Multiple GSM Device Exchange Process Parameters in GSM and IoT Network

Goce Stefanov, Maja Kukuseva Paneva[1]
[1] Faculty of Electrical Engineering, Goce Delcev University, Stip, N. Macedonia.

INTRODUCTION

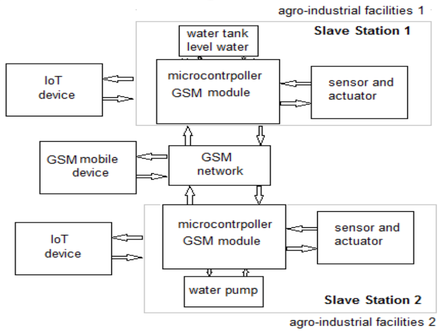
The new needs and directions in the development of the fourth industrial revolution, the so-called industry 4, define the tasks and solutions that electronics must fulfill.

Modern electronic systems provide the ability to process and store measurement data on-site and transfer it to the IoT and GSM SIM network. We witness daily tribunes and panel discussions sponsored by companies and even governments for the introduction of the terminology of digital agriculture, i.e. the introduction of smart electronic solutions in agriculture.

Also, smart electronic systems are often integrated into a complex RF, GSM and IoT network complemented by visualization and storage systems such as LCD displays, SCADA, HMI (human-machine) interfaces. The paper provides a solution for an electronic system that provides integration into a GSM network of process parameters from two remote agro-industrial facilities and their distribution to a GSM mobile device as and IoT network. The solution enables the visualization of process parameters locally on LCD displays and remotely on an mobile device in GSM network and cloud in IoT. A data log file is also provided for store the value on the process parameters on a local computer.

DESIGN OF THE PROPOSED ELECTRONIC SYSTEM

The electronic system consists of two Slave stations located in each of the two agro-industrial facilities. Each of the Slave stations measures the process parameters in the specific agro-industrial facility and sends them to a GSM device. The Slave stations also exchange data with each other about the state of the equipment and the process in the agro-industrial facilities. The design of the prototype electronic system, subject to the paper, includes the design of the system for measurement, monitoring and transfer of the process parameters on mobile device through GSM network and IoT device through internet network. The block diagram of this electronic system is shown in Figure 1.



EXPERIMENTAL RESULTS

Figure 14 illustrates the prototype on the Slave1 station, while Figure 17a) shown print screen of the mobile device that illustrates the correct operation of the electronic system in Slave 1 station. Figure 18 presents the prototype on the Slave 2 station, while Figure 21 shown print screen of the mobile device that illustrates the correct operation of the electronic system in Slave 2 station.

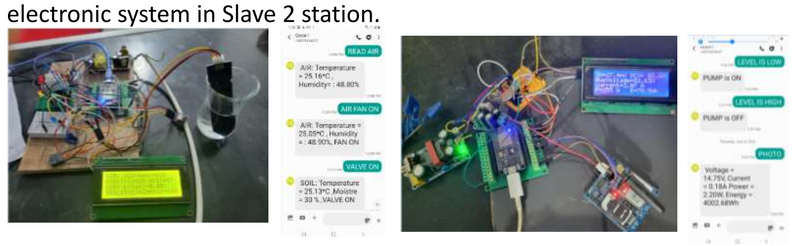


Figure 22 shows print screen the current values of the process parameters in the Slave 1 and Slave 2 stations transferred in IoT network via Blynk cloud [23]. It can be especially emphasized here that the two red LED lights indicate that the fresh air supply fan and the water supply valve in the irrigation line are turned on. The reason for this is the alarms initiated with the text Soil Moisture Is Low and CO2 Is High.



CONCLUSION

The paper provides a solution to a current problem in every industrial branch, especially in the so-called green energy and smart agriculture. It combines connection in GSM and IoT networks of an agricultural plant with multiple remote facilities. The solution measures, visualizes locally on LCD displays, stores locally in a data log file and sends the process parameters from both facilities to the GSM and IoT networks. Also, the two agricultural facilities exchange data with each other through the GSM modules installed in them.

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