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Krushi Roboter- Future Farmer's Friend

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***Abstract*: -- This robotic vehicle is an agricultural machine of a considerable power and great soil clearing capacity. This multipurpose system gives an advance method to sow, plow, and water and cut the crops with minimum manpower and labor making it an efficient vehicle. As jobs in agriculture require intelligence and quick, where robots could be substituted. The mode of operation of the proposed machine is simple even to the layman. Model is controlled using Android Application through BLUETOOTH. The application is specifically designed for moving the robot in variable directions such as forward, backward, left and right. Developed agriculture needs to find new ways to improve efficiency. The project gives an integrated application in the field of agriculture, which plays a vital role in the development of the nation. The machine will cultivate the farm by considering particular rows and specific column at the fixed distance depending on the crop. Moreover, the vehicle can be controlled through the Bluetooth medium using an Android smartphone. The whole process calculation, processing, monitoring are designed with motors & sensor interfaced with microcontroller.**

Keywords: - Bluetooth, microcontroller, motor driver circuit, transmitter and receiver.

I. INTRODUCTION

In the field of agriculture, various operations for handling heavy material are performed. For example, in vegetable cropping, workers should handle heavy vegetables in the harvest season. Additionally, in organic farming, which is fast gaining popularity, workers should handle heavy compost bags in the fertilizing season. These operations are dull, repetitive, or require strength and skill for the workers. In the 1980s, many agricultural robots were started for research and development. Kawamura and co-workers developed the fruit harvesting in orchard. Grand and co-workers developed the apple harvesting robot. They have been followed by many other works. Over history, agriculture has evolved from a manual occupation to a highly industrialized business, utilizing wide variety of tools and machines. Researchers are now looking towards the realization of autonomous agricultural vehicles. The first stage of development, automatic vehicle guidance, has been studied for many years, with a number of innovations explored as early as the 1920s. The concept of fully autonomous agricultural vehicles is far from new examples of early driverless tractor prototypes using leader cable guidance systems date back to the 1950s and 1960s. In the 1980s, the potential for combining computers with image sensors provided opportunities for machine vision based guidance systems. During the mid-1980s, researchers at Michigan State University and Texas A&M University were exploring machine vision guidance. Also during that decade, a program for robotic harvesting of oranges was successfully performed at the University of Florida. In 1997, agricultural automation had become a major issue along with the advocacy of precision agriculture. A robot is a machine that can be programmed and reprogrammed to do certain tasks and usually consists of a manipulator such as a claw, hand, or tool attached to a mobile body or a stationary platform. Autonomous robots work completely under the control of a computer program. They often use sensors to gather data about their surroundings in order to navigate. Tele-controlled robots work under the control of humans and/or computer programs. Remote-controlled robots are controlled by humans with a controller such as a joystick or other hand-held device.

II.RELATED WORKS

Several Projects like User friendly fuzzy logic based farm automation using arduino and Lab view using x bee controller are being undertaken. Also automatic milking systems, irrigation and harvesting systems, Tank farming automation using several meter designs are practiced in most of the western countries.

III.SYSTEM ARCHITECTURE

3.1 Existing System

At present, People use the manual controlled Tractors and other irrigational equipment. The agricultural function is performed by this respective vehicle, to perform different functions. So farmers using one vehicle to perform one task. For example, we are using tractor for only one task such as cultivating, for smoothening the surface we are using roller, for harvesting and seed flowing we are using labours to cut the crops and flows the seeds on the agricultural land respectively and we are using old method to watering the agricultural land. So farmers need individual vehicles or labours to perform individual tasks of the farming.

3.2 Proposed system Configuration

In this project we will be fabricating a multipurpose irrigation vehicle that will be able to dig the Earth, Sow the seeds and Cultivate the crop after the harvest is ready. We have designed an agricultural robot which will be able to perform five different functions including sowing, ploughing, water pumping, harvesting, rolling. We will be using a android smart phone application to control the vehicle to respond to the control signal this type of vehicle should be useful for the farmers as a low investment option instead of buying 2 or more machines to do this work done by a single machine of ours. We are using solar panel as a power supply to our agricultural robot.

