ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 19, April 2017

ALL TERRAIN SURVEILLANCE ROBOT

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Abstract—The main aim of this project is to make a robot which can make a surveillance in all the terrain such as land, air, water. This robot will go to that place and sense that physical environment. And it has a monitoring camera in front of it so that we can see everything through a computer.

I.INTRODUCTION

This project demonstrates, illustrates and simulate the robot which is so called All Terrain Surveillance Robot. This robot will go to any place such as land, water, air and make the surveillance in that environment and it has a monitoring camera in front of it so we can see everything through computer . Say For e.g.: In the military purposes the bases of the enemy camp are to be viewed secretly and those collected information are send back to the user via monitoring camera. For the rescue purposes, this vehicle can easily go in the place and monitor whether anyone is struggling there and send the collected information back to the user so that we can save them easily. If someone have spotted this vehicle and chase for it, since it has the advantage of going in the three different terrains and it can be easily escaped from the place.

II.OBJECTIVES

The goal of our project is to design implement and to test a stable All Terrain Surveillance vehicle which can able to travel in land water and air. A surveillance camera is mounted in the vehicle which is used to capture the images and send these data's to the computer at the receiver side. If the goal is accomplished then our team would also like to design and implement some of the autonomous commands that may help a user in collecting the data. The commands include auto-landing command auto-move command etc.

III NEED OF PROJECT

Personal drones have been all the rage of for past few years as toys and primarily as new devices for capturing amazing ariel phhotography. Since technology has improved a numerous practical applications and the use of flying technology have emerged. Since it can go in land air and water it is used in *Military and rescue purposes.*

IV. EXISTING SYSTEM

In the existing system, since there was a availability of separate systems for the air, water and land surveillance one can not able to do the task of other. In the olden days the available vehicles are quadcopter, floating vehicle and the ground surveillance vehicle.

V. PROPOSED SYSTEM

In our proposed system all the three available existing systems are integrated and made into a single system known as the All Terrain Surveillance vehicle which can go in land water and air. The flight motion is controlled by KK2.1.5 using RF Transmitter and Receiver. The land and water movement is controlled by Arduino Uno using DTMF decoder.

VI. SYSTEM OVERVIEW

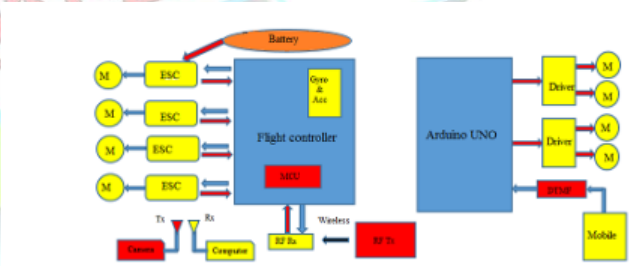

Fig 1: Block Diagram

*A.*Controls of Quadcopter

Roll – It is made by moving the right stick to the either left or right. And this will moves the quadcopter, which makes the quadcopter to move in that direction.

Pitch –It is made by moving the right stick either towards front or back. This will stables the quadcopter, and which makes the quadcopter front or back.

Yaw – It is made by moving the left stick to either the left or the right as of roll. This control moves quadcopter left or

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right. It denotes different directions to quadcopter and changes the direction during flying.

Throttle – Done by moving the left stick front. It is disabled by moving it towards back. This controls the altitude and height of the quadcopter.

Trim – This is the key which is used to control the above roll, Pitch and the yaw when they are not in control.

The Rudder – This is as same as that of yaw by controlling the left stick. This is also known as thrown round. It will moves either left or right.

Aileron – Similar to the right stick. It can be made directly by controlling the roll by left or right.

The Elevator –It is similar to the right stick, by controlling the pitch either to the front or back.

Manoeuvring: Back turn – A circular turn which is done in either clockwise or anti clockwise direction.

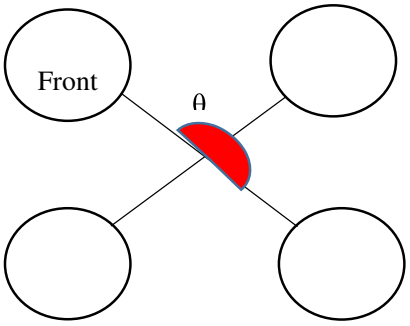
Hovering – It is used to maintain the stability of vehicle while flying. It can be made by controlling the throttle.

