Automatic Plant Irrigation System

Group - 04 (Spring'22)

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Introduction:

In recent years, many people seem to forget to water their plants on time due to a hard workload. Our proposal is based on automatic irrigation, which will be extremely beneficial in terms of irrigation. We know that when people go on vacation, they do not water their gardens and that they frequently forget to water them. As a result, there's a risk the plants will be harmed. In all agricultural seasons, an automatic irrigation control system has been devised to assist the automatic supply of appropriate water from a tank to a field or household crops. One of the goals of this project is to analyze how human control may be removed from irrigation while also optimizing the use of water. The method used is to continuously monitor the moisture level in the soil to determine whether irrigation is required and how much water is required in the soil. To transport the required amount of water to the soil, a pumping device is used.

Proposed Model/System:

Basically our whole project depends on two things, one is the moisture of the soil and another one is proper time (24 hours). We have used one potentiometer as our soil sensor and another one determines the percentage of moisture when the circuit is activated. Next it has a Clock circuit which is used to measure time and it is built using a 555 timer Ic and a 20-bit synchronous BCD counter. Finally, the hardware has a ‘SR Nor Latch’ memory circuit which decides when to turn on the water pump motor. It uses the outputs from the clock circuit and the soil moisture sensor circuit as input to decide when to turn on/off the water pump motor.

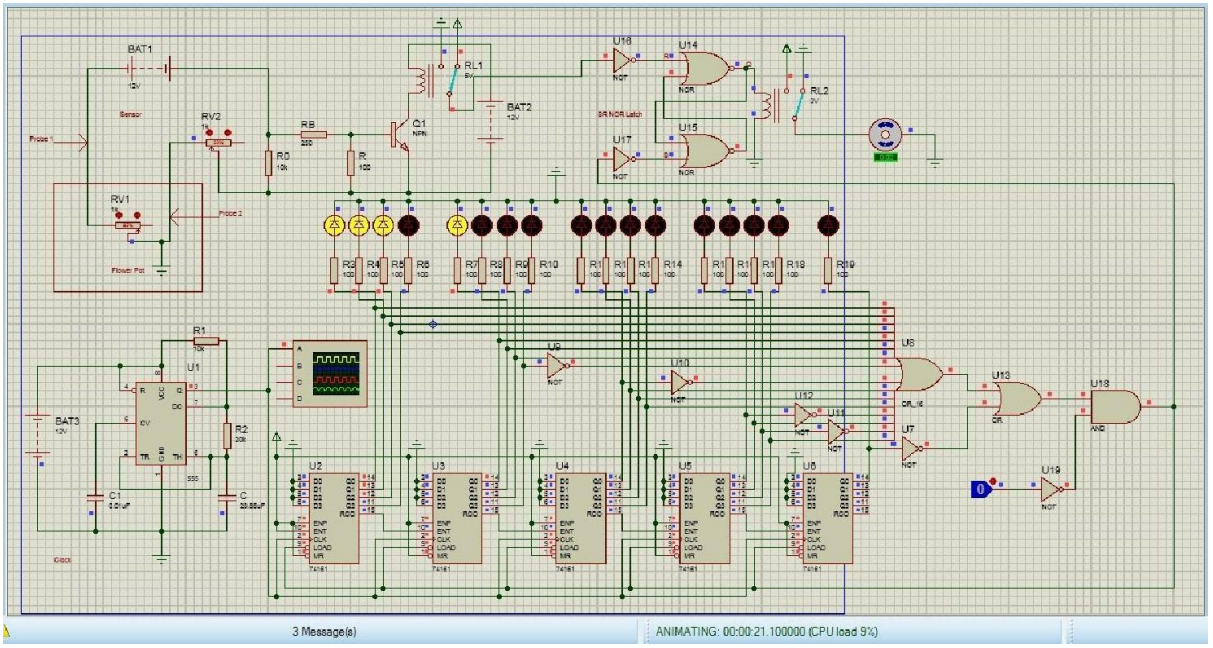
Experimental Setup:

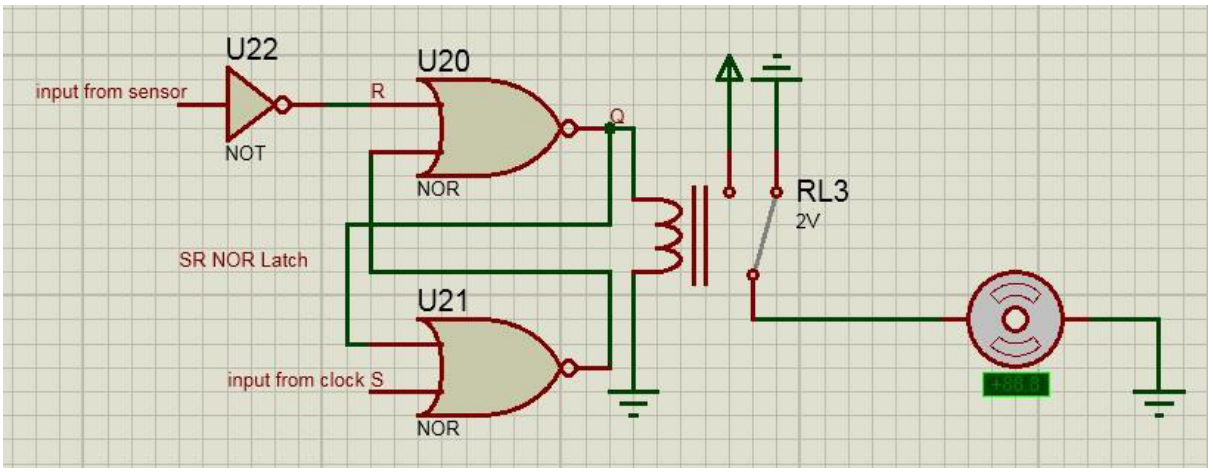
The components we used for this project are:

1. 555 timer Ic
2. 74161 Ic
3. NPN BJT
4. Relay
5. Logic toggle
6. DC motor
7. Led lights
8. AND gate, NOR gate, NOT gate, OR gate

9. Potentiometer
10. Resistors
11. Capacitors
12. Buzzer

Circuit Diagram:





Results and Analysis:

Clock Input	Sensor Input	Output (Q)
0	0	0
0	1	Q (0)
1	0	0

1	1	1
0	1	Q (1)
1	0	0
0	0	0

Short Explanation: The Model is in excellent good condition. It watered the plants every 24 hours while also deciding whether or not water should be released based on the soil moisture. The circuit is in perfect working order. We can also physically water the plants at any moment by hitting the toggle button. We may also reset the device and choose whether it will water the plants during the day or at night by hitting the toggle switch.

Conclusion:

To improve things, we can add a Bluetooth module that allows us to control the motor from anywhere within the range. Aside from that, if we have multiple plant species, we may also add extra indicators to each plant's soil region, as different plants require varying levels of moisture in their soil. Additionally, we can put a display that shows the current moisture level. Furthermore, an LDR may only be used to water plants during the day, not at night. Overall, we can make improvements on this project.

To sum up, if this approach is applied in real life, it will be extremely beneficial. We can monitor the moisture level of the soil by using a variable active resister in the soil and one on it. We also used a timer ic to generate a 1-second pulse, which we can use to count the entire 24 hours. The method will work if both parameters (low moisture level and 24 hours) are satisfied. We also included a toggle switch for turning the system on in an emergency. This type of modernized system is required in an agriculture-based country like ours.