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Gps Based Hawk Eye – Unmanned Aerial Vehicle

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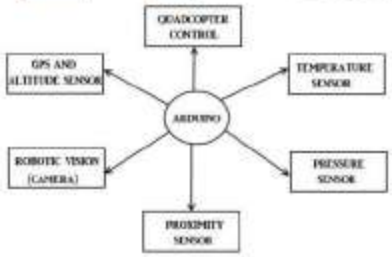
Abstract: **Robotics is an upcoming field in the present trend. Micro and Nano-electronic systems have their equal share in robotics. With the usual aid of future in mind, this paper deals with the application of robotics for human welfare which possibly is a way to analyze, summarize, record, observe and comfort a havoc situation. The usage of reasonable cost materials and open source electronics with optimum coding acquaintances that can yield a better understanding of an environment and to protect the life in it is the purpose. Arduino open source boards which come along with the Arduino software forms the base for the system. The system runs the various accessories from the I/O ports of the board. Vision sensors, infrared sensors, altitude sensor, proximity sensor and GPS devices are connected. Using the APM and manual control operations the bot can be controlled and operated. Further this Bot can work on its own i.e. it uses Artificial Intelligence to counter all obstacles and provide the data to the nearest base station. Its main application is to save human life from risks and enhance accuracy over menaced places.**

I. INTRODUCTION

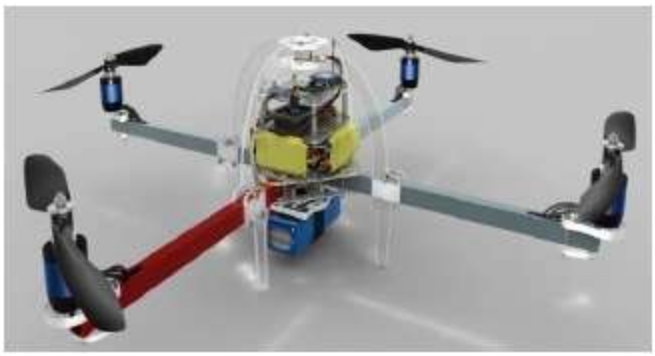
Under the present day scenario it is very difficult for a human to know about the fire accident or war zone with accuracy and instantly updated. Our proposal is that we can use robots or minibots for such usage and save human life. This system is efficient and interactive which also comes at a very low cost. Easy assembling of the system makes it compatible and simple for any ordinary person to re-assemble and repair it. Arduino is the back bone for this system which takes the input from pressure, temperature, altitude, vision (camera) sensor and GPS and transmits the data using an Arduino Yun Messenger over air medium that can be received using an Arduino IDE and a laptop. The system can fly and submerge in water. Further it can withstand heat (Silicone coating) and water resistant (Parlyene coating).

Layout:

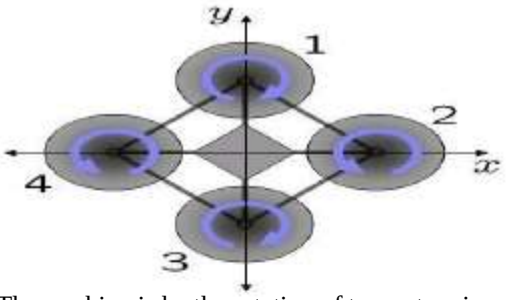


The Flying Machine:

A Quadcopter, also called a Quad-Rotor Helicopter, This unique helicopter was intended to be the prototype for a line of much larger civil and military Quad-Rotor helicopters.



The design drives four rotors using the Ardupilot board. No tail rotor is needed and control was obtained by varying the thrust between rotors.



The working is by the rotation of two rotors in one direction (Ex. clockwise) and other two rotors in the opposite direction (Ex. anticlockwise). This system can be controlled by the Arduino Platform for Flight.
The Arducopter platform has the following features:

- 6 Degree of Freedom IMU stabilized control
- Gyro stabilized flight mode enabling acrobatics (loops and barrel rolls)
- GPS for position hold, waypoints and return-to-launch
- Magnetometer for heading determination
- Barometer for altitude hold
- IR sensor integration for obstacle avoidance
- Sonar sensor for automated take-off and landing capability
- Automated waypoint navigation
- Motor control using low cost standard PWM Electronics Speed Controllers (ESC's)
- On board flight telemetry data storage
- Mounted camera stabilization capability
- Wireless command & telemetry for long distance communication
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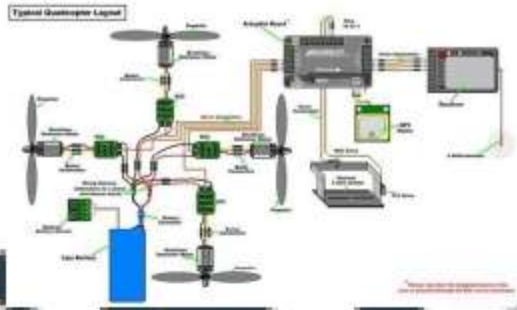
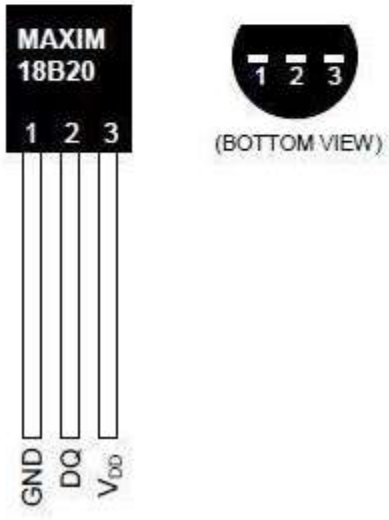
- Capability to fly in “+”, “x”, “quad”, “hexa” and “octa” configurations
- Battery level detection
- User configurable LED flight pattern
- Capability to use any R/C receiver
- ArduCopter Configuration and Ground Control Software
- Real-time graphs of flight data
- GUI for configuration of PID and other flight parameters
- On Screen Display (OSD) integration
- Waypoint programming using Google Maps
- Mixer table view to auto configure "+", "x", quad, hexa and octo configurations
- The circuitry for the base of the system is,



