

AGBOT

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Abstract :- This is field of invention where present invention relates to multi-tasking robot and more particularly, the robot which works on artificial intelligence to perform more than one agricultural tasks like harvesting, weeding, culling and ploughing with the help of image processing and brain wave technology

Key Words: Robot, artificial intelligence, multi-tasking, agricultural task, image processing, brain wave technology.

INTRODUCTION

The robots in agriculture or agbot are robots deployed for agricultural purposes. Agriculture is the backbone of the Indian economy, it is the key development to the rise of sedentary human civilization. Despite the fact that agriculture accounts for more than quarter of the Indian economy, it is considered highly inefficient, wasteful and incapable of solving the problems of hunger and malnutrition. It is estimated that as much as one-fifth of total agriculture output is lost due to inefficiencies in harvesting, transport and storage of crops. These factors mean that farmers need to produce more at a higher quality, and in a sustainable manner, with youth turning away from the profession; there is a lesser workforce for

the farmers. On the improvement of the agriculture field.

NECESSITY OF AG-BOT

In the prior art some inventions are GPS or GIS enabled but in each citation an invention with robots which are multi-tasking but not effective; an invention has poor accuracy in vegetation harvesting; an invention that always needs human intervention to switchover from the particular task to another for a multi task robot.

To overcome these problems robots which are capable of understanding the human thoughts are necessary. The present invention makes it possible by using sky brain wave technique.

The objectives of the inventions are, to introduce an agbot which converts human thoughts into action using sky brain wave technique; to introduce image processing, spatial recognition, the aid of real time controlling, and GPS to produce 80% accuracy in vegetation harvesting and crop cultivation.

