Real Time Wireless Communication between Quadcopter and Android in Agriculture Field – A Review

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ABSTRACT

Currently, Agricultural field facing some problem: - the lack of human labors. There are some reasons like it requires hard work which causes tiredness and migration of some farmers from the farm to industry which offer them more profitable and more stable and jobs, another one reason is health issues which are caused by manual pesticide spraying. In this situation, it is necessary to introduce and develop agricultural automation and sensing technologies for increase agricultural productivity. In this system we introduce Quad-copter [QC] which is light weight and low cost. It is also known as UAV i.e. Unmanned Aerial Vehicle. More recently quad-copter design becomes popular in unmanned aerial vehicle (UAV) research. These unmanned aerial vehicles use an electronic control system and electronic sensors which stabilize the aircraft, in short it is controlled by android phone . Because of their small size and agile maneuverability, these quad-copters can be flown indoors as well as outdoors. It is autonomous flight for fertilizer spraying, manure spreading by using android device. There is real time Bluetooth communication between quad-copter and android device. Here the quad-copter can be control through android phone for fertilizer spraying. So the hard-work, human efforts lack of human labors problems can be solved by it .This system reduce the problem related to the agricultural field and also improve the agricultural productivity. This system reduces the health problems which are caused by manual spraying.

KEYWORDS: Joystick, Wi-Fi, GSM, Quad copter, Camera, Android phone.

I.   INTRODUCTION

India and other developing countries are facing many problems in agriculture field like shortage of labor, health issues. As per World Health Organization survey, there are 3 million or more cases of pesticide poisoning in each year. Asthma, Allergies and Hypersensitivity are the prospect effect on human health on exposure to pesticides. Children and new born babies are at great risk to exposure of pesticides because they are not having strong immune system.

UAV are very popular for monitoring, package delivery, search-and-rescue missions, target tracking, and various other applications. Commercially available UAVs such as ARDrone and AscTec Pelican Quadcopter are an economically possible option for deployment in autonomous aerial missions. New research is allowing QC to communicate perceptively with other autonomous vehicles, to explore unknown environment and to UAV in dense surroundings with speed and precision. Achieving persistent coverage while reducing risk and maintaining high sensors data quality presents significants challenge. As risk and sensor data quality often increase the when flying closer to the ground. These advances will allow QC to complete missions such as long-term surveillance and search and rescue.

Now a days each and every person uses computing device like Smartphone. This motivated us to use smart phone for interfacing mobile phone with electronic devices. Quad copter is an Unmanned Aerial Vehicle (UAV) which is controlled by android application. QC is a rising UAV and it is lifted by four propellers with four rotors. The robotics applications are currently evolving. Use of this robots in agriculture fields is mostly very popular so many people try to do some robots which helps them in agriculture field.

A unique framework is offer by automated agriculture for robotic developments. Precision agriculture can be automated for primary and secondary agricultural tasks. The primary goal is to improve the agriculture production. The coupling between field workers and robots should be done in such a manner that humans should feel comfortable in the presence of robots. HRI system is introduced To face issues such as: regulations, safety and comfort. Flexible automation is focused in this work.

II. LITERATURE SURVEY

UAV are very popular for monitoring, package delivery, search-and-rescue missions, target tracking, and various other applications.

Alex Waller [1] Planner for Autonomous Risk-sensitive Coverage. From paper the proposes system for surveillances are purpose of risk-sensitive areas using a team of unmanned aerial vehicles (UAVs), which keeps the track of the areas that are already surveyed and time of the previous survey. PARCov is used for detection of risk by using quad copter in risk sensitive area which are under its coverage. It is able to cover more area and provide continuous surveillance. A nonlinear optimization formulation is also used in this paper to determine the optimal altitude for Quadcopter flying with maximized data sensor quality and minimizing risk.

To reduce the uncertainty of the detection risk, PARCov seeks to move each Quadcopter towards a low-cost region in its vicinity. The uncertainty grid is used to keep track of the regions in that have been surveyed and the times that they were last surveyed.

Miguel Torres-Torriti [2] paper HRI is introduce i.e. Human Robot Interaction, because of lack of human labour there is need to introduce as well as developed automation and sensing technologies for all tasks like harvesting, seeding, grove supervision etc. Fully Robotized farm are not yet possible therefore human labours are also needed to handle the robot or for the autonomous farming. In this paper they summarized the state of art of human robot interaction in agricultural field. There is guidelines and strategies for designing a human device/robot interaction in agricultural field.

