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The Application of Internet of Things Technology in Facilitating Automated Irrigation

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ABSTRACT

In agriculture, the Internet of Things can enhance crop yields and optimise time efficiency. Automatic plant irrigation is a modern method of watering that reduces the need for human intervention. Farmers and households face numerous challenges when using technology to assist with tasks, especially in planting in rural areas. This issue arises due to a lack of interest and understanding among citizens or the general populace regarding the application of technology. We aim to tackle this issue by providing open training and hands-on experience in using automatic plant watering systems. The methodology used in the seminar to introduce automatic plant watering systems is primarily instructive and demonstrative. The deployment of automated irrigation systems under a non-profit initiative in the village has enhanced our comprehension of technology's significance in agriculture. This technology offers an efficient solution for simplifying plant irrigation, conserving electricity and water, and enhancing plant care.

Keywords: Automated Irrigation, Internet of Things, Technology

INTRODUCTION

The Internet of Things (IoT) denotes a network of interconnected physical devices that can communicate with one another via the internet. In agriculture, the Internet of Things (IoT) can be utilized to gather and analyze environmental data, including temperature, humidity, and plant hydration requirements (Mohammed & Abdu, 2024). The advancement of technology is escalating daily, as humans consistently seek tools or innovations to facilitate their labour, making technology an essential component of human life. The Internet of Things is a technology designed to connect and facilitate data exchange among devices and systems via the internet (Hunko, 2024). The advancement of technology is escalating daily, as humans consistently seek tools or innovations to facilitate their labour, making technology an essential component of human life. The Internet of Things is a technology designed to connect and facilitate data exchange among devices and systems via the internet (Sudhi, 2024). The Internet of Things is advantageous for addressing issues that continue to rely on traditional systems by transforming them into automated solutions, such as improving efficiency in agriculture, healthcare, and manufacturing processes.

In agriculture, the Internet of Things can enhance yields and optimize time efficiency. Automated plant irrigation is a modern method of watering that minimises the need for human labour. Consistent irrigation and adequate moisture levels will deliver quantifiable nutrients to enhance plant quality. Watering plants is a crucial maintenance task, since it necessitates adequate water intake for photosynthesis, which is essential for growth and development.

Farmers and the community typically engage in manual irrigation according to a predetermined schedule; nevertheless, this practice is inefficient since it demands considerable time and effort (Irawan et al., 2022). The owner cannot abandon the plant for an extended period, as it would suffer from water deprivation, leading to wilting and death. In a community service initiative, partners inevitably encounter challenges. The investigation reveals issues related to the community service plan, namely a deficiency in public comprehension of the utilisation labor. The utilization of technology is essential for facilitating daily tasks (Pham et al., 2021). The use of cellphones remains limited in facilitating daily tasks. Farmers and households in Randuwatang village, Kudu District, face several challenges, including the limited use of technology to facilitate agricultural tasks, especially in planting. The lack of interest and understanding regarding the use of technology, especially among citizens,

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contributes to this issue. We want to address this issue by offering open teachings and practical experience with tools, including autonomous plant watering systems (Giri et al., 2016).

The author uses a moisture sensor to automatically water plants. This tool aims to facilitate listeners' practical understanding of technology's application in agriculture. The objective of this action is to ensure that farmers and other villagers comprehend that using existing technology can alleviate or resolve daily challenges, particularly in agriculture and horticulture (Lopez, 2021). The goal is to empower individuals to maximize their use of technology and deepen their understanding of its applications.

RESEARCH ELABORATIONS

The methodology employed in the seminar regarding the introduction of automatic plant irrigation is an educational or demonstrative approach. The author promptly executed a demonstration and presentation to the public about automatic plant irrigation (Giri et al., 2016). The equipment used consists of automatic plant watering systems that do not include Arduino or humidity sensors. The execution of community service initiatives in this program is endorsed by several factions of the village administration, including local leaders and agricultural committees, who recognize the importance of sustainable practices in enhancing community agriculture. The execution of this activity will attain success and efficiency through the collaboration of local inhabitants. This exercise took the form of a seminar that introduced automatic plant watering, utilizing tools and PowerPoint presentations to initiate the proceedings. The session commenced with a presentation on automated irrigation and proceeded with a demonstration of a basic device utilizing a humidity sensor. The exercise was implemented at the village hall.

