DRIP IRRIGATION FILTER AUTO-FLUSHING SYSTEM

Parag Achaliya, Madhuri Gangurde, Shubhangi Rayate, Arati Raut, Manjiri Khairnar

Department of Information Technology, SNJB's COE Chandwad, SPPU University

Abstract: Now a day's android service technology is widely used to integrate heterogeneous system and develop new applications. Our application highlights some of the limitation of farming. Our purpose arisen regarding the cleaning of filter will have done automatically without any manpower through mobile application and it takes few of seconds to complete entire cleaning of filter. Our project is going to use pre-processing, segmentation, optimization and feature extraction. Our project having trained data in which system the garbage detection of filter is takes place through sensor. Once the choked up is detected it gives the message to control meter along with pressure input output reading. This reading also displays on user's mobile application. Then user clicks on flush button and filter will automatically clean or flush the filter and impurities are thrown out through flush valve. Whenever choked up is detected motor will automatically on or off. Our system is useful to farmers. This system successfully overcomes the drawbacks in earlier system. This system increases speed of the services.

Keywords: Relevant API calls, Application Programming Interface.

I.   INTRODUCTION

The existing system of drip irrigation filter have problem of manual cleaning of filter, hence it requires more manpower and it consumes much more time. In our proposed system the cleaning of filter will done automatically without any manpower through mobile application. Auto-flushing system will take less time to complete entire cleaning process. Irrigation is the process of supplying the required amount of water to the Agricultural Crops, plants and dry areas. This can be applied during the times when the rainfall is less than the average downpour which is needed. Drip Irrigation also is known as Trickle Irrigation is a popular form of Micro Irrigation System. It includes the dripping of the water to the root zone of the plants into the soil via a small plastic pipe system. It can be well fitted with outlets for the emission of the water, known as pipes, valves, emitters or drippers. Instead of using the emitters, micro spray heads may be used in the crops or trees which have wider root zones. Out of other methods of Irrigation, Drip Irrigation allows the deep drainage. The normal filtration system has many problems faced by farmers for cleaning of filter.

The Farmers are not able to easily detect the chocked-up of filter before manually open it. When water completely stops its flow from outlet valve then after that farmers find out that filter gets chocked-up. Then they open filter manually which is so time consuming process. The project we are implementing avoid drip irrigation from being chocked-up. All Detail information are provided to user on their mobile app. User simply click on flush Button then filter performs self-cleaning process. The normal filtration system has many problems faced by farmers for cleaning of filter. The Farmers are not able to easily detect the chocked-up of filter before manually open it. When water completely stops its flow from outlet valve then after that farmers find out that filter gets chocked-up. Then they open filter manually which is so time consuming process.

The advantages of drip irrigation filter with auto-flushing system is;
   a) To save the time of farmers and to reduce the extra efforts which required for manual cleaning.
   b) To easily detect the chock up in the filtration system.
   c) Inform to user about filter blockage through notification or message.
   d) it also provides motor On/Off facility to user.

The system modules should have the following features-
   a)   User Registration- Here User have to register with required parameters such as name, mobile, password and hardware ID.
   b)   User Login- After user registration done successfully user can login to the system.
   c)   System on/o_- After login user can on/o_ system start water _filtering.
   d)   Maintain pressure of _filter- User can also maintain pressure of system.

e) Removing dirt- System can automatically removing dirt.

II. METHODOLOGY

- **Existing System Cleaning Process-**

Figure 1: Existing Filter System Clean by Manual Method

Now a day it is observed that many farmers are frustrated due to manual cleaning of filter. If impurity level of
water is higher than 3-4 times cleaning per day is required. So the auto-flushing system saves the time and keep relax. The existing system cannot provide auto-flushing of garbage which clotted on filter net. The proposed system will provide flushing of impurities automatically through mobile application. Our proposed mobile
application also provides all input output pressure readings. Whenever filter gets choked-up user gets notification on mobile. Then user will proceed further for flushing. For overcoming this problem, we can Implement a system which is easily solve this problem.

