

Survey on Click for Grow System

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Abstract— Click for Grow is an IoT based project that provides an environment to grow plants all Seasons, even on summer and winter days. However, environmental factors inside the plants such as high temperatures and a high humidity can negatively impact the plants. Basically, controlling this environment is essential in order for the plants to grow strong and healthy. The aim of this project was to design and build a plant controller that can maintain the temperature, humidity, by acting upon live sensor readings and be able to display the status of the system to the owner. If the moisture level is below threshold value, turn on water supply and Provide Water to Plants through Water Pump. The project was split into two parts: programming a micro controller to act as the central hub that manages the sensors and water supply on/off.

Key words: IoT, Micro controller

I. INTRODUCTION

Click for Grow project is working towards Provide water to plants automatically after sensing the moisture level of the plants. With the help of Click for Grow you can grow any plant at home.

Click for Grow project focuses primarily on reducing the wastage of water and minimizing the manual labor on field for irrigation. Click for Grow help you grow plants quickly and easily. The Click For Grow gardening system is extremely easy to use and maintain! Click for Grow applications of the IoT typically use sensors to assist in environmental protection by monitoring air or water quality, atmospheric or soil conditions.

IoT (Internet of things) helps organizations and individuals access information, facilitating major decision making processes. It revolves around increased machine to machine communication and reduced human-to-human or human-to-computer interaction. It refers to a wireless network between objects. An object can be a physical device, building, vehicle, machinery etc. embedded with, sensors, electronics, software actuators and network connectivity to collect and exchange data. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved accuracy, efficiency, and economic benefit to reduced human intervention.

A. Goals or Objectives:

- To sense soil moisture, humidity of plants and water flow rate.
- To transform and freshen up your life with Click for Grow system that take care of plants automatically by watering them.
- To make sure they have enough light, oxygen and nutrients at all times.

II. LITERATURE SURVEY

“Grey Water Reuse for Agricultural” – After installing the decentralized gray water treatment systems in a small rural community it contributes to a more sustainable water supply. Grey water is all waste water generated in households or office buildings from streams without fecal contamination. The outcomes of this survey, offer insights on people’s views on waste water issues and general water, as well as their practices, motivation and concerns related to using grey water treatment for a portion of their household waste water and reuse of the treated grey water for irrigation. After evolving the survey responses, it provides evidence that rural communities are willing Water 2012, 4581 to accept reuse of treated grey water for irrigation. Furthermore, some people in the studied area are willing to learn more about grey water treatment and reuse in order to operate grey water systems for irrigation purposes .The grey water use in gardens helps to achieve some goals of ecologically sustainable development in Urban Areas.[1]

“Farmer field schools and local agricultural research committees: complementary platforms for integrated decision-making in sustainable agriculture” - Farmer field schools (FFS) and local agricultural research committees (CIALs) constitute two platforms for promoting integrated decision-making and innovation for sustainable agriculture by farmer. FFS offer community- based, non-formal education to groups of 20–25 farmers. Discovery-based learning is related to agroecological principles in a participatory learning process throughout a crop cycle. By a team of four or more volunteer farmers elected by the community CIALs are staffed as a permanent agricultural research service. The committees create a link between local and formal research. FFS and CIALs both mainly focuses on identifying concrete solutions for local problems with having various commonalities, but they apply different styles of experimentation and analysis. FFS and CIALs, both increase the capacity of individuals and local groups for critical analysis and decision-making; and both stimulate local innovation and emphasize principles and processes rather than recipes or technology packages. [2]

“Growing or connecting? An urban food garden” - Food security is a critical development issue in South Africa and government policy advises on the household growing of vegetables for nutrition. South Africa has the highest rates of HIV/AIDS in the world and this has had a devastating effect on both nutritional status and food security. The impact of HIV/AIDS is also felt across household’s food security mechanism where those affected are unable to work to gain income, grow food and family support networks are most stretched by the presence of sick relatives and orphans. Urban food gardens are increasingly common around the world in high-income countries but less so in low-income countries. [3]