3.3 DC Motor

DC Motors fall into the category of Electrical motors that converts electrical energy into mechanical energy. There are several kinds of DC Motors. They work on the principle that when a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move which is known as the motoring action. If the direction of electric current in the wire is reversed then the direction of the rotation is also reversed. When magnetic field and electric field interact they produce a mechanical force which causes the direction of rotation of this motor to change and is given by Fleming’s left hand rule which states that if the index finger, middle finger, and thumb of your left hand are stretched mutually perpendicular to each other and if the index finger represent the direction of the magnetic field, middle finger represents the direction of the electric current the then the thumb represents the direction in which the force is experienced by the shaft of the dc motor.

3.4 Bluetooth:

Here Bluetooth is used as a basic universal Remote control for Bluetooth enabled serial devices such as Bluetooth modules connected to the microcontroller. It is a short-range wireless networking technology and is used to link (or pair) two devices, such as smart phones and headsets, cameras and printers, and keyboards and computers, it is sometimes called a cable-replacement technology. Both devices must support Bluetooth in order to be paired, if they do, though paring the paring is designed to happen automatically, with little to no user interaction. The Bluetooth module used here is a HC-05 based on SPP support. HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. In our idea we have made use of blue tooth Control App available on Android as controlling software more like a remote control for the manual operation of the robot.

3.5 Water sprinkler:

The type of water sprinkler used here is E-JET905F. This water sprinkler comes in use when the humidity level goes below the set point.

3.6 Camera:

The cameras used in robots are commonly used as an image sensor. These cameras are sensitive to IR light and have an IR filter placed in front of the lens. Cheap webcams may not have such a filter, which makes them very sensitive to sunlight. Camera calibration has always been an essential component of photogrammetric measurement. Self-calibration has become essential for high-accuracy close range measurement. The sensor that is used in the camera has a highly integrated cmos constructed array with extraction and enhancement facilities built in the space. It also performs extracting any extra edges from the image but the microcontroller has to process it. The two extreme types of calibration approaches are named as the photogrammetric calibration and pure auto calibration techniques. Traditionally the methods of calibration were used to resolve a pack of non-linear equations based on triangle measurement principle. Using servo, we can control the tilt angle of the camera in the device.

IV WORKING PRINCIPLE

In this project we will be fabricating a multipurpose irrigation vehicle that will be able to DIG the Earth, Sow the seeds and Cultivate the crop after the harvest is ready, We will be using a android smart phone application to control the vehicle to respond to the control signal this type of vehicle should be useful for the farmers as a low investment option instead of buying 2 or more machines to do this work done by a single machine of ours. Heart of our robot is intel’s most power family of microcontroller 8051,we are using at89c2051 Two microcontrollers ic2 is first microcontroller which acts as master controller ,decodes all the commands received from the transmitter and is responsible for executing all the commands received from the remote and also generating pwm pulses for the speed

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control . ld293 motor driver ic which drives two motors these two motors are vehicle driver motors and it also runs the motors for all other attachments of agriculture in the vehicle seed sowing, cultivating, harvesting, ploughing and rolling.

