

## Green automation and monitoring over MATLAB

Pooja Tekale<sup>1</sup>, P. R. Thorat<sup>2</sup>

*PG student<sup>1</sup>: dept. of Electronics*

*Savitribai Phule Women's Engineering College,  
Aurangabad, India*

*Email: [Pooja.tekale92@gmail.com](mailto:Pooja.tekale92@gmail.com)<sup>1</sup>*

*Assistant Professor<sup>2</sup>: dept. of Electronics*

*Savitribai Phule Women's Engineering College,  
Aurangabad, India*

*Email: [thorat.popat.r@gmail.com](mailto:thorat.popat.r@gmail.com)<sup>2</sup>*

**Abstract-** This is the advance technology of monitoring and controlling of the greenhouse and it is real time method. We get output in graphical form by using MATLAB software here PC and system are interconnected by using arduino nano which is fastest upcoming microcontroller. Parametric reading like temperature, soil moisture; light and PH sensor we get at the graph at Y-axis and it will helps to monitor the environment of the earth perfectly by the sensors. AVR microcontroller is used for the purpose of interfacing of sensor to get output at LCD display also check change in cultivation. We are added controlling part as LDR is use as artificial light, water pump for the supply of water in the absence of human operator and cooler for the temperature maintenance and GSM module is also used for getting present status of the green house when we are away from it.

**Index Terms-** LDR (Light Dependent Resistor), RISC (Reduced instruction set computing), WSN (Wireless Sensor Network), GSM (Global System for Mobile Communications), ADC (Analog to digital converter)

### 1. INTRODUCTION

Automation is process of controlling the manufacturing equipment and course there by replacing human operator environmental situation monitor is one of the extremely vital aspects in agricultural manufacturing that effect on the maintenance of crop. Much loss occurs every year because of damage of products the main reason behind that change in climatologically situation.

Now a day's automation is used in all over and the whole things can be operate mechanically other than some fields in our country where automation is not used and not been adopted or not been put to a fully use, it may be possible because of a number of reasons. One of them is cost and one such field is agriculture. Agriculture has been one of the main employments of man in our country, as we know early civilization and even today physical intervention in undeveloped are expected. Greenhouse is new skill available in which handle climate to raise products and keep away from the effect of season changes on the plants. Greenhouse is in concert a vital role in manufacturing of the suitable vegetables, fruits, flowers and high value and susceptible undergrowth resembling capsicum. Intend of greenhouse

environmental check to get the best climatic conditions (controlled temperature, moisture, light and PH level and other important parameter responsible for the production) for crop development, increased crop yields, improved quality of crops, and regulated growth cycle of crops. Greenhouses are generally applicable for rising flowers, vegetables, fruits and tobacco plants. Most of the Greenhouse systems still use the physical system in monitor the warmth and moisture. Number of difficulties can occur at the time of production not for worker but it also affects production rate because the temperature and moisture of the greenhouse must be incessantly monitor to make sure best situation. Greenhouse helps to monitor important part of the agriculture sectors.

In our nation, as they can be used to produce vegetation beneath forbidden climatic parameter which directly or not directly the plant growth and Hence they produce good quality of product.

In this project the advanced mechanization and monitor of the region of the green house is done and this determination completely monitor and controlled.



Fig.1 Greenhouse

And we get output in graphical form at MATLAB. We get parameter at the output like the temperature, soil moisture, PH level, light, basic nutrients which are responsible for the growth of the tree

## 2. RELATED WORK

About 95% of plants, food and cash crops are grown up in open field by cultural method. Man has knowledge how to grow products in natural ecological situation. In some temperate regions climatic situation are extremely bad and no crops can be grown-up. Automation is the technique for growing plants all around year by protecting plants from extreme cold and temperature. Chemical application of nutrients and pesticide is important processes in agricultural production. About 30-35% of production losses reduces by pesticide spraying.

Greenhouse automation system controls the temperature, moisture, PH level, light using different control devices and transfers the data to the PC. Autonomous robot are enables the greenhouse automation process for spraying the pesticide and helpful the diseased plants. This system failed diseased plants and updating of remote monitoring.

