Automatic Grip Irrigation Control System Based on Sensors

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Abstract. Drip irrigation are a certain type of irrigation that gives low-pressure water to soil and plants using plastic tubes placed beside or in the plants' roots. It is a substitution of sprinklers or other types of furrowing methods of irrigating plants, which can be used to control the moister and processed by sensors. Sensors and sensors can be used to help the progression of the grip irrigation system. It shall be the coming future of the agriculture in both of small scale and large scale for it can obviously save water and labor in an obvious extent. A drip irrigation is a low-pressure, low-volume lawn and garden watering system that delivers water to home landscapes using a drip, spray or stream. It keeps roots moist, but not soaked, all while using less water than other irrigation techniques. In this study, the designed drip irrigation control system is based on the use of variety of sensors: wind sensor, soil moister sensor and rain sensor. After getting a correct database, we can use the control system based on sensors to make the pouring of water in an automatic way which can obviously decline the amount of water waste in the irrigation procession.

Keywords: Automatic, Drip irrigation, control system, sensor, productivity.

1. Introduction

With the increasing need for water around the world today, water is becoming a much more precious resource that is meant to be conserved. One of the easiest ways to save water in our daily lives is to make Soaker pipes the easiest way to create drip irrigation. These garden hoses have small holes along their length to allow the water to drain away. Although this is a cost-effective option initially, it uses more water than a drip system in the long run. Agriculture is a field that will continuously occupy a large proportion of humans' daily life for it affects all the things we eat. The major problems nowadays are the productivity of food grains, shrinking water resource, declining soli health. Technology on the irrigation control system is a fast movement of productivity in agriculture where natural resources are fixed.

A drip irrigation system has many tangible components. A kit combines the components needed for a particular application. You can find kits to create systems for landscaping plants such as vegetable gardens, flower beds, container plants and trees and shrubs. Some kits allow you to scale the system to meet your irrigation needs. Other kits may provide repair parts or convert pop-up sprinklers for drip irrigation. Backflow obstructers, or siphon-proof devices, prevent water from the irrigation system from flowing back into the feed water and contaminating drinking water when the system is turned off, a requirement in most areas. The pressure regulator or decelerator makes the irrigation system and the water pressure compatible. Without such a device, a typical household water supply device puts too much pressure on a drip irrigation system. Filters prevent debris from clogging pipes and imitators. Some pressure regulators have a built-in filter. Flexible tubes carry water. The black or brown stain allows the tube to blend into the soil and root sheath. Uv resistance protects the tube from sun damage. The fitting connects the system components. The pile anchors the tube and supports the transponder to prevent it from being blocked by soil, debris or insects. Some problems have a built-in transmitter. The riser lifts the imager above the top of the plant. The timer sometimes turns water on and off. The timer prevents overwater, minimizes water waste, and allows the system to operate as an automatic water supply system. Some can be connected to a home automation system and controlled from a computer or smart device. Some smart devices can even regulate drinking valley schedules based on weather activity and provide reports on water usage, creating an ideal smart home solution. The hole hole creates an insertion point in the tube to connect the imager or tube of a smaller diameter. The Knurls are cut clean through tubes of different sizes. Some clamps can also be used as borers. You plug the hole that you accidentally made the hole. The plug can also move the

transmitter without replacing the tube. The emitter enters the tube and drains water into the soil or plants. Gallons per hour (GPH) indicates flow. The flow rate required depends on the type of plant being sprayed and the type of soil. The imager is rated for the maximum acceptable water pressure, and is expressed in pounds per square inch (PSI). The pressure compensation imager provides a constant flow rate even if the water pressure changes. Turbulent flow meters are designed to prevent clogging. A drip irrigation system may contain drips, bubbles, and misters.

For these previous researches on automatic drip irrigation system, some are focusing on the type of components that are using [1] and some are concentrating in the impact on chemical materials that are using on the components as well as the circuit setting inside of the controller [2].

