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Farming Robot

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ABSTRACT

Agriculture is very labour intensive field and only field where the robots are not involved. Now-a- days many Industries are trying to reduce this human labour by making robots and machines. A vision based row guidance Method is presented to guide a robot platform which is designed independently to drive through the row crops in a field according to the design concept of open architecture. Then, the offset and heading angle of the robot Platform are detected in real time to guide the platform on the basis of recognition of a crop row using machine Vision. And the control scheme of the platform is proposed to carry out row guidance. Here we are designing a autonomous intelligent farming robot which indicates the plant health by observing the colour of their leaves and based on the height of the plant. The robot also notes the surrounding environmental conditions of the plant like Temperature, humidity so that the robot will decide about health of plat and will display on the LCD. The robot has also watering mechanism it will water the plants according to their needs by observing temperature and humidity. It will also tell when the cutting process should take place by observing the leaf colour.

Keywords: ARM7, Image processing, Irrigation Robot

I. INTRODUCTION

In this project, we are going to make a robot which uses vision based row guidance method to drive through the row crops. Ultimately, a unique system has been described for Plant & Food Research which makes use of a number of electrical and computer systems engineering theories. A prototype robotic arm has to be designed, developed and constructed, which should be integrated with motors, controllable using specific electronic components and custom computer software.[1] A number of sensors are integrated into the robotic system including colour, proximity, temperature and humidity systems. [2].The system required the use of vision, with custom algorithms being developed to identify plant growth rates. The entire system will integrated into a fully automated package. This allowed the system to autonomously return to specified sites (i.e. individual plantlets) at set time intervals to identify subtle changes in growth rates and leaf colour.[3] This provided the potential for plant nutrient levels and the immediate environment to be routinely adjusted in rezones to continuous sensing Resulting in optimized rapid growth with minimal human input.[4] Image based solutions are particularly well suited for remote sensing applications, and can meet the accuracy, resolution and timeliness requirements of typical PCM applications [5]. Automation is a illumination of human afford from the working field. From last two decade the industrial automation is growing very rapidly. But the automation concept in agriculture is not developed as much projected to increase to 9 billion souls.Sensors located in fields along with hand-held or tractor based solutions on the other hand provide the missing link .Such devices can be used for very high spatial resolution and by consolidation of results, can also be used for providing information of a larger farmland.[6].Some solutions are also available in the microscopic to telescopic range, such as the Colour Pro software for estimation of infected leaf area, chlorophyll, protein, and bacterial colonies count; CytoPro for chromosome analysis and others by BARC [7].These are well suited for query resolution, information on markets and upload of static image type of applications. Tele centres (sager, farmer help lines also depend on automation of query resolution using databases or depend on experts for query resolution.[8].

II. PROPOSED SYSTEM

Agricultural autonomous Robot which will sense the conditions in real time For this, we are analysing the field parameters such as, Temperature, humidity, etc. The Robot will also have a Plough to plough the fields, and then a seed dispensing mechanism, Watering mechanism, so, in all this is a completely autonomous robot.

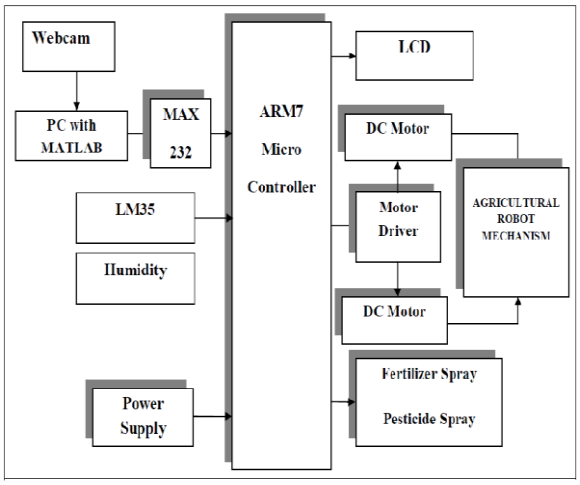

Figure 1: Block diagram of Farming robot

The main feature of the Robot is the Ability to sense the health of plants using Image processing. For this we are using a special purpose Web cam which will take photos inside the field and analyse the growth according to the height, colorization of leaves etc.

The captured image are then processed through image processing technique, then converted into voltage levels through MAX 232 level converter which is shown in block diagram. and gives it to the microcontroller unit. In the microcontroller unit, c language coding is predefined. Robot which has several motors is activated by using the relays. Relays are nothing but electromagnetic switch which ON/OFF according to the control given by the microcontroller unit.

III. EXPERIMENTAL SETUP

Figure 2: Hardware of Farming Robot

This figure shows hardware of project. It includes plants which are healthy plant, disease plant, abnormal plant and buggy . A webcam is place on buggy. And with the help of webcam images will be captured. And In this project hardware water mechanism will be happen.

IV. RESULT

Figure 3: Result on LCD

Now transformer is connect to buggy and switch . when switch is a ON . on LCD above result 3(Intelligent farming robot , temperature and humidity) will be displayed. The temperature is ambient temperature. Then buggy will move on. And stop where first plant is

place. Then on LCD 4 result(capture image 1) will be displayed . With the help of webcam ,we can take the photo of first plant. Then on laptop following image will be displayed . In this image comparison between recently captured image and data base image. Then laptop shows us health of plant.