B. Principle and Working

The principle and working of a propeller is based on Bernoulli's Principle and Newton's Law which states every action has equal and opposite reaction. This is Newton's third law. Bernoulli's principle states that for an in viscid fluid the speed of the fluid flow depends upon the reduce in the pressure or the fluid`s potential energy simultaneously. Newton's third law states that every action has an equal and opposite reaction. An air propeller is designed in such a way that the flow of air in the upper side will be more than in the bottom. There is because the propeller normally has a more pressure below that it`s top. This difference in pressure produces the lifting of quadcopter. Lift coefficient is related y a non-dimension coefficient that equates the lift produced by a flying body such as a wing or complete aircraft, the dynamic pressure of the fluid flow around the body, and a reference area associated with the body.

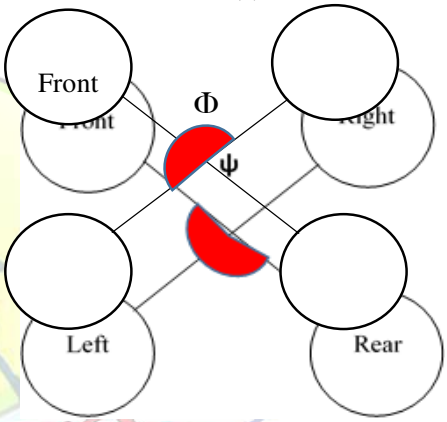
C .Mechanism

Quad copter is a small flying vehicle which has four propellers fixed to its base across the frame. The target for the fixed rotors is used to control the movement of quadcopter. All the four rotors speed does not depends to each of other`s speed. By independent the control of the yaw, pitch and roll of quadcopter can be made easily. Pitch, roll and yaw direction of Quadcopter.



(a)

(b)



(c)

Fig 2: (a) Pitch direction (b) Roll direction (c) Yaw direction

D. Taking off and land motion mechanisms

Quadcopter is a small flying vehicle which has four propellers fixed to its base across the frame. The target for the fixed rotors is used to control the movement of quadcopter. All the four rotors speed does not depends to each of other`s speed. By independent the control of the yaw, pitch and roll of quadcopter can be made easily. This Pitch, roll and yaw direction of Quadcopter. [4] discussed about a system, GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management. The database stores the current month and also all the previous month data for the future use. Hence the system saves a lot amount of time and energy. Due to the power fluctuations, there might be a damage in the home appliances. Hence to avoid such damages and to protect the appliances, the voltage controlling method can be implemented.

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E. Hovering or stationed position

The hovering or stationed position of the vehicle is done by two pairs of rotors, done by rotating these rotors at same speed either in clockwise or anticlockwise direction. By making these two rotors to rotate either in clockwise and anticlockwise position, the total summation of reacting torque is null and this allows the Quadcopter to be in a hovering position.

F. Front and back movement

Front and back motion is controlled by increasing and decreasing the velocity of back and front rotor. Decreasing and increasing back and front rotor's speed at the same time will affect the pitch angle of vehicle.

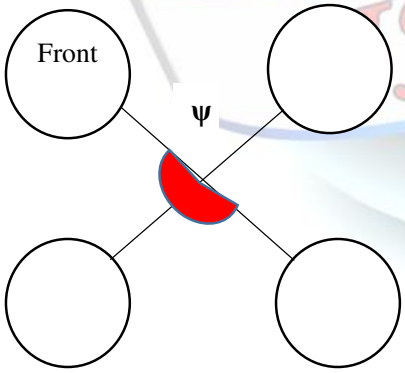
G. Left and right motion

By changing the yaw angle the left and right movement of vehicle can be achieved. Yaw angle can be controlled by increasing and decreasing anti-clockwise rotors velocity while decreasing and increasing clockwise rotor speed.

VI .CONTROL FOR LAND AND WATER

DTMF

DTMF (Dual Tone Multi Frequency) better called as sensitive tone is a system of signal tones used in telecommunication. They are widely used in remote controlled vehicles banking and audio mails. There are twelve DTMF signals, each of the signal is made up of a pair of tones from the selection: 697 Hz, 770 Hz, 852 Hz, 941 Hz, 1209 Hz, 1336



Hz, and 1477 Hz. These tones are classified into low and high groups, and each signal uses one from each group. This avoids the noise for misinterpreted as a part of signal.

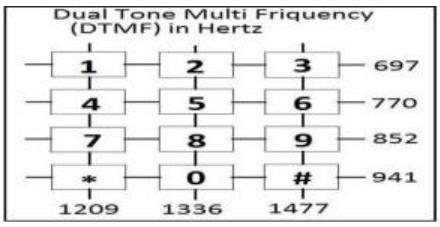


Fig 3: DTMF Keypad

DTMF decoder

The DTMF decoder used here is CM8870 which is used to decode the incoming DTMF tone into a four bit value at the output. Now this output four bit value can be used for making the decision as for e key pressed on the mobile keypad the data have different key.