“A literature review of on-farm research design and data evaluation methods”- On-farm, field scale agronomic research is not a new phenomenon. For example in the 1940's and 1950's, most open pollinated corn varieties were replaced by high-yielding hybrids across North America. During this time, obvious yield differences among the hybrids became less and less apparent, requiring more precise comparisons. The field strip test was institutionalized to fill this on- farm research need. However, debate then increased among scientists as to the relative merits of conducting such research, compared with highly controlled small plot research replicated and randomized over relatively few locations with field variability tightly controlled (Duvick, 1991). Over the past 15 years, on-farm research has received new prominence in agricultural systems research which attempts to reduce environmental damage and to increasingly serve the needs of society, including the farmer (Anderson and Lockeretz, 1991). Collaboration between university researchers, farmers and producer organizations has increased through programs such as the United States Department of Agriculture's Low-input/Sustainable Agriculture Program where such collaboration is requisite to funding approval. This agency has channelled unprecedented federal funds to groups doing on-farm research (Anderson and Lockeretz, 1992). [4]

“Literature Review of the Agricultural Distribution Services Sector: Performance, Efficiency, and Research Issues” - A competitive agriculture sector requires not only more productive farms and agricultural processors, but also a more efficient agriculture distribution system. This is especially the case for the Philippines being an archipelago of thousands of islands, of which only a few are large enough to have the scale of farming that allows economies of scale in processing. Thus, in comparison to Vietnam or Thailand or Peninsula Malaysia, the Philippine agricultural economy is far more fragmented and vulnerable to the inefficiencies and vagaries of the country's distribution system. There is a familiar lament about the state of the Philippine agricultural distribution system; that is, it is cheaper to bring corn from Bangkok to Manila than to bring corn from Cotabato to Manila. This familiar lament exemplifies a fragmented agricultural economy. This literature review characterizes the structure and performance of the agricultural distribution sector in the Philippines. Drawing from previous studies, it describes agricultural marketing in the country as a complex and fragmented system. The paper looks at several models that deal with market integration and price correlations, and emphasizes the urgency of applying these methods in analyzing different commodity markets in the country. It discusses issues such as monopoly power in agricultural distribution, transportation, price margins, technology and infrastructure, based on the existing literature. Finally, it presents a number of major research gaps and corresponding suggestions for research.[5]

“Android Arduino Interface with Smart Farming System” - Agriculture is the important construction of critical food crop. Agriculture is represented as manufacture, dispensation encouragement and division rural products. Agriculture plays an important role in the entire life of a

given nation. Agriculture is the spine of financial system of a given country. Sensors provide a bridge between the actual objective and essential humanity. Sensor allows the capability to view the earlier unobservable at the fine decision above huge spatiotemporal balance. It has a thick collection of possible application to manufacturing, knowledge, carrying, municipal roads and Security. The sensor node is always called a mote, is a node in a sensor arrangement that is proficient of performing some dispensation, assembly sensory in order and communicates with other connecting nodes in the network. It determines the temperature, pressure, humidity and soil conditions.[6]

“The literature review on firm growth factors” - The firm growth factors is an important topic in firm growth research. The scholars in this field have achieved significant outcomes by empirical study and factors model. This paper summarized the firm growth factors outcome and identified its the future trend by literature review.[7]

“https://store.arduino.cc/usa/arduino-starter-kit” - It provides the lots of information about Arduino Uno kits used in IOT based project, also show the different equipment such as sensor, water pump, LED display, bread board.[8]

“https://www.clickandgrow.com/pages/about-us” - It provides the information about sensors moving towards our goal through offering high-quality indoor gardens and food growing systems that support our dream of building large, self-sustainable farms to locations where they are needed the most.[9]

“ieeexplore.ieee.org/document/5886983” - it provides information about firm growth factors outcome and identified it's the future trend. It can be shown the diagrams for related to firm so it can be easy to understand working of firm factors. [10]

III. PROPOSED WORK

Click for Grow project is working towards provide water automatically to plants. The complete flow of the project and the functional modules of the project are as follows:

Flow of the Project:

There are different sensors i.e. Soil Moisture sensor, humidity sensor, temperature sensor used to sense the soil. We have to first apply sensor to plants and read temperature, moisture level and humidity of plant and according to moisture level we have to turn on water supply and provide water to the plants through water pump.

