IOT Based Smart Irrigation System

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Department of Electrical Engineering

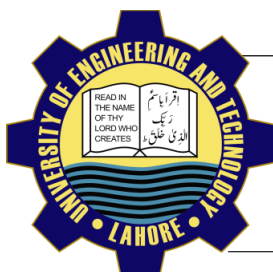| Mureed Qasim Shah	2018-UET-NML-Elect-37
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1. Abstract

The agriculture of farming has started past 12000 many years straight back, Neolithic age gave the beginning of civilization, Farming and later becoming continued as traditional farming techniques. Agriculture has always been backbone of Pakistan's economy. About 70 % of the populace is related to agriculture directly or indirectly. Its share towards GDP is mostly about 25 percent which can be more than the share of any other sector. Various problems related to agriculture are constantly hampering the development of the nation. Agriculture in Pakistan uses 93 % of the water that's available while significantly 60 % of that water is wasted for the application and transport into the field. The reason that is significant application losings could be the lack of knowledge about irrigation scheduling and proper irrigation system. A possible option for these irritating dilemmas is to decide on advanced agriculture system that consists of contemporary styles. So we can make farming smart using IOT. Internet of Things technology is one of the fastest-growing fields in different domains including agriculture. The leading characteristic of this project is that it will reduce the wastage of water during irrigation alongside many more advantages. the sensor used in the system collects the data from the soil and sends it to the IOT web server where it can be further examined. We will develop an android mobile application which will provide essay access to information to the farmer. Furthermore, we have been using the NPK soil sensor that will help us in determining the fertility of the Soil.
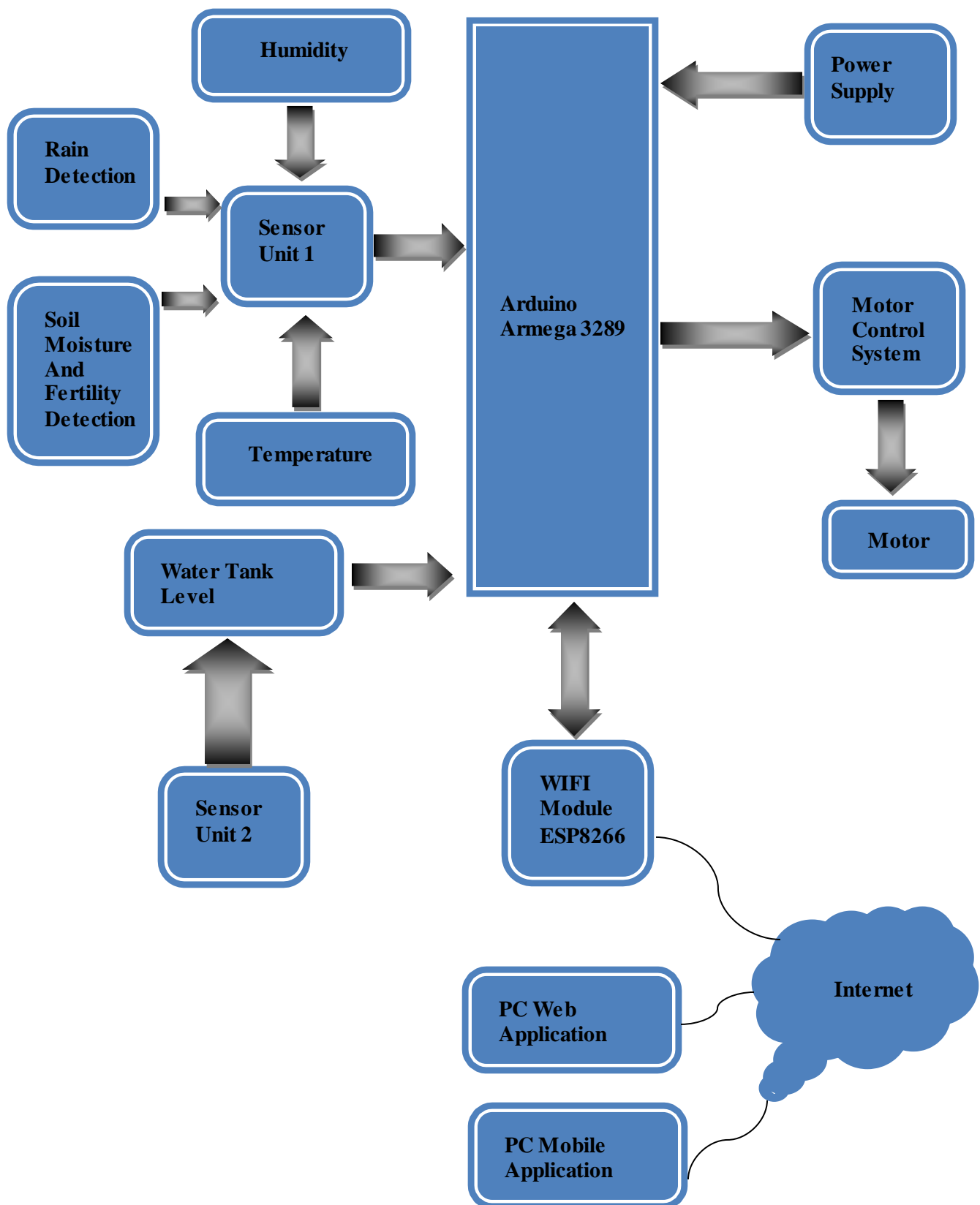
2. Project Problem

"To design a system that will reduce water wastage during irrigation as well as increase productivity of the crops."