BLOCK DIAGRAM

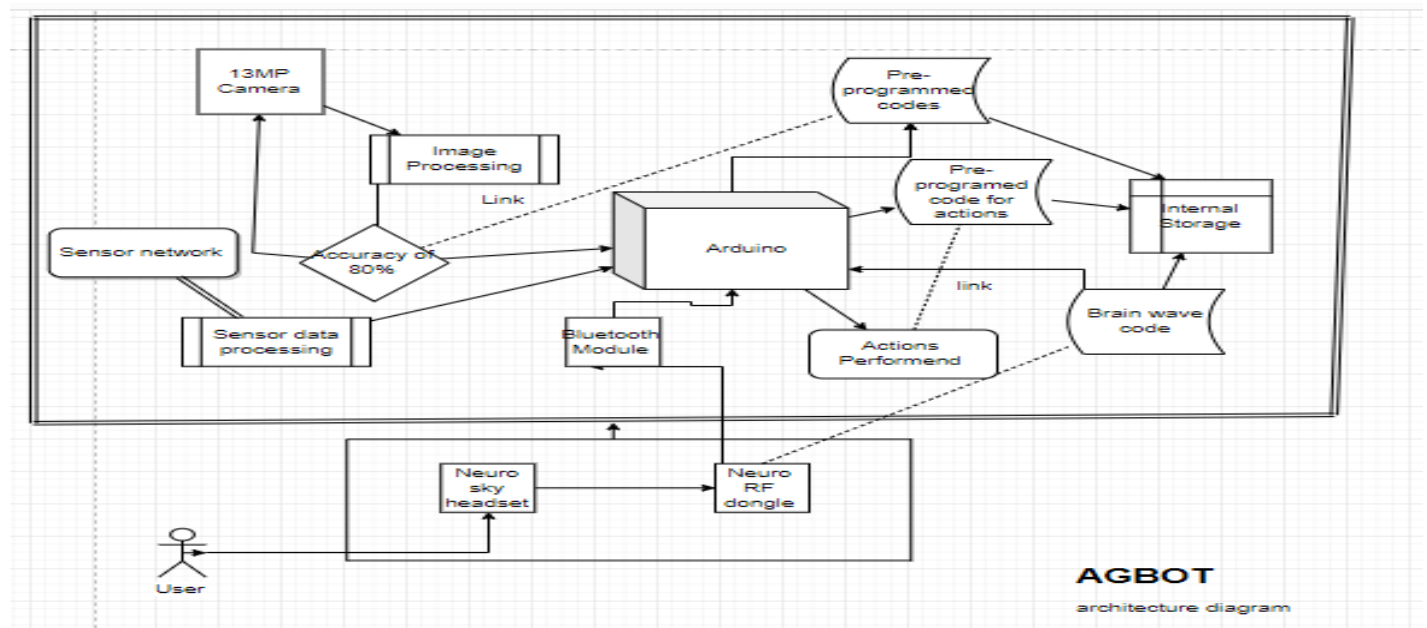


Fig -2. Block Diagram

- **Arduino:** The Arduino is a microcontroller board based on the Microchip and pin they are divided to two types UNO and MEGA ATmega328P microcontroller and developed by Arduino.cc
- **GPS(Global Positioning System):** The concept of GPS is location based system. GPS satellite transmits radio signal containing current time and data about its position of the user.
- **Sensor Networks:** Variety of sensors used in this are used in this device they are:
 1. Ultrasonic sensor
 2. Infra-red sensor(IR)
 3. Motion sensor
 4. Electro-Encephalography sensor(EEG)they combine to form a sensor network.
- **Battery:** Car battery are used in this where the high voltage rechargeable that supplies current to motor.
- **Bluetooth Module:** This module is used to connect the master and the slave, in this it connects the User and the Agbot.
- **Brain-wave tech:** It is which plays the major role in the device of converting the brain signal waves to binary outputs.

COMPONENTS

The functioning of entire device depends upon the four important parts. They are:

1) GPS (Global Positioning System):

This is Global Positioning System, originally NAVSTAR GPS, a satellite linked base system which can transport or receive information on or near the Earth. The obstacles such as mountains and buildings block the relatively weak GPS signals.

2) Arduino (MEGA)

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts.

3) Power supply

In order to move this heavy device, two car batteries are used. Each of these car batteries give the supply power of 12.6V or above which intensively move this vehicle. These are rechargeable batteries that supply current to the

electric motor vehicle. This supplies DC current. These automobile batteries have 6 cells and each of these cells have lead component and consists of lead alloy grid filled with sponge which acts as cathode. Anode is coated with lead dioxide. And each of the cells is filled with sulphuric acid which acts as an electrolyte.

4) Bluetooth module

The Bluetooth technology manages to communicate between the channels wirelessly. Bluetooth module can transmit or even receive the data wirelessly using two or more devices. It consists of host and a client. This can receive or transmit the data from the Host Controller Interface (HCI). The pairing should be done in a frequency of 2.4GHz. It is a secure protocol and is perfect for the short range, low cost, low power consumption between two electronic devices. It sends and receives the data in the form of radio waves. Every Bluetooth adapter has a particular range of connection. We use Bluetooth version 4.0.

5) Sensor Networks

Wireless Sensor Network (WSN) is a wireless network which consists of a base station and a number of nodes wirelessly connected to the base. The networks are used to monitor or analyze physical or environmental conditions like sound pressure, temperature, objects or obstacles. These data are passed to a main location such as microcontrollers. In this device, varieties of sensors are used. They form as wireless sensor network. They consist of Ultrasonic sensor, motion sensor, IR sensor, EEG sensor.

- **Ultrasonic sensor:** It is a type of acoustic sensor divided into three broad categories such as transmitters, receivers and transceivers. The transmitter converts electrical signal into ultra sound. The receiver converts ultra sound into electrical signals. The transceivers can do both the works.
- **Motion sensor:** Most of the motion sensor detects the motion by changing the frequencies they produce. The frequencies are microwave and infrared. The principle of the motion sensor is Doppler effect. The main part of the motion detector circuit is the dual IR reflective sensor.
- **IR Sensor:** It is an electronic sensor that measures the infrared light radiating from the object in its field of view. It can measure the heat of the object as well as detects the motion. It can only measure the infrared radiation.
- **EEG sensor:** It is brain signal processor which inturn processes the brain waves

into binary output and transmit through the RF module.

6) Brainwave technology There are totally four main brain waves present in a normal brain of a human. This can be measured and transmitted using neuro headset and the neuro RF module.

- Neuro Headset
- Neuro-RF module

Neuro Headset

It is a brain wave starter kit developed by the sky brain technology. It is an 8 channel wearable EEG headset and designed for scalable and contextual human brain research and provide access to brain data with quick response and in easy way.

