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Solar Power Crop Detector

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ABSTRACT

Solar power crop detector refers a technique to find the type of crop grown in the various types of the cultivable lands. The System which uses the Solar Power as the main supply for the entire system. In this system we are using three different types of sensors such as Temperature Sensor, Humidity Sensor and Ph Sensor. Based upon this sensor value the suitable crop is displayed in the LCD including the sensor readings.

Keywords: pH, temperature, moisture, PIC, Solar power

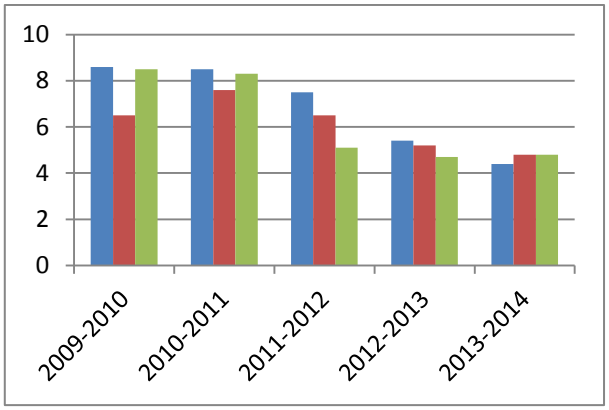
I. INTRODUCTION

The concept of smearing automation on agronomy is very new. The agricultural industry is very much sheathing when compare to all other industries because the sort of job involved in agriculture cannot be predicted and many monotonous tasks are not exactly the same at every time. In most cases lots of factors have to be considered (i.e. atmosphere condition, land status, etc.) before the commencement of the task. This based on a prototype – "SOLAR POWER CROP DETECTOR" an autonomous agricultural gadget for determining pH levels, minerals and type of Garner grow in soil entirely powered by solar energy.

II. METHODS AND MATERIAL

A. Serviceable

At present scenario even though the agriculture is a mainstay of our country, but the GDP (**Gross domestic product** (**GDP**)) is the market value of all officially recognized final goods and services produced within a country in a year, or over a given period of time. It is often used as an indicator of a country's material standard of living is becoming devastated. The current **GDP is 4.8**; it is **decreased 50% of the value of GDP in 2009(table1)** .If this stage continues after a decade there will be no standard for a crop. The major reason for this status is trailing of data's. To overcome such defect gadget will collect all the nutrients in the soil and be beneficial to for medley of the superior reap kind and also to store the data of the particular regions and send the status of the rural locations to the database in ministry of agriculture, agriculturists, and students.



Graph 1 quarterly GDP of India from 2009-2014

B. Revolution By A Gadget

SOLAR POWER CROP DETECTOR is a new method of technology in the field of Agriculture. It enriches the crop cultivation in the field. Thus, the nation economy is to be increased. It provide acknowledgement to the cultivators about the crop cultivation in the field. Nation Economy and the cultivation in the field.

C. Factors to be Considered

The main objective considered here is the pH value of a soil. pH is probably the single most informative measurement that can be made to determine soil characteristics. At a single glance, pH tells much more about assoil than merely indicating whether it is acidic or basic. For example, availability of essential nutrients and toxicity of other elements can be estimated because of their known relationship with pH. pH it measure the acidity Soils than to acidify the soil. The pH value below the 7 is Acidic and above the pH value 7 are Alkaline. Plants having different acidic level and it also have different temperature and moisture level found in the soil.

$$\mathrm{pH} = -\log_{10}(a_{\mathrm{H^+}}) = \log_{10}\left(\frac{1}{a_{\mathrm{H^+}}}\right)$$

D. Classification

Table 1. Classification Of pH

DENOMINATION	pH range
Ultra acid	**<3.5**
Extreme acid	**3.5-4.4**
Very strong acid	**4.5-5.0**
Strong acid	**5.1-5.5**
Moderate acid	**5.6-6.0**
Slight acid	**6.1-6.5**
Neutral	**6.6-7.3**
Slightly alkaline	**7.4-7.8**

E. Crop Classification According To pH

TABLE2. Classification of Crops

pH VALUES	**CROPS**
4.5-5.0	Azalea ,bilberry ,blueberry ,cranberry, heather, orchid, pin oak
5.1-5.5	Ferns , iris ,orchids , parsley ,conifers , maize , millet , rye , oat , radish , potato , sweet potato, pine apple
5.6-6.0	Aster , carrot , cucurbit ales , bean , crimson clover ,peanut , soya bean , rice , petunia , rhubarb ,violet
6.1-6.5	Cabbage , cauliflower , turnip ,cucumber , pumpkin , squash ,pea , strawberry , tomato , sweet corn