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RESULTS AND DISCUSSIONS

The automatic sprinkler system facilitates effortless plant irrigation without user intervention, saving time and energy in system maintenance. Utilize moisture sensors to ensure that plants receive a sufficient and regular supply of water by precisely assessing their hydration requirements. Minimize water wastage by using a more effective irrigation system. This gadget provides advantages for farmers and the public by ensuring plant health without the concern of inadequate watering, particularly for those who are occupied or distant from their plants. This technology facilitates the progression of agricultural advancements and exemplifies efficient and environmentally sustainable modern agricultural innovation. This initiative will offer new insights to the community, particularly the youth, on the significance of automation and technology in agriculture and will cultivate increased interest in technology-driven agricultural practices.

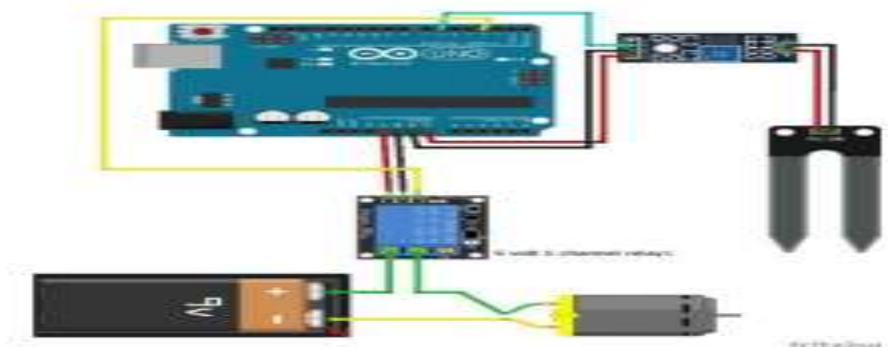


Fig 1 Automatic Plant Watering Sensor

The service implementation team of the Ministry of Agriculture and Information Technology concentrates on the creation and execution of automated irrigation technologies. This support program aims to enhance public comprehension of how automation technologies may simplify daily duties, particularly in routine agricultural operations like crop irrigation. Fifteen individuals from the village hall attended the course.

Trainees are required to comprehend the fundamental principles of automated irrigation, which uses moisture sensor technology. A demonstration of the automatic watering system is presented to provide a practical understanding of its operation, encompassing installation and smartphone connectivity for remote monitoring and control. This training session offers both

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theoretical knowledge and practical exercises, enabling participants to observe the tool's application in real-world scenarios. Participants exhibited considerable enthusiasm for engaging in each phase.

Upon completion of the exercise, participants were requested to complete a questionnaire to evaluate the change in knowledge levels before and after the training. This study's results seek to demonstrate the degree to which socialization has effectively enhanced public comprehension of automation technologies in agriculture. The outcome indicated that participants' comprehension improved by 88% following the socialization of automatic plant watering sensors. This service activity aims to educate participants on technology usage and to motivate them to actively incorporate technology into their daily lives, particularly to enhance agricultural productivity in rural regions.

CONCLUSIONS

The deployment of automated irrigation systems under a non-profit initiative in the village has enhanced our comprehension of technology's significance in agriculture. This technology offers an efficient solution for simplifying plant irrigation, conserving electricity and water, and enhancing plant maintenance. This practice enhances individuals' comprehension of how technology can be seamlessly integrated into daily life to facilitate work and augment productivity. Automatic irrigation technology is anticipated to be extensively implemented in the hamlet with the backing of the local government and stakeholders, facilitated by awareness campaigns and ongoing training. Enhancing access to technology and internet resources is essential to optimize the utilization of these instruments, particularly for farmers. Moreover, continued advancement via research and partnerships with academic institutions is anticipated to enhance the efficacy of these tools and tailor them to regional needs. The establishment of agricultural technology-oriented communities is promoted to facilitate the exchange of experiences and inventions that enhance the community.

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