

Amphibian Spy Robot for Continuous Monitoring

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Abstract– An Amphibian Robot represent an amphibious robot which is viable on land as well as on water. They are made to small and compact enough to easily transport. Amphibian Spy Robot are remotely controlled robots, equipped with a camera, transmitting video data to the intervention troop. The project suppose a movable robot with a remote controller by using ARM processor. The robot equipped with a camera, remote controller, antenna, batteries, four movable wheels and two propellers. Charge Couple Device (CCD) camera is used to capture information surrounding the robot. Remote operated Amphibian Robot is a small robot designed for spying, surveillance and inspection purpose. For transmitting and receiving wireless signals to control the motors of robot control system we used Radio Frequency modules in wireless remote control system

Key Words– ARM, BLDC motor, Camera, Propeller, LPC 1768

1. INTRODUCTION-

Through RF signal Spy robot can capture audio and video information from the surrounding and can be sending to a remote station. The control of robot involves three distinct phases: perception, processing and action. This robot is not quite huge one and designed to be easy transportation processor, and the task is performed using motors. When the user controls by remote controller, the spy robot will move to desired destination and spy image around the robot in this project. The preceptors are sensors mounted on the robot. It's processing is done by the processor or on-board microcontroller. This task is performed by motors. When the user controls by remote controller, the spy robot will move to desired destination and spy image around the robot in this project. In practice, it is usually an electro-mechanical machine. It is guided by computer or laptop, mobile or electronic programming. It is able to do tasks on its own. Wireless controlled robots use RF circuits which have drawbacks of limited control.

2. PROPOSED SYSTEM:

The operation system is the spy robot with wireless remote control. The CCD camera can modify range more than 100ft. The wireless camera can be able to upgrade with the 360 degree left and right directions by using PIC program so that

the functionality is having a movement at many sides. Moreover, this camera can upgrade to move up and down directions. Instead of DC motors which driver the CCD camera, stepper motor can also be used. The spy robot can be commanded directly by remote controller. For the advance of spy robot, it can be built a robot with wireless visual system that the user can observe and control the situation via computer or mobile.

Block Diagram:

ROBOTE MODULE:-

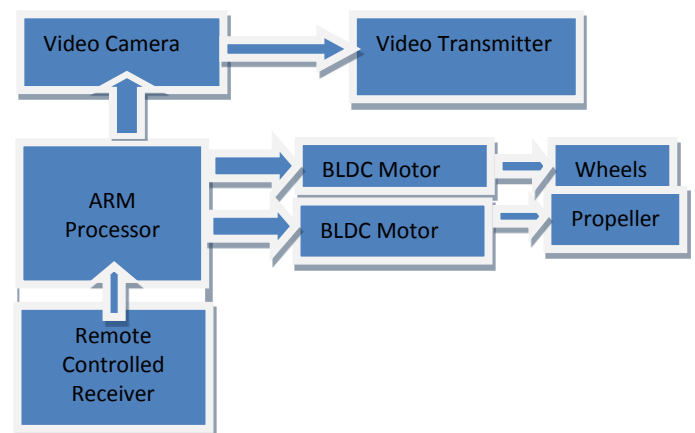


Fig. 1. Block Diagram of Proposed System

CONTROL MODULE :-

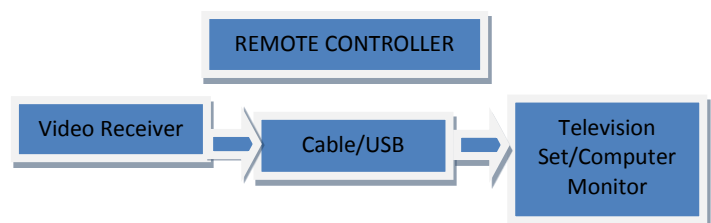


Fig. 2 Block Diagram of Proposed System

Block Diagram Description:-

- ▶ Trans-Receiver
- Charge-Coupled Device camera fixed on roof of robot. CCD camera captures continuous video and sends it using transmitting antenna to the receiver.