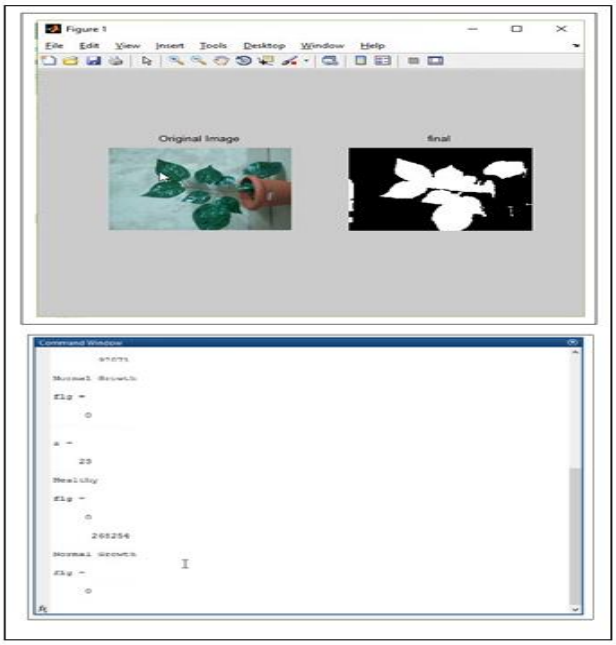

Figure 4: Result after detection of first plant on laptop.

Result is plant has normal growth and plant is **"Healthy".**Then buggy will move on and will capture picture of second plant which is shown in following figure.

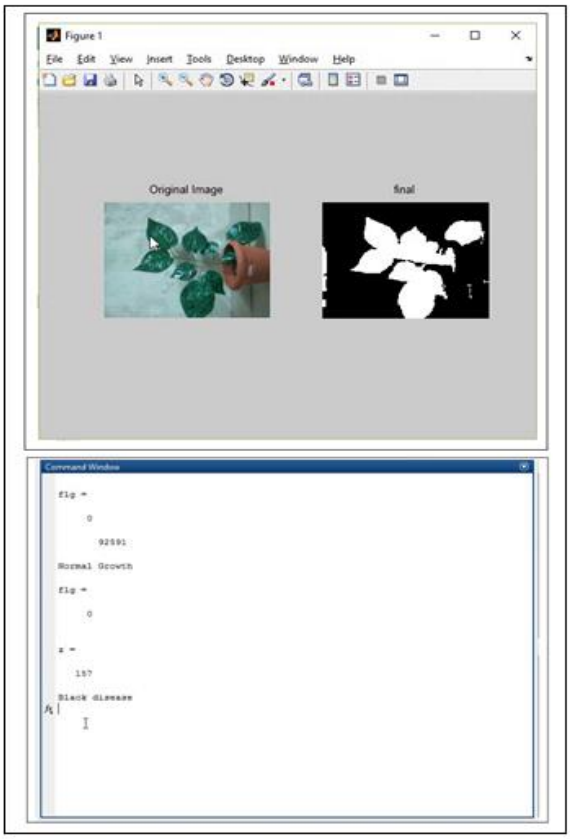

Figure 5: Result after detection of Second plant on laptop.

Result of second plant is plant has normal growth but has **"Black disease" .**Then buggy will move on and will capture picture of third plant which is shown in following figure.

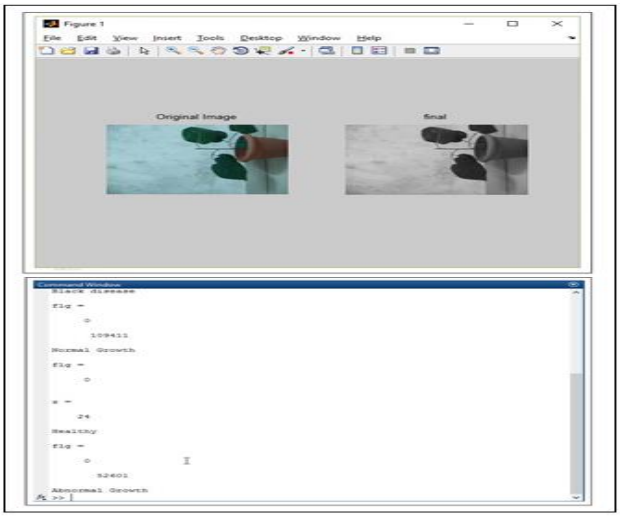

Figure 6 :Result after detection of third plant on laptop.

Result of third plant is plant has "**Abnormal growth**".

V. CONCLUSION

The system uses image processing to observe the leaf colour which increases further accuracy of the system as it identifies colours very accurately than humans. The system also observes different environmental conditions such as humidity and temperature which human cannot measure accurately. It also involves watering mechanism. Its features are Fully automated system thus reduces the human labour, More Accuracy. Its applications are This system can be used only for agricultural system in which It can be used to know the plant health. Its future scope is Wire-less System. The system can further modified for picking fruits and actual cutting process by the system.

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