Abstract

In the modern era with the advancement of technologies, it is important to make human life easier and simpler. Sri Lanka can be considered as a green country where a plant is valued a lot and regular watering is essential part in taking care of it. Also in a country where agriculture is a strong point in economy and an automated watering system would serve the as a great solution for problems facing in growing up a good plant and make it convenient to do so. It'll reduce water wastage and minimize the manual intervention needed.

Table of Content

1. Introduction

Watering plants could be sometimes time consuming and with busy life schedules attending to them daily could be inconvenient. Aim of out project is to develop an automated watering system that would take care of the watering without manual intervention effectively saving lot of cost and yet satisfying plant's needs. This report presents the design for such a system.

2. Motivation

Almost every house at least have a small garden and even with all the developments and apartments still there is a place at our homes for a few plants. Yet if you ask what's the major challenge in having a garden or plants the answer would be watering. With all the busy schedules and life styles it would be easy to have a automated system to do the watering. When going out for vacations or at times you suddenly remember that you forgot to water the plants we might have to rely on a neighbor or sometimes it's going to be a hard time for the plants.
Also in commercial use like in farms and it takes a lot of time and to be done in a reasonable time it takes lot of human resources. To make farming effective it's important to reduce those additional costs and look for more feasible options.
So we wanted to create a affordable automated watering system to overcome those problems.

3. Objective and Scope

The objective of this project is to design an small scale automated watering system that'll take care of watering without human intervention. We considered aspects like Installation cost, Water Saving, expandability when designing the system.
Installation cost should be low so that it's affordable and worth considering for use. Effectively watering when needed will save water wastage and We wanted to create an system that is expandable and customizable as per requirements.

4. Literature Review

Similar items are available with agriculture equipment manufactures like hunter, hozelock, Gardena.

http://www.hunterindustries.com/en-metric
http://www.hozelock.com/watering/auto-watering.html
http://www.gardena.com/au/water-management/water-controls/

Most of them doesn't present with customizations and with their high end equipment they can be costly. We're implementing our system as client- server module which can be used for many customizations and extensions can be added easily.

5. Requirement Analysis

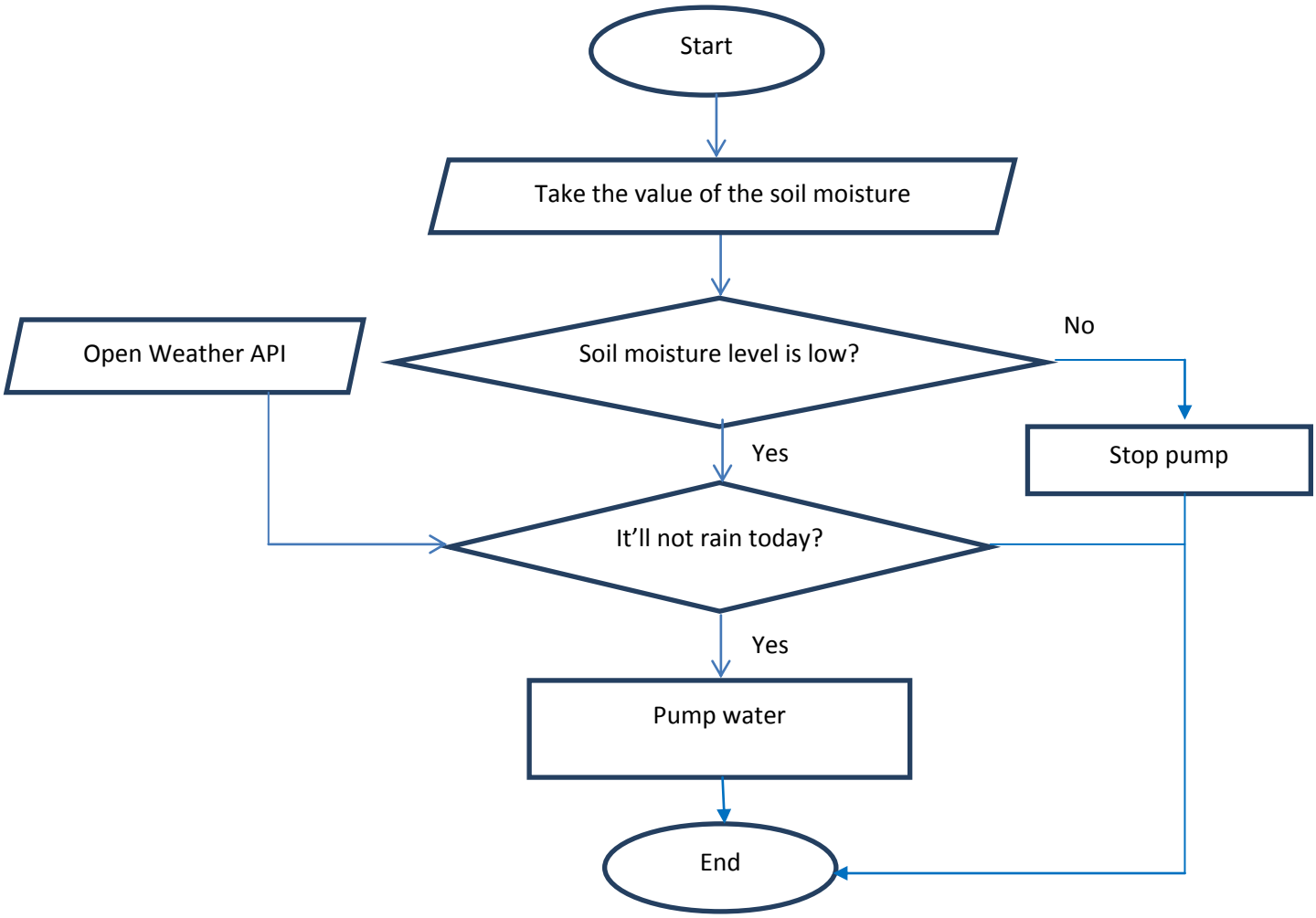
We wanted to develop an fully automatic watering system. So the system should be able to understand when the water is needed and provide according to requirement.