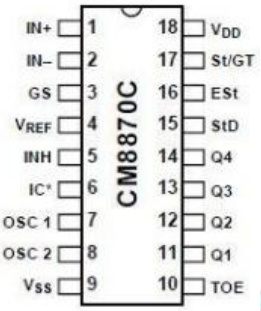


Fig 4: Pin Diagram

Working

The control is done here by two mobile phones one phone is attached to the vehicle while the other is used to make a call. In duration of this call, when any of the mobile key is touched then it will generate a corresponding tone heard at receiver end known as Dual Tone Multiple frequency (DTMF) tone. The vehicles gets the tone through the other phone which is mounted in the vehicle. Then the dtmf decoder is used to process this tone with the help of Arduino Uno. The Arduino controller sends signal to the motor driver IC L293D which drives the motor forward, reverse...etc. since the Arduino output is not enough to drive DC motors, a high voltage and high current drivers are required. The L293D is a quadruple high current half driver designed to provide bidirectional drive currents of up to 600 mA at voltage from 4.5 V to 36V. It will become easier to drive dc motor with such driver. In this paper we are using the surveillance camera which is a wireless. It works on 12 V DC supply. The 12 Volt DC supply is taken from battery placed in the vehicle. The camera had a receiver which is kept in the remote place. Its output signals

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are in the form of audio and video. These received signals are then directly connected to the computer.

VII. MAJOR ADVANTAGES

Surveillance vehicle is the vehicle that have ability to view the any of terrain using wireless camera. The collected data's from the surveillance robot can be recorded and viewed by human directly. This project will build a spy robot that has ability to detect obstacle and stop moving. This project will build an all-terrain surveillance vehicle with wireless surveillance camera which is used to view the current scenario of any places and can be controlled through computer and mobile.

The viewed uses of a robotic security or surveillance capability are numerous and well documented:-Humans are removed from direct exposure to potentially dangerous situation. These surveillance vehicles giving us information that humans can't get.

VIII. APPLICATIONS

Robots have wide-ranging commercial implications. Robots are extensively in the automotive industry, primarily for welding, painting and material handling applications. It is useful at hostage situation, search and rescue. It also finds it`s applications in the war field for spying the enemy bases and sends the collected information back to the user.

IX. RESULT

Thus all-terrain surveillance robot will be formed in which Flight controller, Arduino Uno and DTMF were used in motion of Robot through programming in Arduino and flight controller. We used a wireless surveillance camera which captures audio & video information from surrounding & had been sent to a computer. It has ability to detected obstacles & stop moving. User handled via computer & mobile in any situation & anywhere. Humans are moved out from direct contact to a potentially dangerous situation. They performed tasks which can be used by military or police & can also be used for personal security.

X. FUTURE SCOPE

In the near future some of the changes can be done by compact design, Quick movement, Improved reliability, Night vision camera, Replacement of transmitter with low power transmitter & receiver with highly sensitive to reduce the power consumption. And also to implement some of the autonomous commands that may help a user in collecting the data. The commands include auto-landing command auto-move command etc.

XI. CONCLUSION

The All-Terrain Surveillance Robot has been designed in such a way that it can full fill the needs of the military, the police and armed forces. It has countless applications and can be used in different places and terrains. For example, at one place it is used by the rescue and defence purposes, while at another instance it is used for spy purposes. While another application can be to provide up to date information in a Hostage situation.

XII. REFERENCES

[1]. Hoffmann, G.M.; Rajnarayan, D.G., Waslander, S.L., Dostal, D., Jang, J.S., and Tomlin,C.J. (November 2004). "The Stanford Test bed of Autonomous Rotorcraft for Multi Agent Control (STARMAC)"

[2]. Hoffman, G.; Huang, H., Waslander, S.L., Tomlin, C.J. (20–23 August 2007)."QuadcopterHelicopter Flight Dynamics and Control: Theory and Experiment"

[3]. Er. M. Premkumar "Unmanned Multi-function Robot using ZIGBEE Adopter Network for Defense Application" in International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 2, Issue 1, January 2013.

[4]. Christo Ananth, G.Poncelina, M.Poolammal, S.Priyanka, M.Rakshana, Praghash.K., "GSM Based AMR", International Journal of Advanced Research in Biology, Ecology, Science and Technology (IJARBEST), Volume 1,Issue 4,July 2015, pp:26-28

[5]. Prabhjot Singh Sandhu, "Development of ISR for Quadcopter," International Journal of Research in Engineering Technology (IJRET), vol. 03, Issue 04, pp. 185-186, April 2014.