Journal for Research | Volume 03 | Issue 12 | February 2018
ISSN: 2395-7549

Unmanned Aerial Vehicle for Remittance

S.Aravind
UG Student
Department of Instrumentation & Control Engineering
Saranathan College of Engineering

I.Aasif Ahmed
UG Student
Department of Instrumentation & Control Engineering
Saranathan College of Engineering

K.Ravivarman
UG Student
Department of Instrumentation & Control Engineering
Saranathan College of Engineering

T.Nandha Kumar
UG Student
Department of Instrumentation & Control Engineering
Saranathan College of Engineering

M.Banu Sundareswari
Assistant Professor
Department of Instrumentation & Control Engineering
Saranathan College of Engineering

Abstract

The main objective of our work is to deliver the goods at proper time by an unmanned drone. An Autonomous drone for delivering the goods such as bombs, medical kids, and foods mainly for military uses. This drone was used for dispatching the bombs and armed guns in battle field. And it is also used for delivering the medicines and foods for soldiers in our country borders.

Keywords: Autonomous, Remittance, LABVIEW

I. INTRODUCTION

Reducing the complexity of the delivery, a drone was made to deliver the things in military. This drone consists of camera, ultrasonic sensor, MYRIO, MQTT protocol, Quadcopter, racks, gyroscope. The delivery items are placed on the racks of the drone. The specified address also mentioned through IoT (eg:rack1 =Address).with the help of GPS the mentioned address was tracked by the drone. To avoid crashing the ultrasonic sensors are used. A message was send to the user before shipping with pin number (1 hour). The soldier also has facility to fix the time of delivery in ordering. A programmed call was send to the customer to pick up the order; A keypad display was placed on the drone. The customer must type the pin number which was sending before. When the pin number matches the rack will open and the customer have to take the ordered item. In the digital display the customer have to sign after the ordered item was picked by customer. All the data are stored in the cloud for feature and present process. Camera is used to control the drone in unavoidable situations. Wi-Fi is used to transmit and receive the signal from the hub

II. LITERATURE REVIEW

Delivering the drug for shipment using autonomous quadcopter for business purpose using the arduino by Valentina Gatteschi;Fabrizio Lamberti [1].The complete base was android platform using GNC drone as chasis and occupy a wide range of distance probably it is used for industrial applications and take more time to delivery.The shipment was take place within a factory or Industry to deliver the goods from one unit to another . It replaces the conveyers and reduces the costs and size .The information can be processed step by step in arduino since arduino have operate single input single output at a time.

For the business based applications, Md.R.Haque,M.Muhammed;D.Swarnaker [2] .make an autonomous quadcopter for home delivery purposes .The processor used in this drone was KK board .it has the GPS tracking device fitted with board inorder to locate the desired location mentioned on the GPS.

Efe Camci; Erdal Kayacan [3] made an drone used in hotels and restuarents for suppling the foods ordered by the customers.The processor used in this system is LABVIEW.By using the image acquisition techniques and line follower technique helps to locate the mentioned table and deliver the food to the customers the vehicle itself operated in lower speed .

Shilpa Kedari,Prof .Pallavi Yevale [7] uses their quadcopter for spraying the pesticides to the crops using Arduino.the entire setup carry the pesticide and it spray at the area level which are mentioned in the program

III. EASE OF USE

A. For Conveyance

During the time of war, insufficient of the weapons may result a tragedy situation to the force. Inorder to handle that situation these UAV helps to supply the weapons and to dispatch the bombs on the opponent force areas.

B. For food and survillence

This UAV drone helps to deliver the foods and medicines for the soldiers who are present in the country borders for their injuries. This same drone is also used for surveillance the mentioned area.

IV. EXPERIMENTAL WORKING

The drone consist of four BLDC motors and for each motor there are four Electronic Speed Controller. The heart processor of this UAV is myRio. The myrio programmed of rotation of the motors and opening of racks .It consist of racks where the armed weapons are placed . The location was specified and it was detected using the GPS system and the weapons are dropped at the location .

