Review Paper on IOT Based Agribot

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Abstract- *In Modern world, Automation robot is used in many of the fields such as defence, surveillance, medical field, industries and so on, Agriculture is the broadest economic sector and plays an important role in the overall economic development of a nation. Technological advancements in the area of agriculture will certainly increase the competence of farming activities. The jobs involved in agriculture are not straightforward and many repetitive tasks are not required to do, so the agricultural industry is behind other industries in using robots.*

In this paper, the robot system is used to develop the process of cultivating agricultural land without the use of man power hence, a novel methodology for smart farming by linking a smart sensing system and smart irrigator system through wireless communication technology. The main purpose is to reduce time and increase the productivity rate and assist the farmers and this robot is designed to replace human labor. Here the designing systems like plough the land, sowing the seed, water pumping and harvesting of crops are preferred by this autonomous robot using microcontroller, as this is the main component that supervises the entire process. On the field the robot operates on automated mode. For manual control the robot uses the Remote controller as control device and helps in the navigation of the robot on the field.

I. INTRODUCTION

In present scenario most countries are facing problems due to the old and conventional methods in agricultural sector and it affects the growth of developing countries [1] [2].so it's time to make some technological advancements in the sector to overcome this problem. In India, there are 70% people dependent on agriculture. So we need to study the problems arising in agricultural methods. Innovative idea of our project is to automate the process of sowing crops [1]. The farming system like plowing, cultivating, weeding, harvesting, etc is the different process. All the processes are improvising the mechanism in farming which works automatically with very little man power requirement. The small machine would be assembled from existing mass produced components without the need of changing the existing design and tooling. Also, energy require in this machine is less as compared with tractors or any agricultural instrument.

Sl. no	PARAMETER	MANUAL	TRACTOR	ROBOT
1	Man power	More	Moderator	NO
2	Time require	More	Moderator	LESS
3	Seeding technique	Manually	Manually	AUTOMATICALLY
4	Required energy	High	Very high	LESS
5	Labor cost	High	High	INITIAL COST ONLY
6	Pollution	No	More	NO

II. HISTORY

Agriculture, as the backbone of Indian economy, plays the most crucial role in the socio-economic sphere of the country. India as a predominantly agricultural country attributes a major share of its overall development to the agriculture sector. Indian agriculture is a miscellaneous and extensive sector involving a large number of stakeholders. India has one of the largest and institutionally most complex agricultural research systems in the world. However, such a complex research system was not a sudden development. Instead, historically, it involved a process that started in the second half of the 19th century during the colonial period and eventually led to the establishment of the Imperial (now Indian) Council of Agricultural Research (ICAR). In the present research system, the role of ICAR at the national level in aiding, promoting and coordinating research and education activities across the country is of significant importance.

Automation of agricultural operations is demand of the time to improve the productivity with the help of tools and technology. In recent years, the development of autonomous vehicles in agriculture has experienced increased interest. Many researchers started developing more rational and adaptable vehicles for agricultural operations. In the field of agricultural autonomous vehicles, a concept was adopted to use multiple small efficient autonomous machines in place of traditional large tractors. Most of the researchers are working for autonomous vehicle design for precision agricultural mobile robots. The design works on implementing three different verticals namely 1. Mobile robot navigation 2.

Implements (Framework & Applications) 3.sensor modules. Different countries like the USA, European Unions, Denmark, Australia, Finland, India etc are designing mobile robots under these verticals which are mainly to procure agriculture farming over commercial industries. Automation techniques such as seed sowing, crops cutting, weed mapping, robotic weeding control, micro-spraying, robotics gantry, robotic irrigation, etc. energy and inputs by the control that is better matched to stochastic requirements. There are numbers of field operations that can be executed by autonomous vehicles, giving more benefits than conventional machines.

III. LITERATURE SURVEY OF AGRIBOT

[1] Mrs.R.Srimeena Et al. developed a robot capable of performing operations like automatic Plowing, seed dispensing, fruit picking and pesticide spraying. It also provides manual control when required and keeps tabs on the humidity with the help of humidity sensors .The main component here is the AVR At mega microcontroller that supervises the entire process. Initially the robot tills the entire field and proceeds to ploughing, simultaneously dispensing seeds side by side. The device used for navigation is an ultrasonic sensor which continuously sends data to the microcontroller. On the field the robot operates on automated mode, but outside the field is strictly operated in manual mode. For manual control the robot uses the Bluetooth pairing app as control device and helps in the navigation of the robot outside the field.

[2] Cong D. Pham Et al. designed a versatile robot for operation in agricultural fields. The main objective is to develop a robot that can perform all operations, from seeding, to weeding and harvesting. This requires the robot to be able to carry a wide variety of tools. In addition, we require the robot to be lightweight so that it can operate during wet periods without getting stuck or damaging the soil structure. We focus on keeping the overall costs of the robot at a level which makes it economically viable compared to conventional solutions. We obtain this by constructing the frame so that it flexes, which reduces complexity and makes the frame cheap to build, but at the same time guarantees that all wheels are in contact with the ground. We also describe the development of tools to be attached to the platform, and discuss the implications of the flexible design on the robot and tool control.