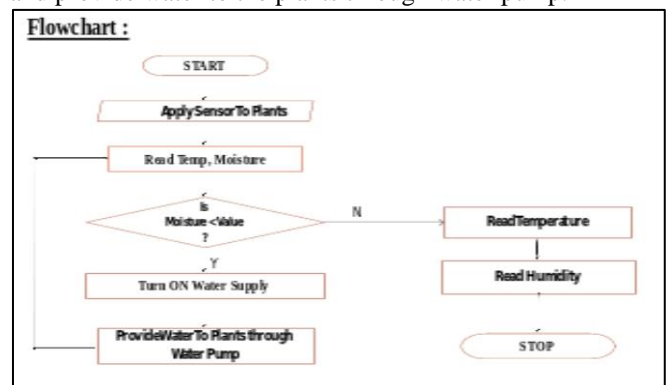


Fig. 3.1: Flowchart for Click for Grow

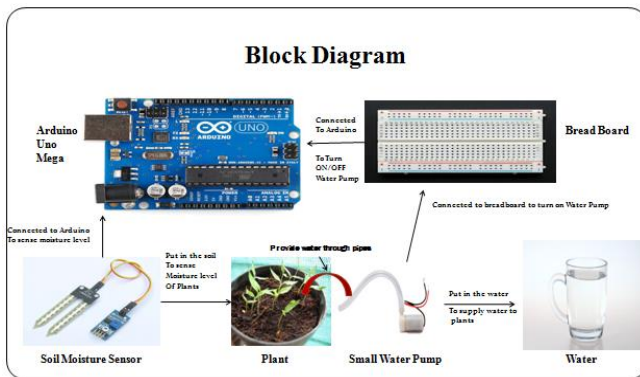


Fig. 3.2: Block Diagram for Click for Grow

A. Functional Module:

The whole system is divided into the four modules. They are Assembly Module, Sensing Module, and Watering Module & Displaying Module.

1) Assembly Module

- 1) Arduino Uno Kit: Arduino is used to connect all the devices such as soil moisture sensor, water pump, water controller and transmitter. Arduino controls the sensor and water supplied to plants.
- 2) Bread Board: A Bread Board is a device used as a construction base in developing an electronic circuit. It is used for multiple functions to create a variety of products using electricity. We are using it for building the arduino circuit and connecting jumper wires and LED

2) Sensing Module

- 1) Soil Moisture Sensor: Soil Moisture Sensor is widely used to detect the moisture of soil. So in this project sensor is used to sense the moisture level of soil by just inserting the sensor into the soil. We can easily read the output by using arduino.
- 2) Humidity Sensor: Humidity Sensor senses, measures, and reports both moisture and air temperature. In this project Humidity sensor is used to sense the humidity, moisture and temperature of plants.

3) Watering Module:

Small water pump is a basic practical technique to pump water. It is used to supply water. We are using water pump to supply water to the plant.

4) 4) Displaying Module:

LED Display is used for displaying the characters and symbols which is interface with a microcontroller. In this project it will display the moisture level, humidity and temperature of plants.

IV. CONCLUSION

This Survey helps in growing plants by providing water to the plants. It reduces the wastage of water and minimizing the manual labor on field for irrigation. We are able to interface with Arduino Uno kit and with the help of Arduino Uno software we are able to detect all sensor to read or observe moisture level, temperature, humidity of soil and provide water to plants through the small water pump. This system help you to grow plants quickly and easily. The Click for Growgardening system is extremely easy to use

and maintain. This system also gives the recommendations to the farmers to grow their plants easily and to store the wastage of water.

REFERENCES

- [1] FAO. Coping with Water Scarcity. Challenge of the Twenty-First Century UN-Water; Food and Agriculture Organization: Rome, Italy, 2007.
- [2] Aizen, H. (1998) ElComité de InvestigaciónAgrícola Local de San Bosco: Estudio de Caso.Cali, Colombia: Centro Internacional de Agricultura Tropical.
- [3] ArmstrongD.A survey of community gardens in upstate New York: implications for health promotion and community development, Health and Place, 2000, vol. 6 (pg. 319-327)
- [4] Carter, M.R. 1992. Characterizing the soil physical condition in reduced tillage systems for winter wheat on a fine sandy loam using small cores. Can. J. Soil Sci. 72:395-402.
- [5] Acharya, R. (2000). Market Power and Asymmetry in Farm-Retail Price Transmission. Paper presented atAAEA Annual Meetings in Tampa, FL, August 2000.
- [6] Raja lakshmi P, Devimahalakshmi S, "IOT based crop field monitoring and irrigation automation" International conference on International System and Control at Nov 2016.
- [7] Xiaodi Zhou ,Business school of Wuhan University, Wuhan, China.
- [8] <https://store.arduino.cc/usa/arduino-starter-kit>
- [9] <https://www.clickandgrow.com/pages/about-us>:
- [10] ieeexplore.ieee.org/document/5886983