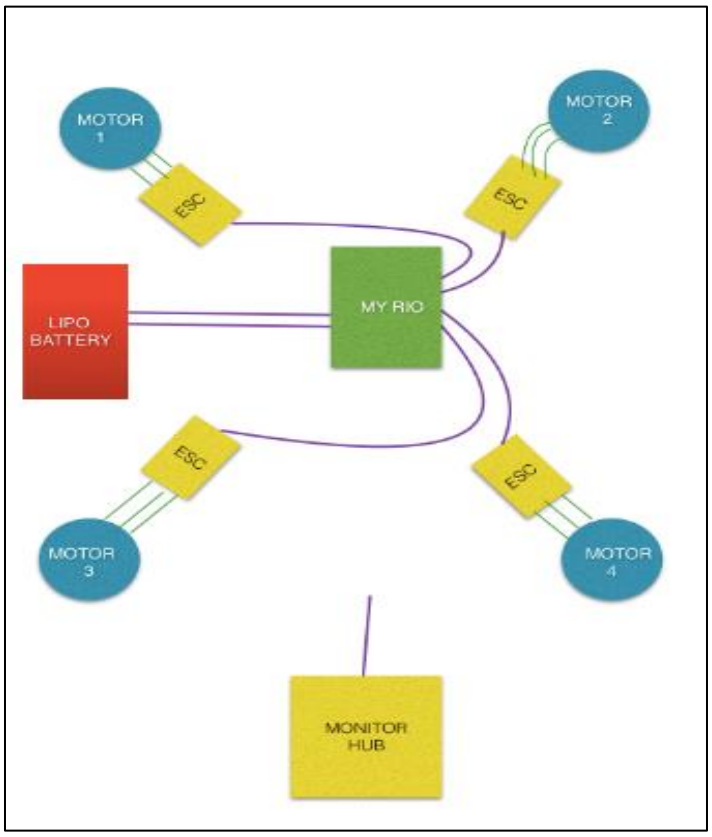

Fig. 1:

The programmed was developed in labview and it was stored in the MyRio. Through the IoT the datas are shared with the monitor hub. If there is a case of unavoidable situation. The drone was handled by human.

V. DESIGN OF UAV

A. CHASIS

The skeleton of the quadcopter is the frame some motors and propellers are attached in the chasis. For hobbyists wishing to mount something with additional weight such as a camera, a sturdier frame rated for more weight is recommended. However, adding a sturdier material typically creates more weight itself, causing you to require longer propellers and a stronger motor to create the lift necessary to pull up the weight. There's always a delicate balance played by the manufacturers between flight speed, aneuverability, and flight time.

Fig. 2:

B. Battery

Finally, to power the quadcopter you'll a power source, which is typically a LiPo (Lithium Polymer) battery. LiPo batteries use a C rating, which stands for it's capacity to discharge. You'll typically see a LiPo battery have "20C". So if you see a 25C 4000mAh LiPo battery, it means that you can get a maximum of 25C * 4 = 100A (A standing for Amps). The power of the battery is usually dictated by the energy draw required from the ESCs. For example if you motor's maximum draw is 19A, at the very least you'll want a 30A ESC to be safe. Now multiply that by the number of propellers you have (4 in this case) and you'll get the maximum draw for your entire quad – 4 * 19A = which is 76A. Your 4000mAh 25C LiPo would definitely be enough for this quadcopter

Fig. 3:

C. BLDC Motor

Brushless DC motor may be described as electronically commuted motor which do not have brushes. These types of motors are highly efficient in producing large amount of torque over a vast speed range. In brushless motors, permanent magnets rotate around a fixed armature and overcome the problem of connecting current to the armature. Commutation with electronics has large scope of capabilities and flexibility. They know for smooth operation, and holding torque when stationary.

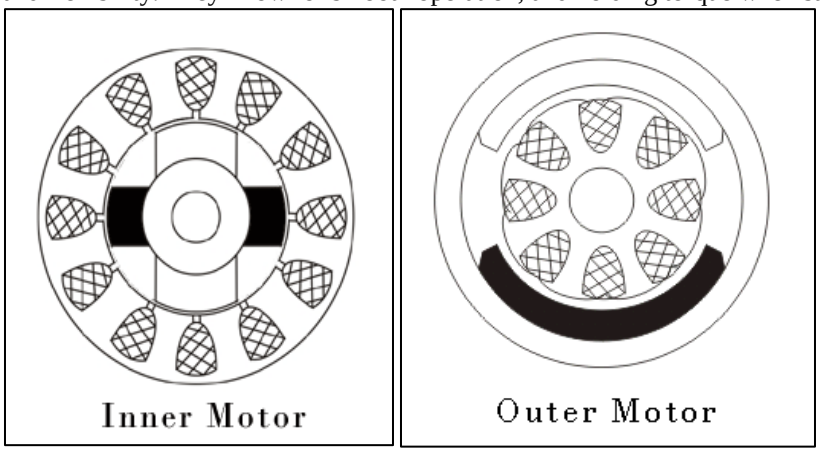

Fig. 4: Inner Motor & Outer Motor

D. myRIO

Featuring National Instruments industry-standard reconfigurable I/O (RIO) technology, NI myRIO places dual-core ARM cortex-A9 real time performance and a customizable Xilinx FPGA in the hands of students. Using this integrated hardware and

software tool, students can quickly create applications on NI myRIO's real time processor leveraging the dedfault FPGA personality which they can customize as projects become more advanced. With its onboard devices, seamless software experience, and library of courseware and tutorials, NI myRIO provides educators an affordable tool to teach multiple design concepts on one device and give students the technology to complete real-world design projects in one semester.