The autonomous robot for pest spraying leads very costly for construction of greenhouse automation. Crop cultivation has been around for a long time. Some disadvantages in implementation traditional cultivation techniques?

Pests and disease: vegetation rising in usual farming method are considerably artificial by pests and infection it was exposed to present be sign so as to previously a lot of thousands year age development in countries such as china, Egypt and India employed means of protection against cold, wind and excessive solar radiation This method of protection was

employed only to provide a short term protection for plants against harsh climate conditions. However when European explorers brought back plants acquired in the course of their travels mint was stream vegetation so as to could not endure the cold European climates. The result was the creation of greenhouse and this early greenhouse was originally referred to as "giardini botanic" as known as "botanical gardens". As a plant grows, it undergoes many developmental changes, including formation of tissues, stem, flower and roots.

The major basis of nutrients that is phosphorus potassium nitrogen used to assist this development process is found in its surroundings. In other words, growth of a plant is solely dependent on the conditions of the surroundings inside which plants are grown. The atmosphere consists of many different factors including light, ambient temperature, soil temperature, humidity, soil moisture and CO<sub>2</sub>.

This climate factors engage in recreation a significant job in the quality and productivity of the plant growth. Bottle green developed theater a key in task to offer cleaner energy source, reduce atmospheric emission, humiliated the crash of hot house gasses, save natural resources and energy, maximize yield and minimize waste, etc.

It would not only be important to the quickly rising renewable power and clean machinery sector, but also be substantially beneficial to society and economy. It is estimated that green energy can save EU3trillion 2050. The "green" jobs are growing faster than overall job growth in the U.S. Thus, going "green" or "sustainable" is not an option, but a necessity. It is noticeably becoming major component of the missions for manufacturers to stay globally competitive. Green manufacturing covers a wide range of manufacturing, from development of green technology products, implementation of advanced manufacturing and production technologies, and introduction of energy efficient and environmentally friendly industrialized processes and systems, from the plant to the enterprise level, and the whole supply chain.

Here, we interpret green manufacturing previous systems used android phone to monitor but lacked to control it using android from remote locations. One of them was based on GSM but commands are needed for the operation which was costly. The biggest disadvantage of these systems was that one person always had to be present in that place or in the vicinity of the green house. Sometimes the farmers cannot predict which action needs to be taken environment and may take wrong decisions thus causing more harm

Type of sensor	Name of sensor	Range of sensor	Unit
Temperature sensor	LM35	-55 to 150 degree Celsius	Kelvin
Soil moisture sensor	PH meter	0 to 100 m	Meter cube of water per meter cube of soil
Light sensor	LDR	30 to 60 nm.	Wavelength (lambda)
PH sensor	PH meter	0 to 100m	Meter cube of water per meter cube of soil

to the plants in the green house.

### 3. PROPOSE SYSTEM

AVR microcontroller (Atmega328) is used which gives high performance and we know it is the RISC based controller. Sensor are use for the sensing of the parameter like soil moisture, temperature, PH sensor and other as per requirement which are connected to controller i.e. AVR and controlling part is also added here.

LCD is used to get display of sense parameter of green house and for the power supply we use adapter in this system. Arduino is the latest upcoming fastest microcontroller which is used in project for the interfacing with the PC. GSM is use for getting parameter reading when we want.

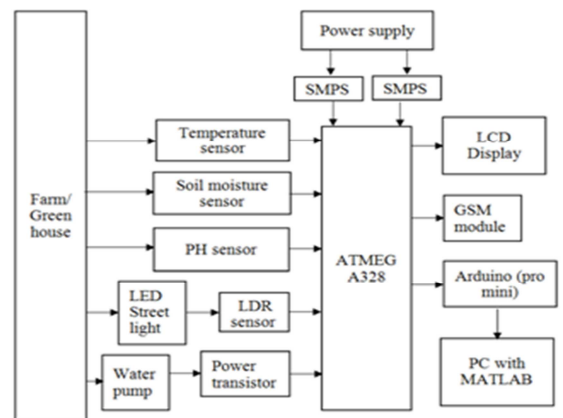


Fig.2 propose system

MATLAB is the software part of project in which we

get parameter reading in the graphical form that is easy to study.