F. Minerals Calculation According To pH

pH	**K**	**P,B**	**N,S**	**Cu ,Zn**	**Ca , Mg ,Mo, M**	**Fe , Mn**
3	**L**	**M**	**L**	**H**	**M**	**H**
4	**M**	**M**	**M**	**H**	**M**	**H**
5	**M**	**M**	**H**	**H**	**M**	**M**
6	**H**	**H**	**M**	**H**	**>M**	**L**
7	**M**	**M**	**M**	**L**	**H**	**L**
8	**M**	**M**	**M**	**M**	**VH**	**VL**

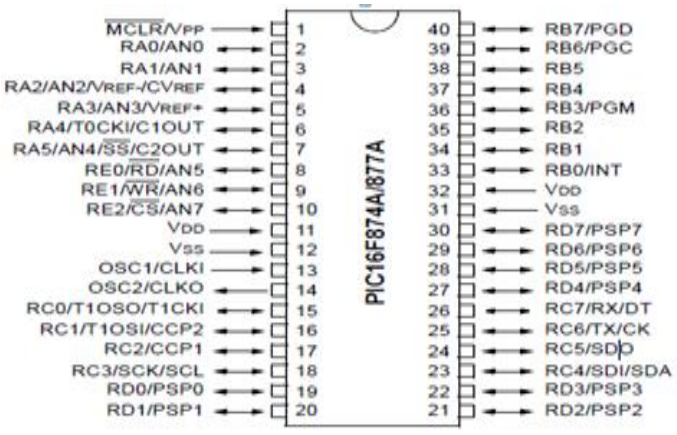
L=LOW; M=MEDIUM; H=HIGH; VH=VERY HIGH

Table3. Strength of Minerals

COMPONENTS REQUIRED

1. PIC16F877A LAUCH PAD
2. LCD DISPLAY
3. pH SENSOR
4. TEMPERATURE SENSOR
5. HUMIDITY SENSOR
6. SOLAR PANEL

G. PIC16F877A PIN DIAGRAM



H. SPECIFICATION OF PIC16F877A

Key Features	PIC16F873A	PIC16F874A	PIC16F876A	PIC16F877A
Operating Frequency	DC – 20 MHz	DC – 20 MHz	DC – 20 MHz	DC – 20 MHz
Resets (and Delays)	POR, BOR (PWRT, OST)	POR, BOR (PWRT, OST)	POR, BOR (PWRT, OST)	POR, BOR (PWRT, OST)
Flash Program Memory (14-bit words)	4K	4K	8K	8K
Data Memory (bytes)	192	192	368	368
EEPROM Data Memory (bytes)	128	128	256	256
Interrupts	14	15	14	15
I/O Ports	Ports A, B, C	Ports A, B, C, D, E	Ports A, B, C	Ports A, B, C, D, E
Timers	3	3	3	3
Capture/Compare/PWM modules	2	2	2	2
Serial Communications	MSSP, USART	MSSP, USART	MSSP, USART	MSSP, USART
Parallel Communications	—	PSP	—	PSP
10-bit Analog-to-Digital Module	5 input channels	8 input channels	5 input channels	8 input channels
Analog Comparators	2	2	2	2
Instruction Set	35 Instructions	35 Instructions	35 Instructions	35 Instructions
Packages	28-pin PDIP 28-pin SOIC 28-pin SSOP 28-pin QFN	40-pin PDIP 44-pin PLCC 44-pin TQFP 44-pin QFN	28-pin PDIP 28-pin SOIC 28-pin SSOP 28-pin QFN	40-pin PDIP 44-pin PLCC 44-pin TQFP 44-pin QFN

I. EFFECT OF TEMPERATURE ON CROP PRODUCTION

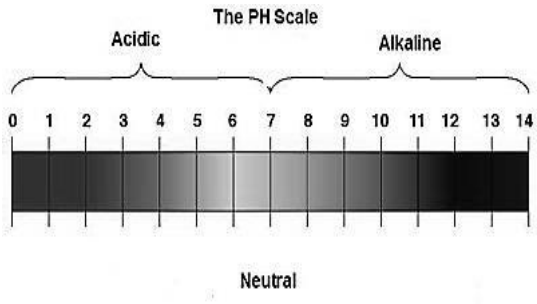
A. Distribution of Plants:

The most essential factors in the climate are temperature and moisture. Plants can grow only in the particular temperature. For each and every crop has specific Temperature and Moisture and tabulated below

Cardinal temperature of different crop's seed germination :