2. Grip irrigation control system

2.1 Components of the automated irrigation system

Grip irrigation control system is made up of two sets—controllers and sensors for one set and the other set is the basic grip irrigation mechanical issues as shown in the Fig.1. To make the automatic grip irrigation control system, the most important portion of it is the grip irrigation technology set. In this flowchart, controllers will be responsible for the control of these components in the basic grip irrigation system that control the flow of water and the pour of the amount of water. And set composed by climate-based controller and soil moister sensor controller are using in a way by connecting with each other. Each time when they get some data or instructions, climate-based controllers and soil moister sensor controllers will check whether each other will send some instruction to the system so that no repeated data will be sent for the system. For these sensors, they will create a database

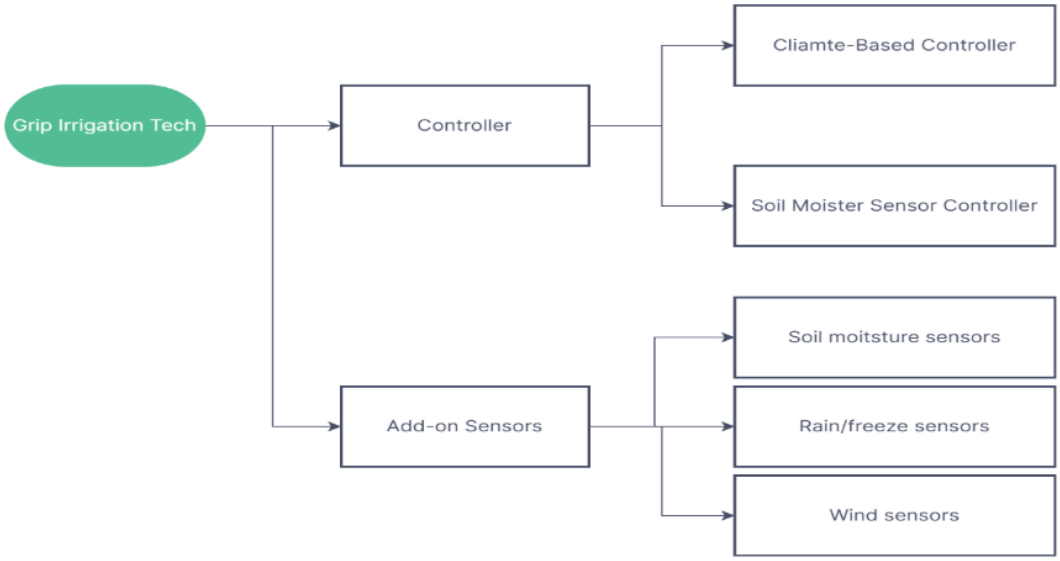

Fig 1 Flowchart of the composition of the system

2.2 Build of circuit

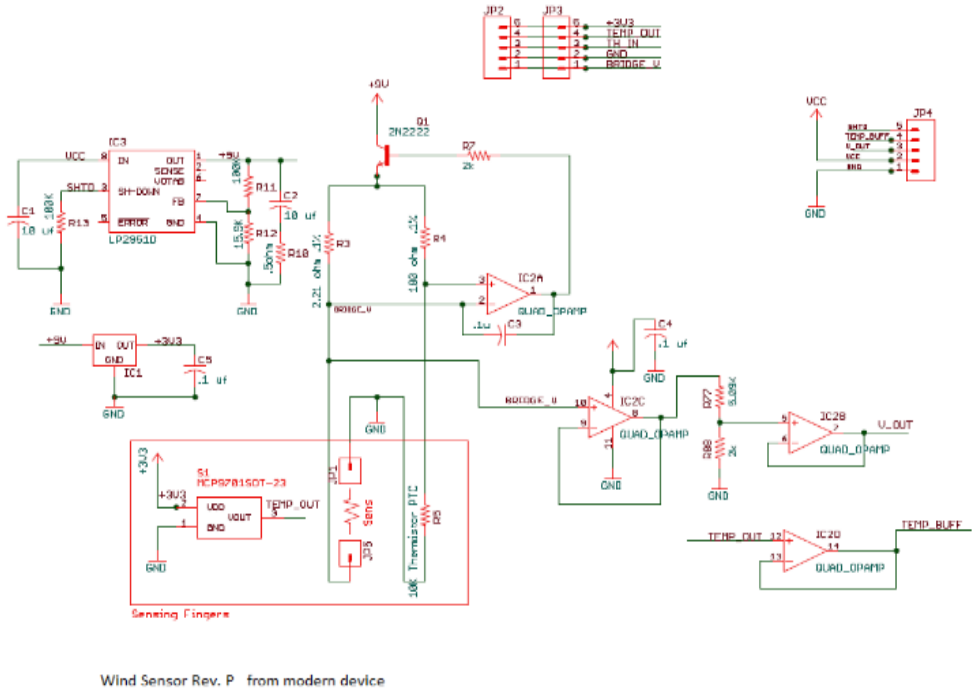

Fig 2 Theory circuit of wind sensor

There are two types of controllers—one is climate-based controller and the other is soil moister sensor controller. The climate-based controller is used and determined by the rain sensors, freeze sensors and wind sensors. All of the sensors will work for all the day to analyze and monitor the weather and the level of wind.

