HOME PLANTS` IRRIGATION INFORMATION MEASURING SYSTEM

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In today's world of using microcontrollers, digital sensors and wireless data exchange interfaces, distributed to improve the quality of technological processes [1], also the use of these technologies in household processes helps to automate or simplify different routine processes.

The goal of the development information-measuring system is to improve the quality of the plant growing control process in households by measuring plant growth parameters.

The functional scheme of the information-measuring system (fig. 1) includes five soil moisture sensors, one temperature sensor, a microcontroller, and a computer. Each soil moisture sensor is installed on the corresponding plant type, in this way, it gets possible to monitor the soil moisture parameters of five types of plants planted in separate areas.

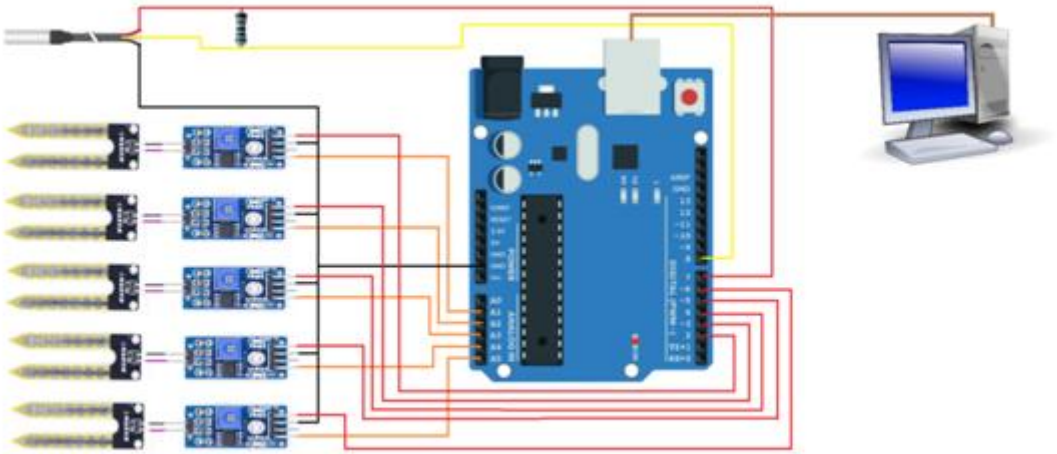

Fig. 1 Functional scheme of information-measuring system

The approximation in the range from 1% to 86% of soil moisture using the method of least squares for resistive soil moisture sensor YL-69 was developed. The linear equation for the resistive soil moisture sensor was obtained.

$$y(x) = -0{,}049x + 5{,}022 \quad (1)$$

According to the results of the calculations, the value of the maximum absolute linearization error is equal to 1.98% of soil moisture, and the maximum value of the reduced linearization error is equal to 2%.

Below is the algorithm of the microcontroller subprogram for measuring parameters from the sensors of the home plants` irrigation information measurement system (fig. 2).

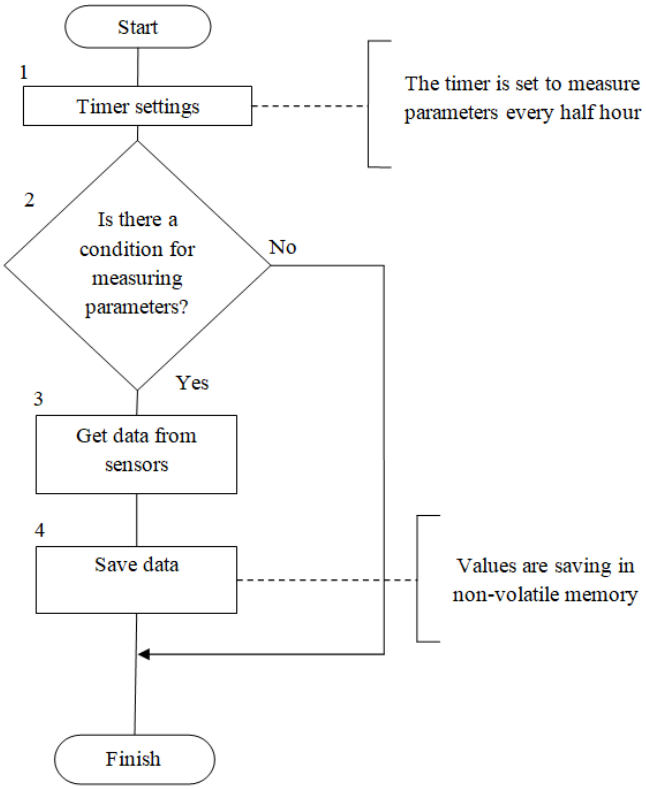

Fig. 2 Algorithm of the microcontroller subprogram for measuring parameters from sensors

During this work, a linear characteristic for the resistive soil moisture sensor YL-69, which simplifies further calculations was found. The following documents of the project: automation scheme, electrical circuit diagram and list of elements were developed and the microcontroller software was developed and tested which makes it possible to monitor the state of plant parameters using the developed home plants` irrigation information measurement system.

References

1. T. Eldemerdash, etal. IoT Based Smart Helmet for Mining Industry Application. – International Journal of Advanced Science and Technology, 2020. – vol. 29, no. 1, pp. 373-387.