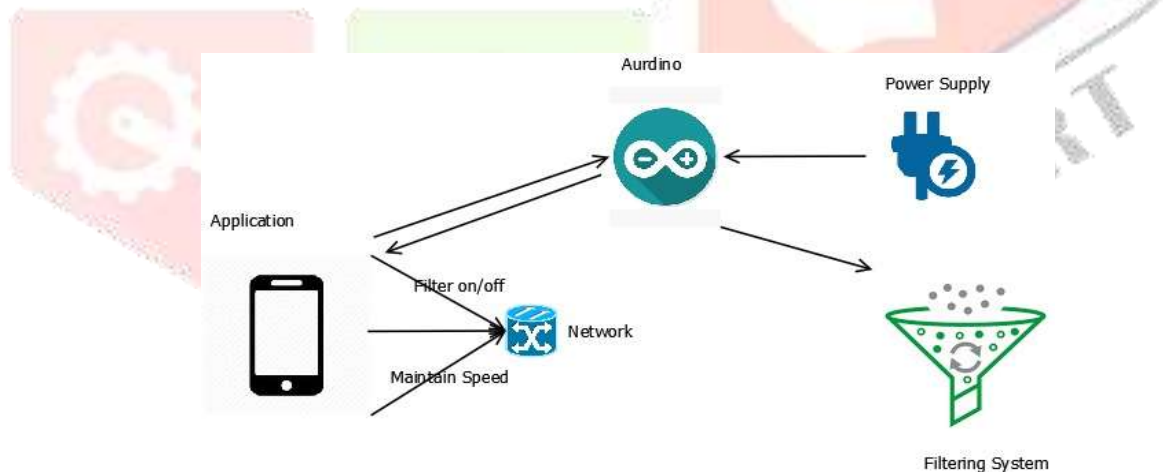- **Proposed System Cleaning Process-**

Figure 2: Block diagram showing the working principle of Drip irrigation auto-flushing system

In our proposed system we are developing automatic water filtering system in our system we are developing mobile that interfacing sensors and hardwares for efficient performance. We are developing system some modules working through android application modules are as follows-

The various modules involved in system are as follows:
1. User Registration and Login
2. Garbage Detection
3. Maintain Pressure
4. System ON/OFF
5. Garbage Filtering

The sequence of operation is as follows:

Water filtering system for drip irrigation is proposed, in which flushing of filter will be done automatically. The mobile application will be develop to monitor the choked-up and flushing process of filtering. These will reduce the manual efforts and time while cleaning of filter. Through mobile application user can handle the overall system. First user has to register and login on application. Once registration is done user can operate the overall system as per their requirement. If chocked-up is occurred the user get the notification on mobile application. After that, for flushing mechanism user can adjust or maintain the pressure of inlet and outlet as per requirement using the seek bar provided on application. System ON\OFF facility is also provided along with auto-flushing. Whenever user wants to ON\OFF the system then user can do it through mobile. After these, for self-cleaning the button is provided on GUI, if user wants to clean it then by clicking on flush button user can clean the filter automatically.