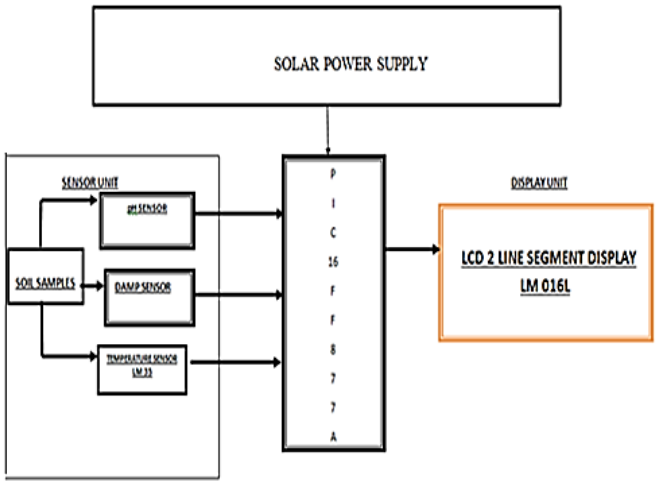
Crop's Seed	Temperature (OC)		
	Minimum	Optimum	Maximum
Rice	11	32	41
Maize	9	33	42
Wheat	4	25	32
Soybean	9	30	41
Barley	4	22	36

B. pH TABLE



III. RESULTS AND DISCUSSION

Block Diagram



C. BLOCK ENLIGHTENMENT

SOLAR POWER SUPPLY BLOCK

The entire block is controlled by using the solar power. Solar Power it provides the power to the controller unit, sensor unit and the LCD Display Unit. Where the power from the solar panel is stored in the battery, from the battery the power is evenly distributed to the entire unit.

SENSOR UNIT

The sensor unit consists of pH Sensor Unit, Temperature Sensor Unit, Humidity Sensor Unit. The pH Sensor senses the amount of pH range found in the soil. The Humidity Sensor senses the humidity level found in the sample soil. At last the Temperature sensor LM35 senses the temperature level found in the soil.

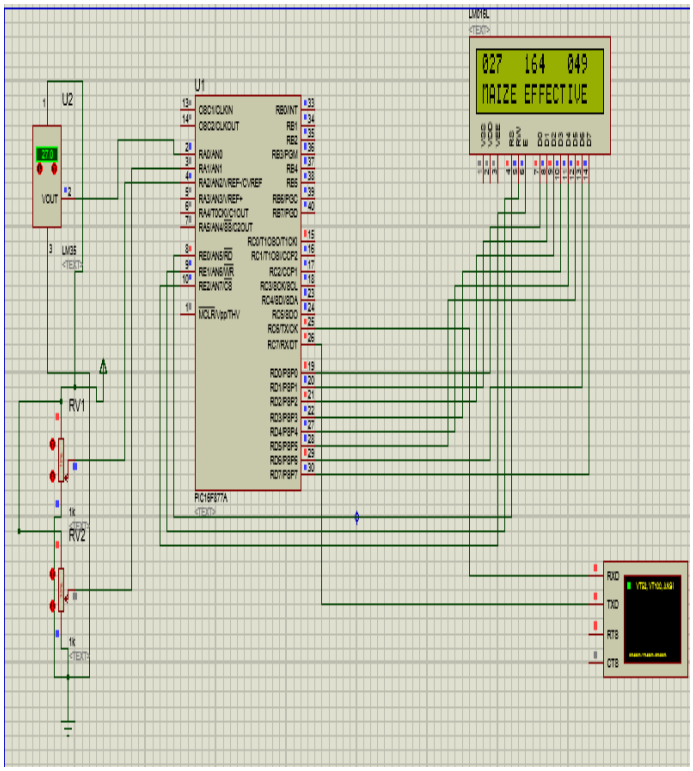
CONTROL BLOCK

The entire system is control by controller PIC16F877A low-power microcontrollers (MCUs) are RISC-based, mixed-signal processors that include smart analog and digital peripherals and offer a number of additional options such as low-power embedded RF and security such as AES encryption. MSP microcontrollers offer the ultimate solution for a wide range of low-power and portable applications. TI provides robust design support for MCUs including technical documents, training, tools, and software.

LCD TWO LINE SEGMENT DISPLAY

LCD (Liquid Crystal Display) displays are used to show the output what we anticipated. Here we use this screen for displaying the pH values of the soil, proportion of macro nutrients and also to display the category of garner. The main benefit of a led display is it assumes only a smaller amount power for its working. Here we use two segments LCD to telecast three of the parameters for the users view.

D. SIMULATION OF MPLABIDE AND PROTEUS



IV. CONCLUSION

This results a new development of automation in the agriculture field. It is a farmer friendly device. It plays major role in the development of nation's economy. And it creates a benefit data's to the future agriculturists about the present crops. It prevents the destruction of garners.

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