In Figure 2, the sensor is operated by hot wire or hot wire technology, which gives an idea of the difference in power needed to retain heat in the thermal element during wind flow and by heating the element. If the airflow increases, if the thermal element suddenly loses heat, it needs more force to retain heat, and if there is no wind, the thermal element remains stable by measuring the difference between the force and the current flow to the heating element and pulling it in the direction.

The internal electronic composition of wind sensor is shown in Fig2 which is connected to the climate-based controller. When it receives an output by the movement of the wind, it will convert the information to digital form and then going through the DAC to convert into the analogue signal and electronic signal to get through the sensor. When power or strength of the wind is larger than what is permitted (for here is 10 meter per second), it will give one information to the climate-based controller which will let the controller to increase the amount of water to be used now. Sensor will give signal that has active High (H) output when the wind is such high. Similarly, rain and freeze sensors are also acting in this way. Going through the signal moving from outside makes it easier to monitor the change of the environment.

2.3 Soil moister sensor

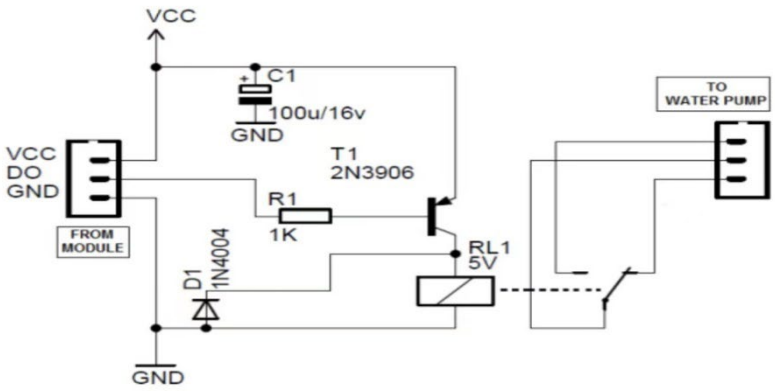

Fig 3 2015,

Soil moisture sensors measure the moisture content of soils. Soil moisture sensor is used for direct weight measurement because removal, drying and weighing of samples are required for measurement. As the approximate value of the content of water cancer water, use the soil and peculiar characteristics of electricity, electricity resistance, electricity dielectric conductivity, electricity interaction with neutral material, etc. Indirect measurement of the moisture content of the volume of water.

In this figure, the soil moisture sensor module which is built around the LM393 comparator, gives an active low (L) output when the soil is dry that is determined by a threshold that was set in advance. This digital output (wet soil → L / dry soil → H) is routed to one of the I/O terminals of the Arduino microcontroller. Based on this input (at D2), the Arduino gives a high-level output via D13 when the soil is dry and a low-level output when the soil is wet. Soil moister sensor controller will get the instruction from the sensors that when the instruction is L, it will output a pre-determined amount of water out by opening the drippers.

This irrigation system will be pre-set as bubbler drip irrigation because it declines much water than the other for its special type of way to pour water.

3. Conclusions and future

The Benefits of Drip Irrigation System are that it minimizes evaporation and overspray and reduces water consumption for lower costs and better water conservation, connects directly to the water spout, eliminating the need to cut into the household water supply line. Water supply line can be placed above ground or under a layer of mulch, eliminating the need for trenches for underground systems. Its Flexibility as plants grow and spread and can be customized for containers, raised beds, vegetable rows or bushes. It has precise delivery to prevent water being distributed where it is not needed or where it encourages weed growth and prevents excessively wet conditions from promoting fungal diseases. Gently, it will bring precise watering that minimizes runoff and erosion.

In the future, there should be chips on machine learning fields or deep learning fields to let the irrigation system to get a better performance on water saving by analyzing current circumstances of the moister value and amount of water used previous few days and make a prediction in the amount of the water are going to be used this day. The use of other types of sensors will be considered, such as temperature sensor. The importance of the volume should also be considered for people will have limited space both for gardening and planting. In order to make the drip irrigation system has a wider range of practical use. The accuracy of the soil moisture sensor can be improved

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