III. PERFORMANCE EVALUATION

Different parameters used in proposed system module are –

1. **Arduino Nano—** Arduino Nano is a small, compatible, flexible and breadboard friendly Microcontroller board, developed by Arduino.cc in Italy, based on ATmega328p (Arduino Nano V3.x) / Atmega168 (Arduino Nano V3.x).
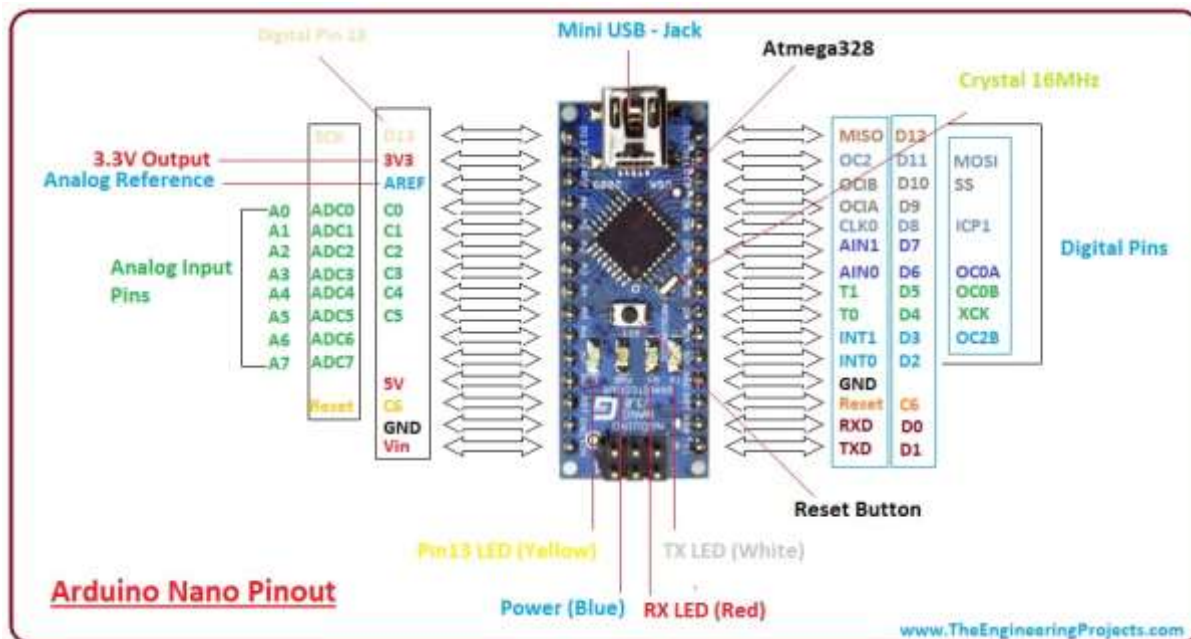

Figure 3: Arduino Nano

It comes with exactly the same functionality as in Arduino UNO but quite in small size. It comes with an operating voltage of 5V, however, the input voltage can vary from 7 to 12V. Arduino Nano Pinout contains 14 digital pins, 8 analog Pins, 2 Reset Pins & 6 Power Pins. Each of these Digital & Analog Pins are assigned with multiple functions but their main function is to be configured as input or output. They are acted as input pins when they are interfaced with sensors, but if you are driving some load then use them as output. Functions like pinMode() and digitalWrite() are used to control the operations of digital pins while analogRead() is used to control analog pins. The analog pins come with a total resolution of 10bits which measure the value from zero to 5V. Arduino Nano comes with a crystal oscillator of frequency 16 MHz. It is used to produce a clock of precise frequency using constant voltage. There is one limitation using Arduino Nano i.e. it doesn't come with DC power jack, means you cannot supply external power source through a battery.

2. **RONICO turbidity sensor-**

Figure 4-RONICO turbidity sensor

Turbidity sensor detects water quality by measuring level of turbidity. It is able to detect suspended particles in water by measuring the light transmittance and scattering rate which changes with the amount of total suspended solids (TSS) in water. As the TTS increases, the

liquid turbidity level increases. Turbidity sensor have both analog and digital signal output modes. You can select the mode according to the MCU as threshold is adjustable in digital signal mode
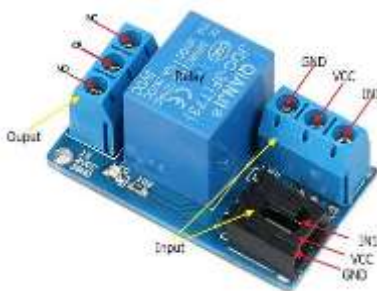
3. Relay-

Figure 5-Relay

A relay is an electrically operated device. The advantages of a relay lie in its lower inertia of the moving, stability, long-term reliability and small volume. It is widely adopted in devices of power protection, automation technology, sport, remote control, reconnaissance and communication, as well as in devices of electromechanics and power electronics.

The features of 1-Channel Relay module are as follow-

1) Good in safety. In power system and high voltage system, the lower current can control the higher one.

2) 1-channel high voltage system output, meeting the needs of single channel control.

3) Wide range of controllable voltage.