VI. GUIDELINES FOR GRAPHICS PREPARATION & SUBMISSION

A. Connecting MyRIO Wirelessly

1) Wireless connection

When you connect the myRIO to a host computer over a wireless network, you can wirelessly detect the myRIO, deploy applications, and use shared variables to transfer data between the myRIO and the host computer. Before you can configure the settings of the wireless network on the myRIO, you must connect the myRIO to the host computer over USB. To learn about configuring the wireless network on the myRIO, launch LabVIEW, click the Set Up and Explore link, and select Configure WiFi.

B. Installing Software on MyRIO

When you run the Getting Started with myRIO wizard, LabVIEW installs the recommended software set on the myRIO. You can also use Measurement & Automation Explorer (MAX) to manually install software on the myRIO.
Complete the following steps to install software on the myRIO using MAX:

1) In MAX, expand Remote Systems in the configuration tree and then expand your myRIO target.
2) Right-click Software and click Add/Remove Software to launch LabVIEW Real-Time Software Wizard.
3) Select the recommended software set for the myRIO.
4) Click Next.
5) Click myRIO *x*, where *x* matches the version of the LabVIEW myRIO Toolkit.
6) Click Next to view a summary of your selection.
7) Click Next to start installing the software. When the installation completes, the wizard restarts the myRIO.
8) Click Finish to close the wizard.

C. MQTT Protocol

1) MQTT Publish Subscribe Architecture

The MQTT messages are delivered asynchronously ("push") through publish subscribe architecture. The MQTT protocol works by exchanging a series of MQTT control packets in a defined way. Each control packet has a specific purpose and every bit in the packet is carefully crafted to reduce the data transmitted over the network. A MQTT topology has a MQTT server and a MQTT client. MQTT client and server communicate through different control packets. Table below briefly describes each of these control packets.

Control packet	Direction of flow	Description
CONNECT	Client to Server	Client request to connect to Server
CONNACK	Server to Client	Connect acknowledgment
PUBLISH	Client to Server or Server to Client	Publish message
PUBACK	Client to Server or Server to Client	Publish acknowledgment
PUBREC	Client to Server or Server to Client	Publish received (assured delivery part 1)
PUBREL	Client to Server or Server to Client	Publish release (assured delivery part 2)
PUBCOMP	Client to Server or Server to Client	Publish complete (assured delivery part 3)
SUBSCRIBE	Client to Server	Client subscribe request
SUBACK	Server to Client	Subscribe acknowledgment
UNSUBSCRIBE	Client to Server	Unsubscribe request
UNSUBACK	Server to Client	Unsubscribe acknowledgment
PINGREQ	Client to Server	PING request
PINGRESP	Server to Client	PING response
DISCONNECT	Client to Server	Client is disconnecting

2) Ideal for Constrained Networks (Low Bandwidth, High Latency, Data Limits, & Fragile Connections)

MQTT control packet headers are kept as small as possible. Each MQTT control packet consist of three parts, a fixed header, variable header and payload. Each MQTT control packet has a 2 byte Fixed header. Not all the control packet have the variable headers and payload. A variable header contains the packet identifier if used by the control packet. A payload up to 256 MB could be attached in the packets. Having a small header overhead makes this protocol appropriate for IoT by lowering the amount of data transmitted over constrained networks.

3) Quality of Service (QoS) for MQTT

Quality of service (QoS) levels determine how each MQTT message is delivered and must be specified for every message sent through MQTT. It is important to choose the proper QoS value for every message, because this value determines how the client and the server communicate to deliver the message. QOS3.for message delivery could be achieved using MQTT:

4) MQTT Client Abnormal Disconnect Notification

When a MQTT client connects to the MQTT server it can define a topic and a message that needs to be published automatically on that topic when it unexpectedly disconnects. This is also called the *"Last will and testament" (LWT)*. When the client unexpectedly disconnects, the keep alive timer at the server side detects that the client has not sent any message or the keep alive PINGREQ. Hence the server immediately publishes the Will message on the Will topic specified by the client. The LWT feature can be useful in some scenarios. For example for a remote MQTT client, this feature can be used to detect when the IoT devices goes out of the network. The LWT feature can be used to create notifications for an application that is monitoring the client activity.