Neuro-RF module

It is the module used in the neuro headset where this module which transmits the binary data from the brain to the other device which it is connected to.

7) Camera

The 13MP raspberry pi camera is mounted on the bot which is attached to the microcontroller where it is capable of night vision using infrared. The design is customizable. It is used to capture images which is needed for the processes. Using Image processing

WORKING

The combination of human mind and the robotic skill plays a key role in the design of the agbot. This is possible with the mind-controlling feature of this robot which is constructed using an arduino microcontroller, the mindwave signals are processed using neuro sky RF dongle. The neuro sky RF dongle is programmed to communicate with the arduino. In the program, the attention value is set to control the robot can be tuned to the accuracy needed. These digital signals are transmitted to the arduino microcontroller attached in the agbot via Bluetooth module. These concepts are used to set any agricultural task which are pre-programmed with the robotic microcontroller.

Usage of image processing for plantation type detection and harvesting with the help of spatial recognition tool, the aid of real time controlling and GPS (Global Positioning System) makes harvesting crops very easy. The robot employs a simple yet efficient system with the aid of Artificial Intelligence concepts to identify the vegetation and harvest it. A 13MP Raspberry Pi 3 Camera Mounted on a Rotatable Motorized stand captures the image of the vegetation available. The captured image is compared with the pool of images that have been preloaded in the system. Based on the criteria set by the user, the image is compared to the filtered set of images. If the captured image matches with the requirement at an 80% accuracy, the camera is then instructed to capture position coordinates of the vegetation. Once the position signal is processed, the rover will transit horizontally to the vegetation and once the robot is in position, the robotic arm will move to the appropriate height and the gripper attached in the

robotic arm, collects the fruit/vegetable and the pressure with which the vegetable should be held for the completing the harvesting, is sensed by the IR sensors fixed on the gripper. This operation loop is executed continuously till no more vegetation of the required type is available or if the system is manually turned off. The rear side of the robot is attached with a ploughing system, crops (wheat, rice), autonomous seed dispensing system with distance monitoring, the seed to be sown can be

chosen by the user. The entire harvesting, ploughing and seed sowing systems are controlled by a DC motor which is in turn controlled by a microcontroller through a motor controller. The robot also has fully fabricated radar and ultrasonic sensors attached to the base of the robot to detect any obstacles and pits while performing tasks.

The proposed agbot has the potential to respond brainwave signals with the help of EEG sensors and a Neuro Sky Headset. It can carry out tasks like ploughing fields, sowing seeds, cutting weeds and harvesting crops with the help of a unique image processing method which helps it to identify different types of vegetation with the help of a set of different preloaded images of different vegetation types.

The electric pulse produced in the brain by the neurons are measured or analysed by the EEG sensors which are converted into binary output to be used in further process. The analog values produced in Neuro Sky Headset are converted into digital output using Arduino program written in Arduino Micro controller.

The programs for various activities for farming is coded and saved in the system. Using the brainwave, one can command the robot to execute a certain activity. The Micro controller will immediately choose the required program for execution using the technique activity selection and pre-programmed loop execution.

ADVANTAGES

- The setup is small and mobilized compared to the tractor.
- Handling of the setup is easy.
- Maintenance at low cost.
- Mainly easy use for the farmers and even others also.

DISADVANTAGES

- Bulky design of unit, can be overcome by modifications.
- Careful handling of electronic parts must be ensured.
- Setup is little heavier due to mild steel used.
- Battery inefficient.

FUTURE SCOPE

- By using advanced technology the electronics

- parts size of the setup will be minimized.
- The battery part can done by solar power.
- In future we can make efficient battery performance.
- battery fast charging can be given an account

ACTUAL DEVICE TO BE FITTED



Fig -1. agbot back view



Fig-2. agbot front view



Fig-3.agbot side view

CONCLUSION

Thus this agbot place a major role in the development of agricultural field. This **agbot** enhances the following methods in agriculture like ploughing, sowing, irrigating, harvesting which is highly economical compared to the existing tractor. It is very user friendly to the farmers. Farmers can just think and operate this device easily.

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