Table1.Specification of the sensor

### 4. PERFORMANCE ANALYSIS

We are discussing about the working and result of the system.

#### 4.1 Monitoring of greenhouse parameter

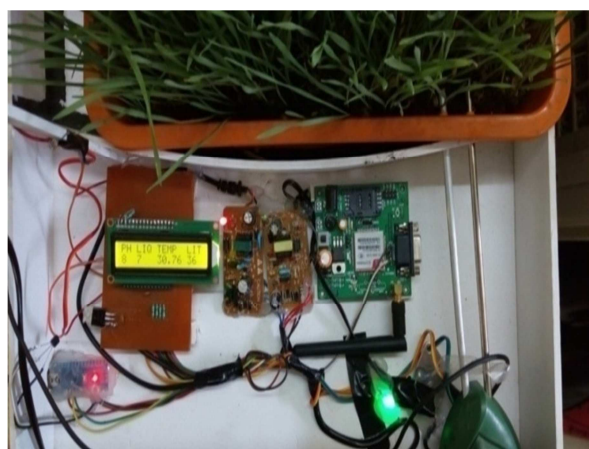


Fig.3 monitoring of greenhouse parameter

Firstly place this system at green house or open field and place all sensor After switching the power supply we get the initialization with the help of LCD which is place on the PCB and connect to the system part when the PCB start conducting and all sensor get started we get output at the LCD display first is the PH sensor reading, second is the soil moisture reading. Third is the temperature sensor reading, and last is light sensor reading after this data is transfer to the arduino nano via connecting wire to the port of the arduino which is connected to PC then we get graph.

#### 4.2 Controlling greenhouse parameter

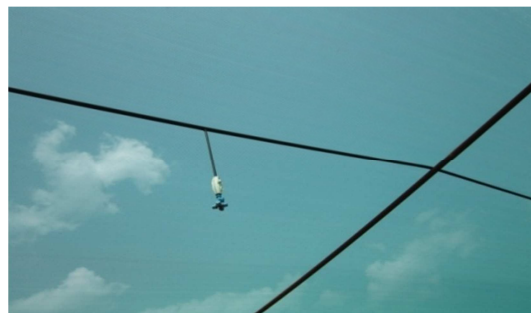


Fig.4 controlling greenhouse parameter

Controlling is very important part in greenhouse without any human operator we can operate this

system by using water pump and Street light. When the level of water in the soil is goes less than set point at that time pump get started by using power transistor and when darkness is occur due to change in atmosphere at that time street LED is on in this way level of the water in soil and the light of the green house.

When the level of soil is less than 74-75 then at that time power transistor is start motor pump at the second controlling part when LDR (light dependent resistor) detect darkness that is efficiency of light at that time street light glow.

#### 4.3 Interfacing with MATLAB

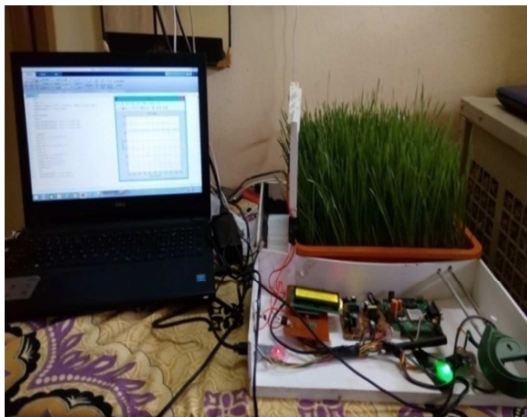


Fig.5 Interfacing with MATLAB

Here arduino nano is use as the purpose of the interfacing of the PC to get output in the graphical form at the MATLAB.

Following figure shows and the system At the MATLAB window we get the graph of parameter as shown in following figure.

