

PROJECT PROPOSAL

CST 392 – 2

Group No: 04

Automated Domestic Water Supply Control System

Department of Computer Science and Technology
Uva Wellassa University
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Group No: 04

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Table of Contents

1. Introduction	3
1.1. Project Title	3
1.2. Project Background	3
1.3. Project Aims	4
2. Project Description	5
2.1. Functional Requirements	5
2.2. Non-functional Requirements	5
2.3. User Roles	6
3. Methodology	7
4. Resources	8
4.1. Hardware Resources	8
4.2. Software Resources	8
5. Project Plan	9

1. Introduction

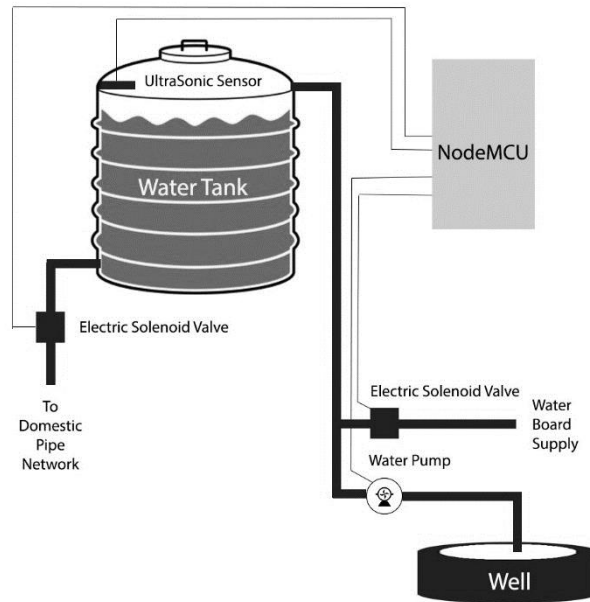
1.1. Project Title

Automated Domestic Water Supply Control System

1.2. Project Background

People use domestic water supply systems which have to be controlled manually. Basically, a domestic water supply system consists of a Water Tank, a Water Pump, Pipe Network and Valves to control the water supply. Since this system is a manual system user has to turn the water pump on when the water level of the water tank is low. But there is no proper system to notify the user when the water level of the water tank is low. Whenever the user has to turn the water pump off manually when the water tank starts to overflow. Moreover, the user has no ability to know the water level in the tank when he needs. Likewise, almost all the functions of the domestic water supply system have to be done manually. Therefore the manual domestic water supply system is difficult to use. It has considerable number of drawbacks.

Automated Domestic Water Supply Control System is an alternative system which can overcome those drawbacks of manual system. In the automated system the user can set the water level of the system, to start filling the water tank from either turning on the water pump to pump water from the well or opening the valve to fill the tank from National Water Board Supply. The automated system can stop filling the water tank when it reaches the top level or a level which the user decides. User is able to set those parameters from a mobile app connected to the system. The user can see the information about the water consumption from that mobile app.



1.3. Project Aims

- Maintaining the water level of the water tank with in a range which is decided by the user.
- Turning on the water pump or valve of water board supply when the water level of the tank reaches the low level
- Turning off the water pump or valve of the water board supply when the tank stars to overflow or reached the high level.
- Displaying the information about current water level, water consumption of the day and month.

2. Project Description

2.1. Functional Requirements

- In Setup stage the system should collect the information about the water tank and its dimensions.
- The system should calculate the average water filling speed from both water pump and Water Board supply separately.
- The system should get the user decisions about low water level (The lowest water level which the user wish to maintain) and high water level (The highest water level which the user wants to keep in the tank)
- Get the user preference about the source which has to be used for filling the tank.
- The Mobile app should Display the Current water level of the tank.
- System should start filling the water tank from the source which user decided when the water level reaches the low.
- Allow user to turn on the water pump or water board supply manually via the mobile app.
- Allow user to stop filling the water tank manually via the mobile app.
- System should stop filling the water tank when the water level reaches the high water level.
- Allow the user to turn on/off the Out Valve of the water tank.
- Display the information about the water consumption daily and monthly if user requests via the mobile app.

2.2. Non-functional Requirements

- User should be able to connect to the system via the mobile app at any given time.
- The system should be accessible from anywhere within the house via mobile app.
- Average water filling speed calculation of water pump and Water Board supply should be accurate.
- When the user stops filling the tank, system should respond immediately.
- The mobile app should not allow unauthorized parties to access the system.
- The mobile app interfaces should be well organized and understandable.

2.3. User Roles

In this Automated Domestic Water Supply Control System a user can install the mobile app to his/her smart phone and connect with the system. The user can setup the system by inserting dimensions of the water tank and setting the low level and the high level of the water tank after connecting to the system successfully. The user can turn on/off the National Water Board supply, water pump of the well, water out valve via mobile app. Moreover he/she can allow the system to maintain the water level by itself as user choice.

