ABSTRACT

The system developed consists of both hardware and software modules. The objective of this final project is to design and develop a soil quality detection device and an automatic watering system for chili plants. The resulting prototype includes a soil moisture and ambient temperature monitoring system integrated with an automatic watering device, using the ThingSpeak platform to transmit moisture and temperature data via API, which is subsequently displayed on the ThingSpeak website. The implementation focus is on home gardens. The problem addressed in this research is the need to maintain optimal soil quality for chili plant growth efficiently and automatically. The aim is to create a tool capable of monitoring soil moisture and ambient temperature, as well as performing automatic watering based on the data obtained. The research results show that this prototype is effective in maintaining soil moisture at an optimal level (70-79%) for chili plant growth, thereby ensuring good growth conditions automatically and efficiently. The plants were able to grow from an initial height of 12 cm to 19 cm within one week, and 1 liter of water was sufficient for one week with three watering sessions, demonstrating that this device is significantly efficient in conserving water usage. In conclusion, this prototype successfully improves and stabilizes soil quality, and significantly conserves water usage through efficient automatic watering, while the temperature sensor helps maintain optimal growth conditions.

Keywords: NodeMCU, Chili Plants, Automatic Irrigation Systems, IoT, ThingSpeak.