4) Being able to control high load current, which can reach 240V, 10A.

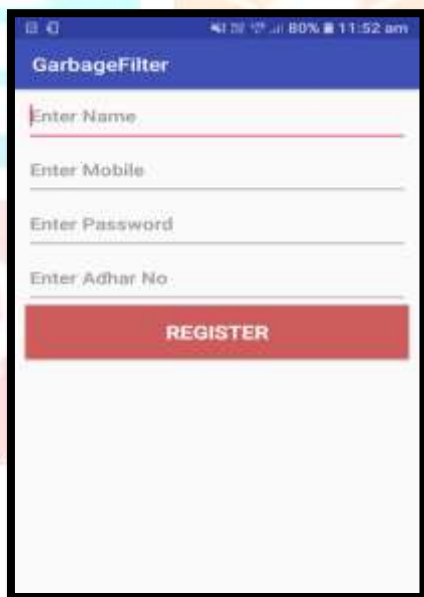5) With a normally-open (NO) contact and a normally-closed (NC) contacts.
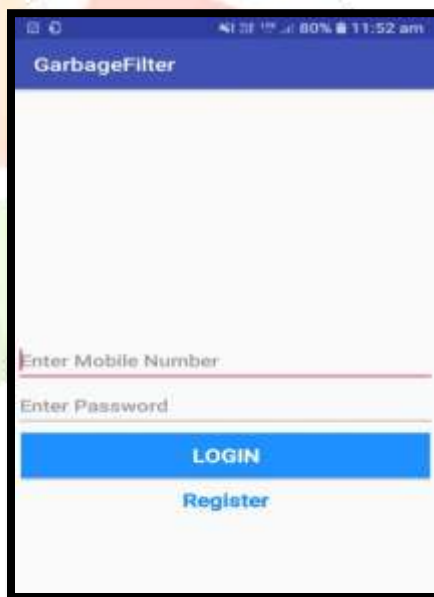

Figure 6 - User Registration   **Figure 7** - User Login

Table 1: Summary of performance evaluation

Parameter	Existing System	Proposed System
Purging Time	Not Adjustable	Adjustable
Time Utilized by System	Time Consuming	Time Saving
System Inform	User does not get any idea if filter is choked-up.	User will get message on mobile if filter is choked-up.
Loss of Product	Loss of expensive product caused by frequent changes	No loss of expensive product caused by frequent changes

IV. CONCLUSION

We conclude that our module will definitely reduce time and human efforts of manual cleaning process. It helps the farmer to done auto-flushing in minimum time. To save the time of farmers and to reduce the extra efforts which required for manual cleaning. To easily detect the choked-up in the filtration system. The device was analyzed and tested. Based on the test results, the whole system performed according to the designed aim and objectives of the project. The device has been proven to be reliable and can be deployed in agriculture for farmers to remove the garbage in filter. The results obtained after design and testing automation system and water filters got that

accuracy or reliability of sensor in the read water clarity value of more than 65 (percent). The Water can be lit up automatically when clarity value less than 789 lux and pumps ON until clarity value which obtained sensors more than 898 lux We Can Control system by Mobile Application.

V.   REFERENCES

[1] Capra, A., & Scicolone, B. (2007). Recycling of poor quality urban wastewater by drip irrigation systems. *Journal of Cleaner Production*, *15*(16), 1529-1534.

[2] Nakayama, Francis S., Brian J. Boman, and Donald J. Pitts. "11. Maintenance." In *Developments in Agricultural Engineering*, vol. 13, pp. 389-430. Elsevier, 2007.

[3] Puig-Bargues, J., Arbat, G., Elbana, M., Duran-Ros, M., Barragán, J., De Cartagena, F. R., & Lamm, F. R. (2010). Effect of flushing frequency on emitter clogging in microirrigation with effluents. *Agricultural Water Management*, *97*(6), 883-891.

[4] Vazquez-Montiel, Oscar, Nigel J. Horan, and Duncan D. Mara. "Management of domestic wastewater for reuse in irrigation." *Water Science and Technology*33.10-11 (1996): 355.