5) MQTT Clients Are Very Simple To Implement

MQTT is open protocol and standardized by the OASIS Technical committee. This makes this protocol easy to adopt for the wide variety of IoT devices, platforms, and operating systems. Many applications of MQTT can be developed just by implementing the CONNECT, PUBLISH, SUBSCRIBE, and DISCONNECT control packets.

VII. CONCLUSION

This paper presents an approach which could be used for developing a small and compact sized quadcopter which can be used to carry out rescue operations and provide audio/video aid to the people in distress. It could also be used as a surveillance system to increase the security strength especially in the area where human interference is strictly prohibited. It could also be used for performing live video streaming. Quadcopters offer advantages for many applications when comparing with their manned counter parts. They save human pilots from flying in dangerous conditions that can be encountered not only in military applications but also in other scenarios involving operation in bad weather conditions, or near to buildings, trees, civil infrastructures and other obstacles..

ACKNOWLEDGMENT

The authors I.AASIF AHMED, S.ARAVIND,K.RAVIVARMAN AND T.NANDHA KUMAR would like to thank their guide Asst. Prof Ms. BANU SUNDARESHWARI, Department OF INSTRUMENTATION AND CONTROL Engineering, SARANATHAN COLLEGE OF ENGINEERING for her guidance and constant support. The authors would also acknowledge the HOD, DR.S.M.GIRIRAJKUMAR, the Principal, Dr.D.VALAVAN and the college management for their support.

REFERENCES

[1] New Frontiers of Delivery Services Using Drones: A Prototype System Exploiting a Quadcopter for Autonomous Drug ShipmentsValentina Gatteschi; Fabrizio Lamberti; Gianluca Paravati; Andrea Sanna; Claudio Demartini; Alberto Lisanti; Giorgio Venezia2015 IEEE 39th Annual Computer Software and Applications ConferenceYear: 2015, Volume: 2

[2] Autonomous Quadcopter for product home delivery:Md R Haque; M. Muhammad; D. Swarnaker; M. Arifuzzaman2014 International Conference on Electrical Engineering and Information & Communication TechnologyYear: 2014

[3] Waitress quadcopter explores how to serve drinks by reinforcement learningEfe Camci; Erdal Kayacan2016 IEEE Region 10 Conference (TENCON)Year: 2016

[4] Prem Kumar.P,Amirtharaja.S(Jan-June 2015"QUADCOPTER VIDEO SURVEILLANCE AND CONTROL USING COMPUTER"proceeding of International Journal of Electrical and Electronics Engineers, volume 07,pp340-346

[5] S.Grzonka,G.Grisetti and W.Bugard,(Nov 2012)"A fully autonomous indoor quadrotor",IEEE Trans. Robot,vol.28,pp 99

[6] Nicolas Ives Roque Pacheo,Daniel de Castro Ribeiro Resende,Pedro Americo Almeida Magalhaes,(may 2015)"stability control of an Autonomous Quadcopter through PID Control Law",International Journal of Engineering Reseach and Applications, vol 5,Issue 5(part 4),pp 07-10.

[7] Shilpa Kedari,Prof .Pallavi Yevale(2006)"Quadcopter –Asmarter Way of Pesticide Spraying", Imperial Journal of Interdiscipinary Research(IJIR) vol-2,Issue-6

[8] Johnson,wayne "Rotorcraft Aeromechanics"(Accessed: 15 April 2014), Cambridge University Press 2013..ISBN 1107355281,9781107355286.pp 282

[9] Pond.p and R.Mahony,(May 2009) "Design Principles of Large Quadrotors for Practical Applications",proceeding of IEEE International Conference on Robotics and Automation,Volume 3,pp3265-3270.

[10] A.Choi-Fitzpatrick,D.Chavarria,E.cychosz,(2015)Up in the Air:A Global Estimate of Non-Violent Drone Use , Joan B.Kroc School of Peace studies at Digital@USanDiego,University of SanDiego.

[11] Mohd Khan(2014)"Quadcopter Flight Dynamics",INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH,VOLUME 3,pp.2277-8616.

[12] DirmanHanafil,MongkhunQetkeawl,Rozaimi Ghazalil(2013)"Simple GUI Wireless Controller of Quadcopter",Int.J.Communications,Network and System Sciences,vol-6,pp.52-59.
[13] Inkyu Sa and Peter Corke(2011)"Estimate and Control for an Opensource Quadcopter",Australasian Conference on Robotics and Automation ,pp.7-9.
[14] GordonOnoniwu,Arinze Okoye,et al.,"Design and Implementation of a Real Time Wireless Quadcopter for Rescue o perations",American Journal of Engineering Research,5(9),2016,130-138.
[15] Dhriti Raj Borah et al.,"A Review on Quadcopter Surviellence and Control",ABDU-Journal of Engineering Technology 4 (1), 2016,116-119.