3. Project Introduction:

IOT is the system of interconnected computing devices that can sense the data as well as convert data over web without any human involvement. The project group shall recommend an IOT based Irrigation and Weather Reporting System. This method will consist of two parts which can be crucial. The first part is linked to irrigation monitoring and managing system plus the second is the weather reporting system. The project group can manage and monitor the way to obtain water coming from a place as well as the suggested system permits the people to directly look at the climate status online without the need of a weather forecasting company in this project. It will help to know about the current temperature, humidity, moisture, and rain by using a temperature sensor and humidity sensor respectively. The system will transfer the data to the microcontroller or process this data and the microcontroller will send this information to the web host over a WIFI Module.

In this project, sensors keep checking the temperature, humidity and rain level and update the data on website. A user can see the details of sensor and according to need of crops or plants he can supply the water just by a click on motor status. Farmers have to work on different part of land so one man cannot take care of the land for water supply. The crops get damage if the farmer does not supply the exact amount of water to crops or plants. So by using this system, farmers don't have to worry about the crops or plants to get damaged as a result of drought or water-logging. The Soil NPK sensor will identify the capacity of nitrogen, phosphorus, and potassium as well as will help us in ensuring the richness of the soil. So in this way we will be able to save the wastage of water during proper irrigation system.

4. Block Diagram:

The block diagram shows an automated irrigation system. Sensor Unit 1 receives inputs from Rain Detection, Soil Moisture And Fertility Detection, Humidity, and Temperature. Sensor Unit 2 sends data to Water Tank Level. Both Sensor Unit 1 and Water Tank Level feed into the Arduino Armega 3289. The Arduino connects to a Power Supply, Motor Control System (which drives a Motor), and a WIFI Module ESP8266. The WIFI Module, PC Web Application, and PC Mobile Application connect to the Internet.

5. Work Distribution

Task Type	Action Plan	Responsibility	
		Leading Role	Supporting Role
Reading and Research	Literature Review	Both Group Members	
	Research Papers		
Writing	Proposal Writing	Qasim Shah	M.Imran
	Technical Report	Qasim Shah	M.Imran
	Presentation	M.Imran	Qasim Shah
	Research Paper	Qasim Shah	M.Imran
	Poster Design	Qasim Shah	M.Imran
	Proofreading	M.Imran	Qasim Shah
Software	IOT Web Server For Sensor Data	Qasim Shah	M.Imran
	Data Collection	M.Imran	Qasim Shah
	Design of Mobile Application	Qasim Shah	M.Imran
	Design of Web	M.Imran	Qasim Shah
	Integrating systems using Mobile Application	Qasim Shah	M.Imran
Hardware	Temperature and Humidity sensor to Microcontroller	M.Imran	Qasim Shah
	Rain sensor and Moisture Sensor to Microcontroller	Qasim Shah	M.Imran
	Dc motor pump and Wifi Module to Microcontroller	Qasim Shah	M.Imran

6. Project Plan/Timeline

Activity	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Write-up	■	■	■	■	■	■	■	■	■
Project Proposal and Presentation	■	■							
Sensor Purchase and Testing		■							
Sensor Implementation and Integration			■	■					
Dc motor pump and Wifi Module				■					
Project Mid Report and Presentation				■					
Design of Web					■	■			
App Development					■	■			
Integration of Web Server and Mobile Application						■	■	■	
Final Report and Presentation									■
Poster Design and Project to Product									■
Research Paper on IEEE Format									■

7. Project Budget

Item	Amount
Humidity Sensor	500 Rs
Rain Sensor	500 Rs
Temperature Sensor	700 Rs
Moisture Sensor	650 Rs
NPK Color Sensor	10000 Rs
WIFI Module	2000 Rs
Motor Pump	10000 Rs
Drainage Pump	10000 Rs
Data Collection	8000 Rs
Microcontroller	2000 Rs
Relay	1000 Rs
Total Expected Amount	45350 Rs

8) Project Constraints

1) Time limitation can limit the complete design of prototype.
2) Delay in Importation of Sensor.
3) Complete integration of weather forecasting, web and mobile application systems.

9) Project Scope and Deliverables

The developed system in this project will avoid water loss during irrigation. Irrigation of crops under adverse conditions leads to a reduction in its yield so it will provide adequate water to crops according to the right environment. We can also grow crops that were not being planted due to lack of water whose profits are quite high. It will reduce human efforts as well as will work automatically. Our project is beneficial for gardening as well as growing vegetables. Basically the project may help the farmers to save lots of the proper time, expense and wastage of water.

Deliverables:

- A system that will optimized water management.
- A proposed integration of the system with mobile/web application.
- A system that will help farmers to save the time, cost and wastage of water as well as increase productivity.
- A system that will determine how much water we have and how many fields we can irrigate.
- A system that will indicates the best time to irrigate crops.
- In the event of heavy rainfall, our system will drain all water except the appropriate amount of water.
- The system will also tell you about the weather forecasting on the basis of Temperature, Moisture, Humidity and Rain Sensor value.
- The project will analyze how much water is required to the fertile and barren land.
- The project will analyze how much time it takes to irrigate the fertile and barren land.
- The project will spread awareness about precision land levelling of farmer field as water loss during irrigation mostly depends on this factor.

10) References

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