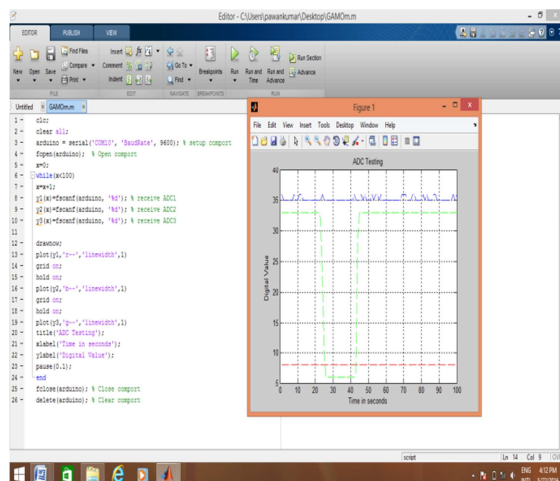


Fig.6 Output by using MATLAB

If there is change in atmosphere then there is sudden change in parameter.

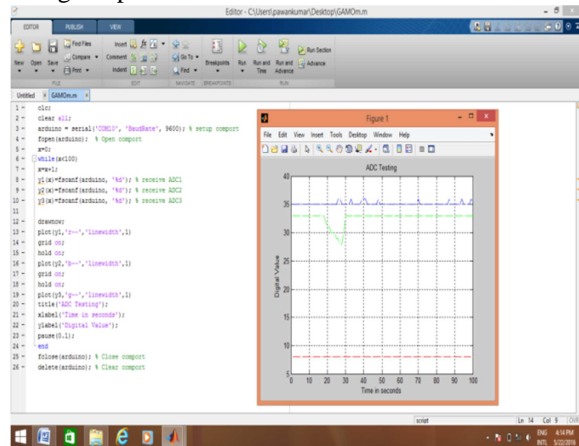


Fig.7 Output variation at MATLAB

#### 4.4 Working of GSM

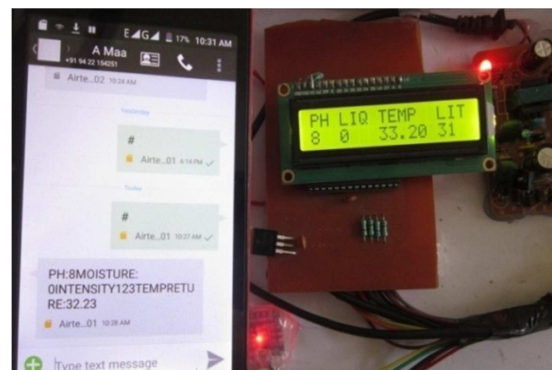


Fig.8 Output by GSM in the system

we are added GSM module which is used to get the parameter reading when we want for that text #message to that SIM card number (xxxxxxxxxx) which is place in side of program then it send parameter value to that number, which is save in program.

In this we get reading of the parameter when we are away from the farm or green house. As shown in following figure.

#### 4.5 field work results

The following figure shows the visited green house result compare with the standard value (range of parameter).



Table- 2: standard parameter value.

Name of crop/vegetable /plants	PH	Liquid	Temp	Light
Wheat	5.5-6.5	7-50	30-40	35-45
Eggplant	4.5-5.3	12-46	35-45	35-45
Onion(red onion)	5.30-5.80	10-80	30-40	30-40
Onion(white onion)	5.37-5.88	10-80	30-40	30-35
Cabbage	4-6	10-80	30-40	40-50
Drumstick	7-10	5-60	30-40	30-40
Rose(all type)	4-6	5-20	35-45	40-50

Table-3: field work results of system

Name of crop/vegetable /plants	PH	Liquid	Temp	Light
Wheat	5.6	8.9	31.76	36
Eggplant	4.8	30	37.60	39
Onion(red onion)	5.3	22	30.01	32
Onion(white onion)	5.6	20	30.01	32
Cabbage	4	15	33.60	41
Drumstick	8	6	31.25	31
Rose(all type)	5	12	36.00	45

In the above table shows approximate parameter value.

## 5. CONCLUSIONS

We conclude that this is the technology of monitoring and controlling of different parameters inside the greenhouse which also help to implemented greenhouse for smooth maintenance using automation of greenhouse that is without human interference. The system design here user friendly, low cost, easily implement & stable, it should be more efficient.

MATLAB has application of image processing so we can check the shape and size of the product and we can make this system wireless this is future scope of technology.

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