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[Skip to Main Content](#)



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Patent Search

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Abstract:

The invention discloses a smart multi-zone automated watering and environmental monitoring system for terrace gardens. The system comprises soil moisture sensors, a pH probe, and a gas sensor interfaced with a microcontroller that controls individual water pumps based on real-time sensor data. The microcontroller executes threshold-based logic for zone-wise irrigation and generates alerts when pH or gas levels exceed preset limits. Data are displayed locally on an LCD and remotely via a LabVIEW interface, with optional IoT connectivity for cloud-based access. The system optimizes water usage, ensures balanced soil conditions, and enhances plant health through autonomous operation, real-time visualization, and remote monitoring, offering a scalable and cost-effective solution for urban horticultural applications.

[Complete Specification](#)

Description:FIELD OF THE INVENTION

[001] The present invention relates generally to the field of automated irrigation and environmental monitoring systems for terrace or small-scale gardens. More specifically, the invention pertains to a smart watering system equipped with multi-zone soil moisture, pH, and gaseous concentration sensing capability, which enables precise irrigation control, environmental assessment, and system automation through a microcontroller-based architecture. The invention further relates to the integration of such hardware with a software interface developed in LabVIEW or equivalent platforms to provide real-time data visualization, parameter adjustment, event logging, and remote monitoring capability. The invention thereby falls within the technical domain of agricultural automation, environmental monitoring, and Internet-of-Things (IoT)-enabled irrigation management systems.

BACKGROUND OF THE INVENTION

[002] Terrace gardening and small-scale urban cultivation have become increasingly popular due to space constraints and the need for sustainable food and greenery within residential environments. However, manual watering of terrace gardens is time-consuming, inconsistent, and often inefficient in maintaining the optimal moisture levels required by different plants. Variations in sunlight exposure, pot size, and soil composition among terrace garden zones further complicate uniform irrigation, leading to overwatering or underwatering, plant stress, and wastage of water resources.

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