- Read data from moisture sensor and send them to server
- If levels are low get weather details to check for rain
- Send the command to water

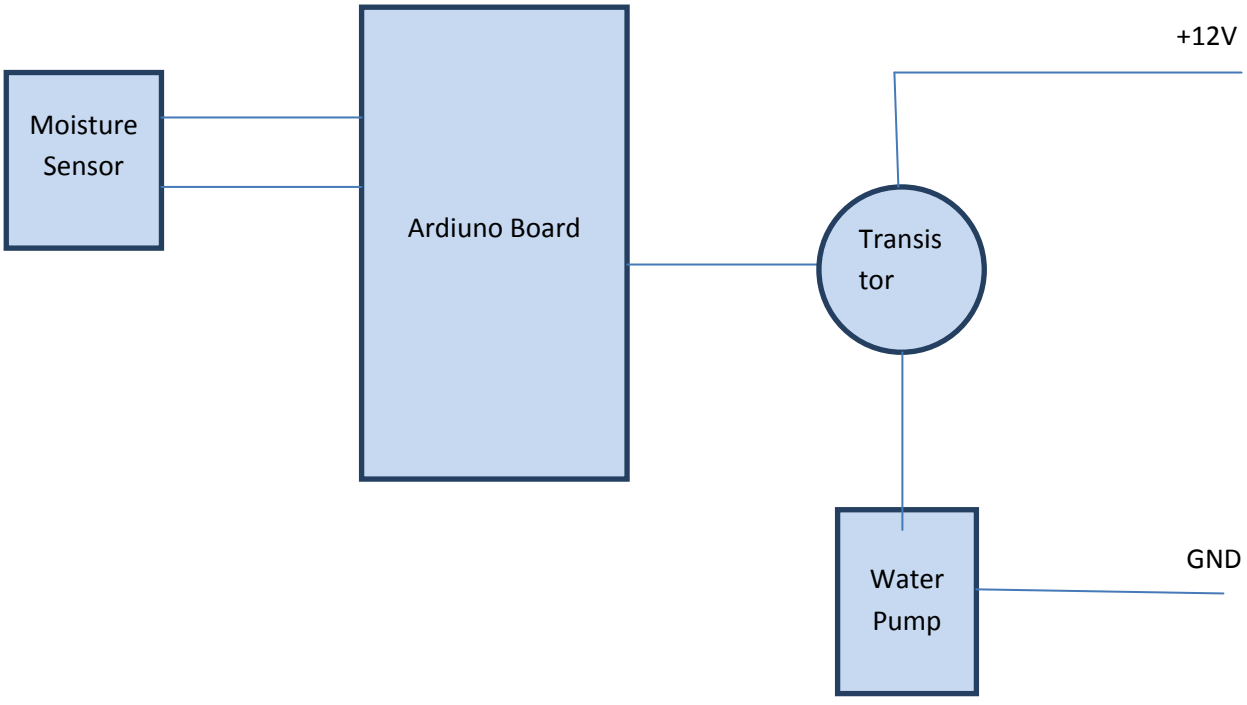
6. System Design and Architecture

To understand when to water we use an moisture sensor which measure the water content in soil.
The readings were acquired from the arduino board which act as the client and send to the server.
If the levels are low server will contact the open weather API and get weather details. If it's not going to rain it will send an response back stating to start the pump. when the moisture level comes to a acceptable level it'll send the signal to stop the pump.