Now-a-days, Robotics applications are more evolving so we are experiencing a quick development in personal robots and service. In precision agriculture, on other way can be automated for primary and secondary agricultural tasks. In improving agriculture tasks, the primary objective is to improve the agriculture production and the service units should be able to interact with humans despite their distrust with the machinery.
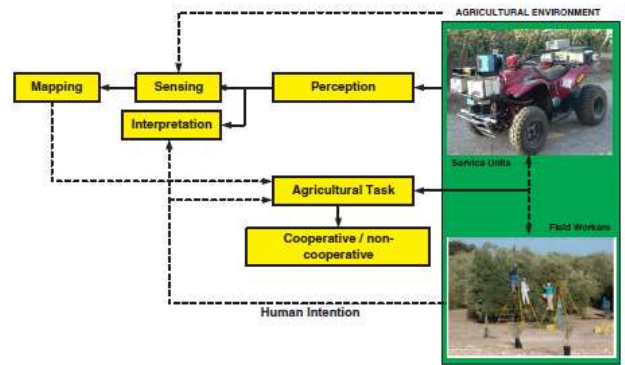

Fig 1. General architecture of an HRI for flexible robotic automation of farms.

In primary task like harvesting, seeding, fertilizing, spraying and secondary tasks like grove supervision, weed detection, hauling, mowing human labor force is present in precision agriculture.

In agriculture, robotics can be seen as a flexible automation based system. Fig.1 shows the most important cores in such HRI architecture: the man (field workers), the machinery and the environment. Following, each stage in Fig. 1 is explained in detail.

The device is required to perform tasks in amounts and times impossible for animal or human morphology. The nature of growing, the weather conditions, the terrain, the available resources, among other factors, influence implementation of robots in the agricultural field.

M Muhammad [3] Quad copter is used for the delivery of the products ordered by online. It is low weight and low cost UAV. It locate and find out the destination by using Google map. This UAV is controlled by android devices. In this paper operation of quad copter is given .There are four rotors two of them are rotating clockwise and other two rotate in anticlockwise which is known as '+' config. and '*'config. respectively.

In "+" config. two motors of QC rotate clockwise and other two motors rotate anti-clockwise. And the opposite motor rotate in the same direction. QC operating motherboard's front will be pointing rotor-1 shown in fig.
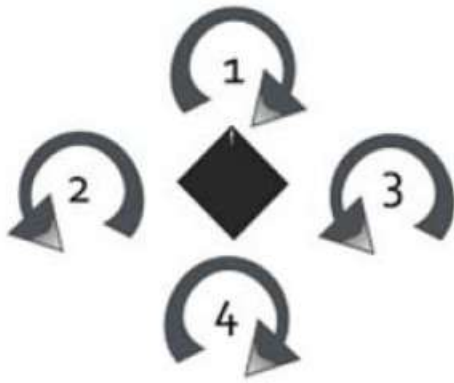
Fig- "+" config.

In "x" config. is almost same to "+" configuration. Only difference is QC operating motherboard front will be point to the direction between rotor-1 and rotot-2 shown in fig.
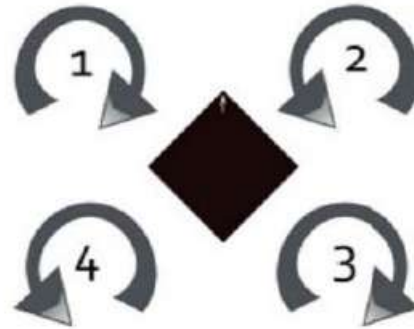

Fig – "X" config.

All the config. requires the opposite rotors spin in the same direction while adjacent rotors spin in opposite directions. An immediate advantage to the quad rotor design is that, it is not necessary to implement additional equipment such as control moment gyroscopes with the sole purpose of negating extraneous torques on the vehicle.

III   TABLE OF LITERATURE SURVEY

Sr. No	Title	Author Name	Year	Algorithm	Advantages	Limitations
1	Reactive motion planning for unmanned aerial surveillance of Risk sensitive areas.	Alex Wallar, Erion Plaku, and Donald A. Sofge	2015	Pseudo code for PARCov, Derandangle	1) Maximize the area covered by sensors mounted on each UAV 2) Provide persistent surveillance	1) Power management becomes a critical issue When conducting large-scale surveillance 2) Optimizing energy
2	Human-Robot Interaction in Precision Agriculture: Sharing the Workspace with Service Units	Daniel Herrera, Javier Gimenez	2015	HRI	1) High-efficiency 2) Sustainable agriculture	1) High initial investment 2) Specialized personal on initial stages
3	Autonomous quad copter for product home delivery	M Muhammad, D Swarnaker , M Arifuzzaman	2014	Working of QC, Load Balancing	1) Faster transport of Goods 2) Timely delivery 3) Reduce the fuel cost	1) Unable to perform at long distance range 2) Mass limit

IV.   CONCLUSION

This paper gives the solution to all problems like shortage of labour, health issues which are faced by farmers during pesticide spraying. In future, battery power will be replaced by solar system as a power source. We can

implement this on large scale using multi-copter with increase tank capacity.

V.   REFERENCES

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