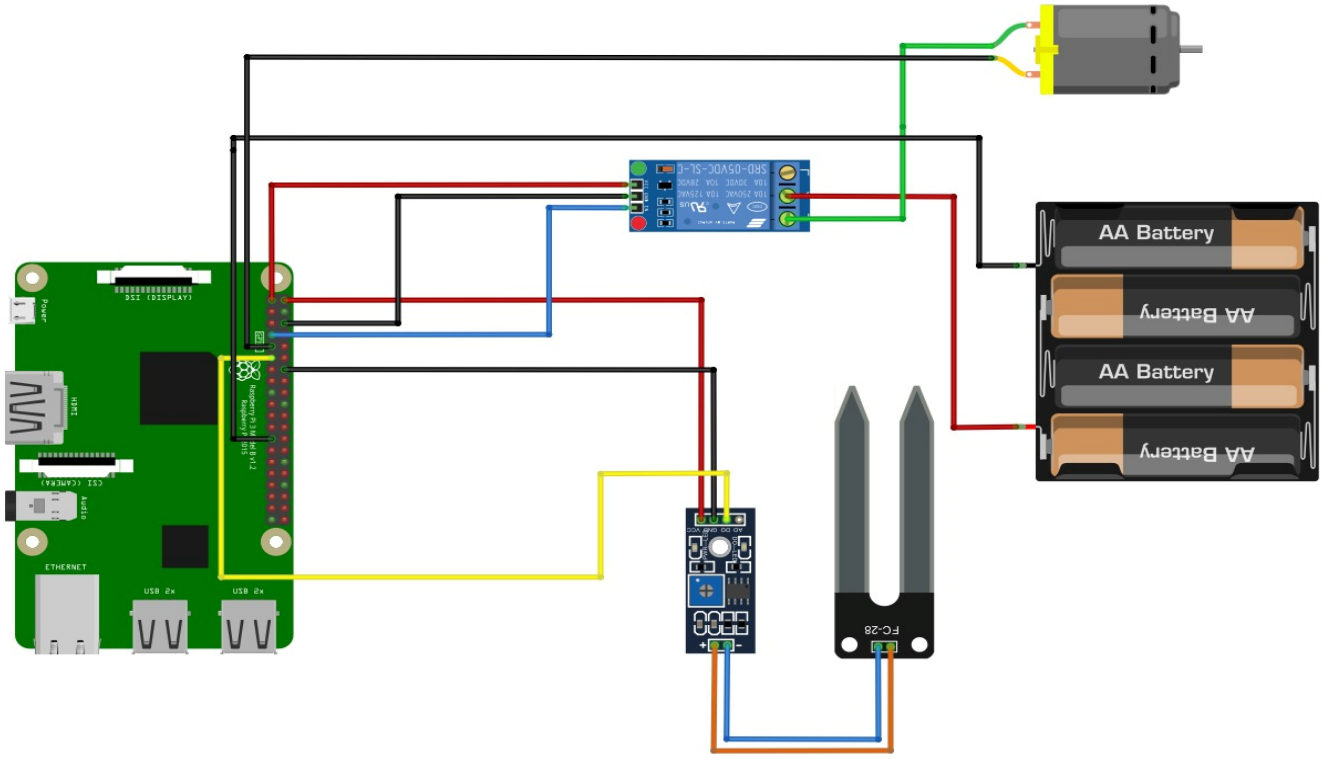
The diagram given on the side represents the operation of the system in an automatic setting over the server. Apart from this, it is also possible to run it manually on the server. The only difference is that the user determines the start and stop. However, the humidity sensor decides whether it works or stops in the automatic system.

SOURCE CODE

- https://github.com/SfrOztrk/iot_soil_moisture_project

SENSORS AND DEVICES

PROTOTYPE



ISSUES

- The battery and pump cables were not standard jumpers, so we had to think a bit about how we could connect them. One of our solutions was to complete the system by using an alligator cable, but then we solved our problem when we expanded the space at the ends of the cables a little more and tangled them together.

- The biggest problem we faced when we first managed to start the water pump was not being able to stop it again. Frankly, this problem took some time, but we found a solution, albeit late. The problem was related to the pin we used for the connection on the raspberry pi. The first pin we used was 5V, but then we handled the stopping process by using a 3.3V pin.

- When we stop the process while the system is in automatic irrigation, the system continues to work, it does not stop. We have not yet found a solution to this problem.

TECHNOLOGIES

- HTML
- CSS
- jQuery
- GitHub
- Python
- Flask / flask_restful
- RPi.GPIO

REAL STATE OF THE SYSTEM