- Receiver processes on received signal and displays it on computer or television set.
- ▶ Remote Controller
- Robot is controlled by remote in forward, reverse, right and left directions.
- ▶ ARM Processor
 - ARM processor is the heart of entire system.
 - All controlling, processing and capturing processes are handled by ARM processor.
 - Proper Selection of ARM processors enables more efficient processing and easier coding.
- ▶ Brushless DC Motors
 - Total six motors are used.
 - Out of these four motors are used for driving motor on land and remaining two are used for floating purpose.
- ▶ Propeller

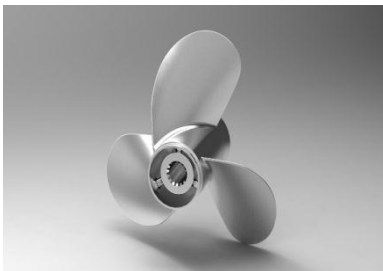


Fig.3 Propeller

- A propeller is a type of fan that transmits power by converting rotational motion into thrust. A pressure difference is produced between the forward and rear surfaces of the airfoil-shaped blade, and a fluid (such as air or water) is accelerated behind the blade.

Working :-

Step 1 : START

Step 2: Make Connection between receiver module and displaying device.

Step 3: Connect the power supply and turn it ON.

Step 4 : Configure transmitter module and receiver module.

Step 5 : Control and direct the robot using remote controller.

Step 6 : Run robot on land or in water.

Step 7 : Give the direction to the robot.

Step 8 : For Right direction turn off right motor and for left direction turn off left motor.

Step 9 : Start the propeller when robot is in water then, otherwise turn off propeller.

Step 10 : Capture video signal throw the camera.

Step 11 : Send captured video to receiver.

Step 12 : Display the captured video signal on monitor and store in video format.

Step 13 : Go to step 5.

3. HARDWARE REQUIREMENTS-

A) Selection of Controller:-

Requirement of the system:-

- I/O Ports
- Inbuilt Timer
- Serial Port
- less power consumption

1)ARM 7 LPC 2138:-

Features:-

- 2 channel ADC
- 2 PORTS P0, P1.
- 512KB program memory
- 32Kb stack memory
- 4-pin High-Performance ARM Microcontroller
- ADC 10 BIT
- Cost is 600

2) Raspberry Pi 2 model:-

Features:-

- Broadcom BCM2836 SOC
- Quad-core ARM Cortex-A7
- CPU Operates on 900 MHz
- IGB Memory
- Operates on 5V supply
- Audio connector, Ethernet connector

3) LPC 1768:-

Features:-

- ARM Cortex M3 Processor Running at 100 MHz frequency
- 12 Bit ADC
- 4 Ports P0,P1,P2,P3
- 512 KB ROM
- 64Kb static RAM
- 70 GPIO Pins
- 8 Channel
- Cost is 1100 Rs.

B) Selection Result:-

This controller LPC2138 used in our project because it's PORT, ADC channel, serial port, operating frequency is greater than other controller and its cost is less than LPC1768 and raspberry pi.

[6] <https://grabcad.com/library/tag/propeller>

[7] www.circuitstoday.com "Mobile Operates Spy Robot"

[8] www.retron.com "Wireless Spy Camera Robots"

4. APPLICATIONS& FUTURE SCOPE-

In surveillance system for continuous monitoring. In military, police and in personal security. In spying and in security based applications uses this type of robot, or useful at hostage situation, search and rescue. Instead of DC motors which driver the CCD camera, Stepper motor can also be used. For the advance of spy robot, it can be built a robot with wireless visual system that the user can observe and control the situation via computer.

5. CONCLUSION-

This type of robot can perform difficult and repetitive works for humans. It can have a very risky job and such dangerous job could be done by using small spy robot. But it is very useful to check and look out the place where dangerous poison gases have. Spy robot can also be used in searching people who are in building destroyed by the earthquake. Wireless camera is place in spy robots, it can be used as remote to enter and exit dangerous place that human cannot. To collect information from the enemy terrain it is used and monitor that information at a far secure area at the time of war. It also safely devise a plan for counter attack. Making a surveillance of any disaster affected area where human beings can't go.

6. REFERENCES-

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