[3]M.B. Srinivas Et al. designed a robot to minimize the labor of farmers in addition to increasing the speed and accuracy of the work. It performs the elementary functions involved in farming i.e. ploughing the field, sowing of seeds and covering the seeds with soil. The robot is autonomous and provides the facility for optional switching of the ploughing system when required. PSoC (Programmable System on Chip) controller from Cypress Semiconductor, USA is used to control the robot.

[4] Y. Chen Et al. The Wireless Sensors Network (WSN) is nowadays widely used to build decision support systems to solve many real-world problems. One of the most interesting fields having an increasing need of decision support systems is agricultural environment monitoring. Agricultural environment monitoring has become an important field of control and protection, providing real-time system and control communication with the physical world. An intelligent and smart WSN system can collect and process large amount of data from the beginning of the monitoring and manage air quality, soil conditions, to weather situations. The proposed system collects and monitors information related to the growth environment of crops outside and inside greenhouses using WSN sensors and CCTV cameras. The temperature and humidity sensors are developed in-house and both sensors are very reliable. Furthermore, the system allows automatic control of greenhouse environment remotely and thus improves the productivity of crops. This paper presents hardware architecture, system architecture and software process control of the agriculture environment monitoring system

[5] T. Bakker Et al. designed an autonomous platform for robotic weeding; the main objective of the project is the replacement of hand weeding in organic farming by a device working autonomously at field level. The distinguishing feature of the described design procedure is the use of a structured design approach, which forces the designer to systematically review and compare alternative solution options, thus preventing the selection of solutions based on prejudice or belief. The result of the design is a versatile research vehicle with a diesel engine, hydraulic transmission, four-wheel drive and four-wheel steering. The robustness of the vehicle and the open software architecture permit the investigation of a wide spectrum of research options for intra-row weed detection and weeding actuators

[6] C. Cariou Et al. In this framework, the development of robotic devices can provide an attractive solution, particularly in the field of autonomous vehicles. Accurate automatic guidance of mobile robots in farming constitutes a challenging problem for researchers, mainly due to the low grip conditions usually found in such a context. From assisted- steering systems to agricultural robotics, numerous control algorithms have been studied to achieve high- precision path tracking and have reached accuracy within ±10 cm, whatever the ground configuration and the

path to be followed. However, most existing approaches consider classical two- wheel- steering vehicles. Unfortunately, by using such a steering system, only the lateral deviation with respect to the path to be followed can be satisfactorily controlled. Indeed, the heading of the vehicle remains dependent on the grip conditions, and crabwise motions, for example, are systematically observed on a slippery slope, leading to inaccurate field operations. To tackle this drawback, a four- wheel- steering (4WS) mobile robot is considered, enabling servo of both lateral and angular deviations with respect to a desired trajectory. The path tracking control is designed using an extended kinematic representation, allowing account to be taken online of wheel skidding, while a backstepping approach permits management of the 4WS structure. The result is an approach taking advantage of both rear and front steering actuations to fully compensate for sliding effects during path tracking. Moreover, a predictive algorithm is developed in order to address delays induced by steering actuators, compensating for transient overshoots in curves. Experimental results demonstrate that despite sliding phenomena, the mobile robot is able to automatically and accurately achieve a desired path, with lateral and angular errors, respectively, within ±10 cm and ±2 deg, whatever its shape and whatever the terrain conditions. This constitutes a promising result in efforts to define efficient tools with which to tackle tomorrow's agriculture challenge

[7] R. A. Tabile Et al. Parameters such as tolerance, scale and agility utilized in data sampling for using in Precision Agriculture required an expressive number of researches and development of techniques and instruments for automation. It is highlighted the employment of methodologies in remote sensing used in coupled to a Geographic Information System (GIS), adapted or developed for agricultural use. Aiming this, the application of Agricultural Mobile Robots is a strong tendency, mainly in the European Union, the USA and Japan. In Brazil, researches are necessary for the development of robotics platforms, serving as a basis for semi-autonomous and autonomous navigation systems. The aim of this work is to describe the project of an experimental platform for data acquisition in field for the study of the spatial variability and development of agricultural robotics technologies to operate in agricultural environments. The proposal is based on a systematization of scientific work to choose the design parameters utilized for the construction of the model. The kinematic study of the mechanical structure was made by the virtual prototyping process, based on modeling and simulating of the tension applied in frame.

IV.CONCLUSIONS AND FUTURE SCOPE

Research efforts are now beginning to invest more in the development of multi-robot vehicles as platforms for a robot farming system. These vehicles include an electronic robot vehicle that can provide crop information using sensors, and two-robot tractors capable of performing various implement functions. Application of inexpensive navigation sensors to the robot farming system makes the system economically adaptable with the environment. With the development of robot farming system, food production can be increased considerably and economically. With fully-automated farms in the future, robots can perform all the tasks like mowing, fertilizing, monitoring of pests and diseases, harvesting, tilling, etc. This also enables the farmers to just supervise the robots without the need to operate them.

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