Flow Chart

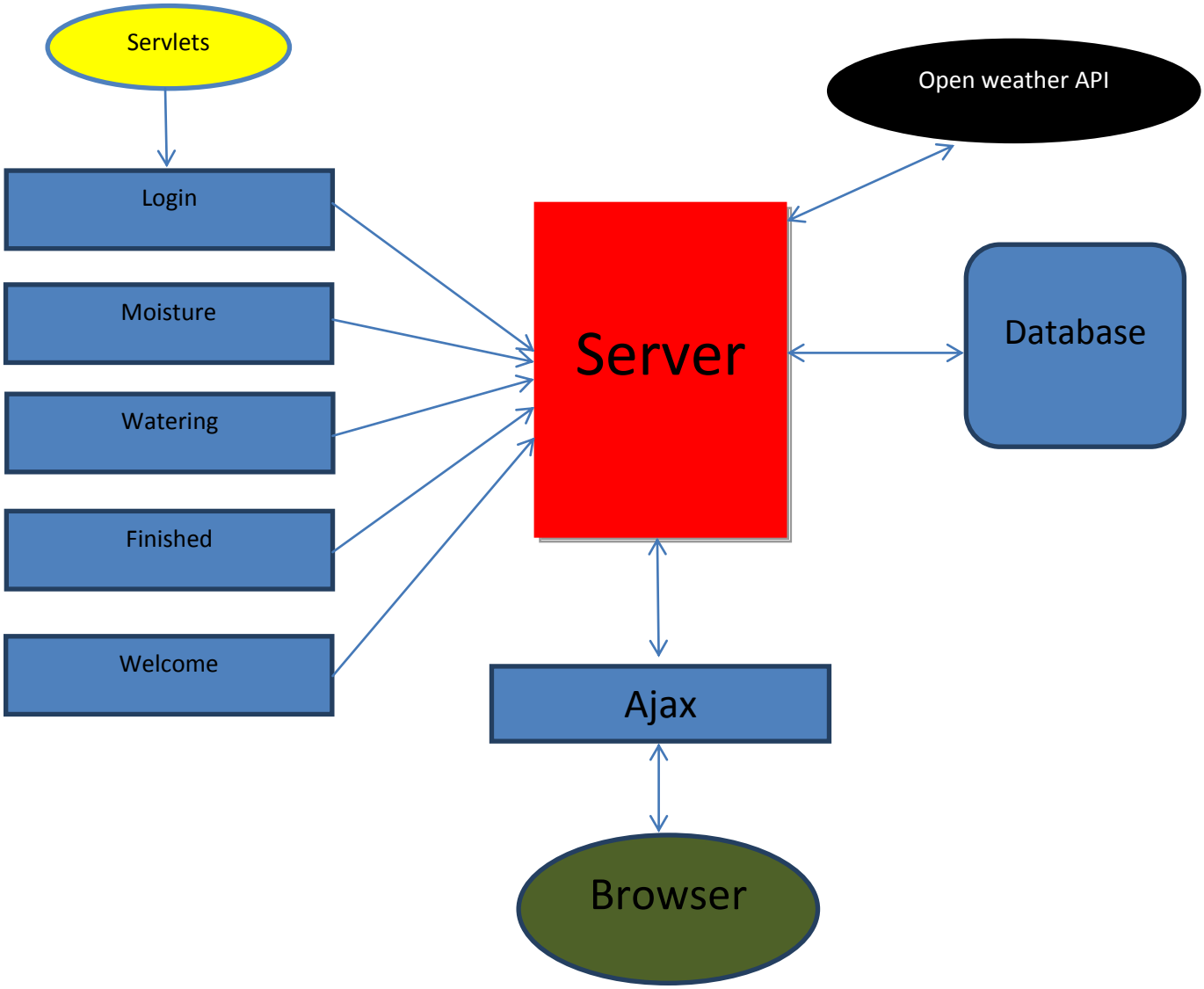


Circuit Diagram-Client



Server Implementation

We implemented a simple login system which is handled by the login servlet. Arduino board is sends moisture levels to the moisture servlet as a GET requests. It is saved in the servlet context on the server side. Ajax can be used for update these values on the client side without refreshing the page. Watering servlet is for sends response to the server whether it is going to rain or not. So when the arduino board sends a request to the Watering servlet sever have to sends GET request to the open weather API and get the response from it. When the watering is finished arduino board will sends a request to the finished servlet including watering time as a parameter. Welcome servlet is to fetch all the result from servlet context and simulated in the main page.



7. Conclusion and Future Work

Our design is a simple beginning system for an automated watering system. Since it's a working prototype there are lot more improvements to be made in practical implementation. The cost is relatively low and could be implemented for a small garden in home and it'll be a home improvement worth considering.

With our client-server implementation it's widely open for customizations. Other devices can be set up such as mobile phones to monitor watering from connecting to web. Also watering times can be setup as we wanted and manual system can also be implemented where user will be notified when moisture levels are low through ussd/sms and he/she can order to water the plants. For all these just little modifications in code is needed.