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# Water Level Controller with Weather Forecasting Using 8051 Microcontroller

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Kaniskaa MS ; Madanagopal C ; Deepa M ; Hariprasath K All Authors

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### Abstract



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#### Abstract:

Water management is a salient role of engineers due to its importance in everyday activities. The proposed work aims to eliminate over- and under-irrigation, as well as water waste, by monitoring soil moisture and enabling automatic switching of the pumping system to adjust the moisture level. Along with the soil moisture levels, the weather forecast is also considered to regulate the moisture level. The proposed design implements a water level controller by tracking the soil moisture levels using an 8051 microcontroller and interfacing it with sensors. A threshold value is set, for both lower and higher values of soil moisture and the live value is constantly compared. When the value is below or above the respective lower and higher threshold values, the motor pumping system is automatically turned on or off respectively. The output values are observed using a web application via an Arduino board. The design also uses Node MCU which is integrated with ThingSpeak to aggregate and store data. The web application has an additional feature of weather forecasts, which is live data obtained using an Application Programming Interface (API) key with Weatherstack API. This weather forecast is used to control the motor and automatically change its state based on the soil's present state of moisture level and the weather that day. This feature makes the design more reliable and practical for integrating it with mainstream agriculture and gardening activities.

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References

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**I. Introduction**

Managing water is one of the important issues in today's world, as it is one of the fundamental needs of human beings. Mismanagement of water in agriculture contributes to a lot of water wastage. This includes situations like excess irrigation, surface run-offs, evaporation of surface water, and under irrigation. The root causes for these problems are, not analyzing the soil's water requirement periodically and not planning the irrigation schedule with respect to the weather conditions. The purpose of the work is to solve this issue by designing a water management system that controls the on and off state of the water pumping system based on the moisture level and with respect to a lower and higher threshold value. This data is observed in a website along with the current state of the water pumping system to the soil. The website also has a weather forecast feature and it instructs the pumping system to switch on and off based on that particular days forecast.

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