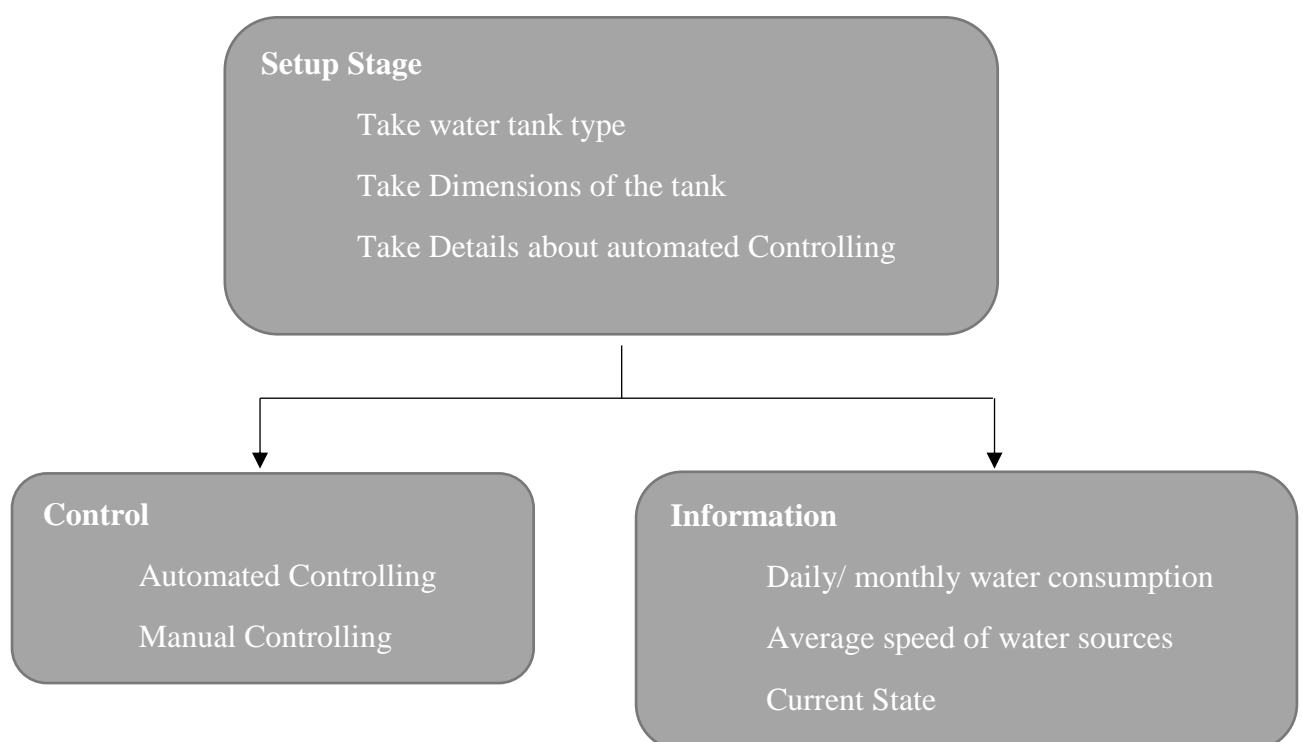
3. Methodology

Automated Domestic Water Supply Control system should be developed by dividing it into 2 main parts. Those are the Hardware system and android mobile app.

In the hardware system we have to fix Electric Solenoid Valves into the Water Board Supply line and water-out line from the tank. We have to connect those two Electric Solenoid Valves and Water pump to the Relay modules separately. Then we can connect them to power source and NodeMCU. After we can place the UltraSonic Sensor inside the top of the water tank which should be connected to the NodeMCU. From the UltraSonic Sensor we can take the distance from water level to the top of the tank. By that data we can derive the height of the water inside the water tank. This measure and the deviation of that measure with the time is used to calculate the other information we planned to display in the mobile app.

When building the prototype of the hardware system we have planned to use small water containers, small pipe network, small water pump and small electric solenoid valves. We don't have to use relay modules because we use low voltages power sources for pumps and valves.

Since we know all the requirements and functionalities of the mobile app in the beginning we planned to use waterfall model to develop the mobile app. We planned to develop mobile app interfaces to cover following areas.



4. Resources

4.1. Hardware Resources

For prototype the domestic water supply system

- Water Containers
- Pipe network
- Mini Electric Solenoid Valve
- Mini Water Pump

For building the Automated system

- Node MCU
- Ultrasonic sensor
- Relay Modules
- Jumper Wires
- Project Board

4.2. Software Resources

- Android Studio
- Arduino IDE

5. Project Plan

Gantt Chart

Stage	Duration														
	FEB		MARCH				APRIL				MAY				
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
Requirement Gathering and Defining the scope															
Submit proposal and presentation															
Requirements Analysis and Specification															
System design															
Interface (mobile app) design															
Gathering Hardware Requirements															
Development session 1 (build hardware prototype)															
Interface (mobile app) implementation															
Development session 2 (Functionality implementation)															
Integration and testing															
Scope review and improvements															
Final testing															
Documentation															