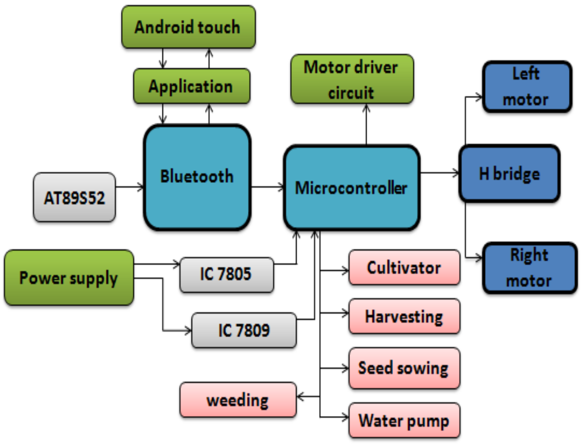


Fig.4.1 represents System Architecture of the

IMAGE PROCESSING USING MATLAB

The programmed location and orientation of the robotic arm is stored with each image. For each sector, all ripe fruits are identified by the image processing software, listed, and picked one by one in a looped task. To improve the therapeutic effect of the image processing in finding and locating the apples on the tree, the platform was designed to control the lighting conditions to the greatest extent possible, using a canopy to cover the entire tree. The MATLAB platform is also used to reduce the effects of changing ambient lighting conditions and provide a uniform background (blue) to ease location.

Fig Processed image under MATLAB

V. MARKET POTENTIAL AND ADVANTAGES

MARKET SIZE

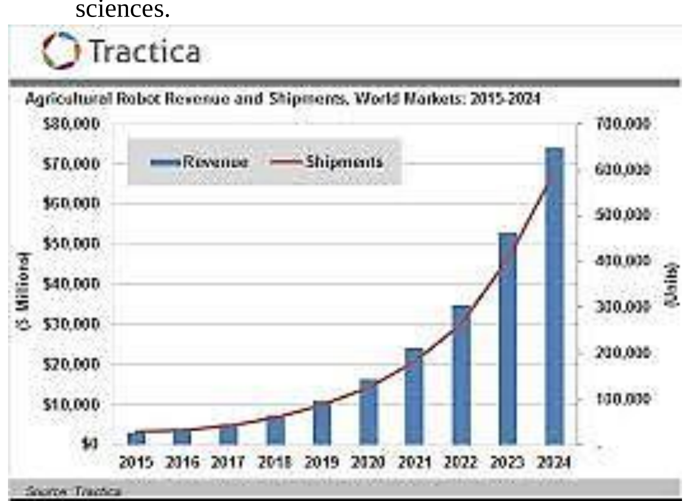
India's gross domestic product(GDP) is expected to grow at 7.1% in FY 2016-17,led by growth in private consumption while agriculture GDP is expected to grow above trend at 4.1% - to Rs 1.11trillion

MARKET GROWTH:

The increasing use of precision agriculture, among farmers, for collecting and processing data helps in making better decisions on fertilizing, planting and harvesting crops .the technique has immense potential to enhance crop yields and profits and to resolve the food and water crises. The increasing need for monitoring crop health for yields and production and the increasing government support for the adoption of modern agriculture techniques are expected to drive the industry demand over the forecast periods.

MARKET PROFITABILITY

- ➢ The trend of maximizing agricultural resources, in a sustainable manner, is positively influencing farmers with its growing demand in the world's food supply chain.
- ➢ The proliferation of IoT has revolutionized the agriculture industry that primarily depends on technology, engineering and physical and biological sciences.



NOVEL:

- ➢ The process of automation in the system totally resolves 90-95% of the problems of the exiosting.
- ➢ Here we are using RFID technology for the control of the machine by giving unique RFID tags for

vehicle
- This project is the solution for all the manual work.

CUSTOMER TYPE
Farmers having their own farm land.

VI. FUTURE ENHANCEMENT

It can be concluded that either GPS and machine vision technologies will be fused. Together or one of them will be fused. With another technology (e.g., laser radar) as the trend development for agricultural vehicle guidance systems. The application of new popular robotic technologies for agricultural guidance systems will augment the realization of agricultural vehicle automation in the future.

VII. CONCLUSION

This multipurpose system gives an advance method to sow, plough and cut the crops with minimum man power and labour making it an efficient vehicle. The machine will cultivate the farm by considering particular rows and specific column at fixed distance depending on crop. The obstacle detection problem will also be considered, sensed by infrared sensor. It can be concluded that either GPS and machine vision technologies will be fused. Together or one of them will be fused. With another technology (e.g., laser radar) as the trend development for agricultural vehicle guidance systems. The application of new popular robotic technologies for agricultural guidance systems will augment the realization of agricultural vehicle automation in the future.

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