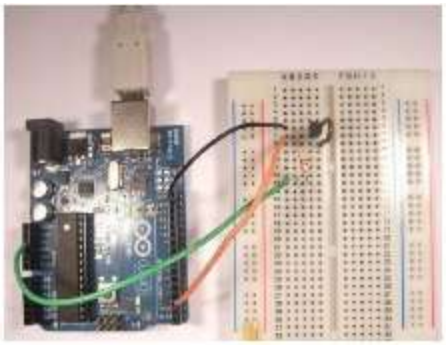
The rotors are water-proof and they fly the system to the desirable attitude.

I. INTERFACING THE TEMPERATURE SENSOR:

The One Wire Digital Temperature Sensor - DS18B20 from Maxim (formerly Dallas) is a great chip for measuring temperature in your projects. Luckily, there is a Dallas Temperature library for the Arduino which makes using this sensor very easy. Wire up the temperature sensor. The DS18B20 can be powered by between 3.0V and 5.5V so it can be simply connected from
GND pin to 0V and the VDDpin to +5V from the Arduino. However, the DS18B20 can also extract its power from the data line which means we only effectively need two wires to connect it up. This makes it great for use as an external sensor. So the 2 wire method is more effective. Simply connect both the GND and VDD pins to 0V. Then connect the DQ pin to pin 2 on the Arduino board (can be Arduino digital pin).



A 47K ohm pull-up resistor is required on the DQ pin to pull it up to 5V. The temperature is displayed in °C

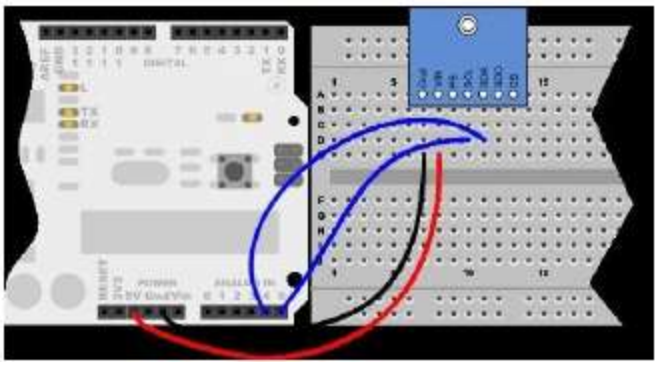


II. INTERFACING THE ALTITUDE AND PRESSURE SENSOR:

The altitude and pressure sensor are interfaced for obtaining accurate information in the affected zone or spy area. Using the pressure obtained, the sustainability of the human life in the particular area can be found. Built-in high resolution pressure and temperature sensors. It detects changes in pressure over a range of 10 to 1200 millibars

The Altimeter module combines highly sensitive pressure sensors with altitude sensors. While it's called an *Altimeter module*, the sensor is useful for many additional applications. By correlating the data from these two sensors it's possible to determine barometric pressure, altitude, changes in height, rate of climb and descent, and other useful information.

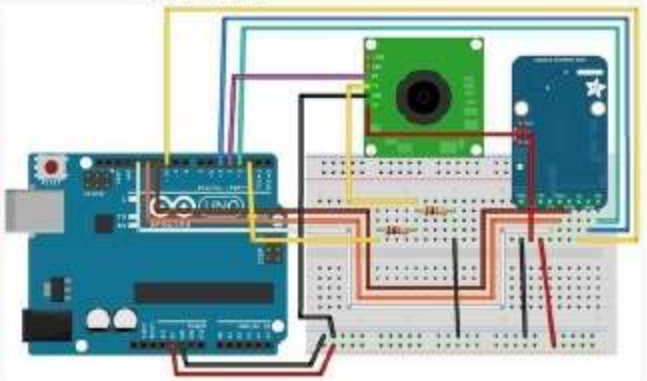
Applications include rocketry, unpiloted aircraft, remotely operated vehicles, robotics, weather stations, ballooning, and other uses involving calculating altitude, air pressure, height, or changes in temperature



Basic Wiring:

- Power Requirements: 3.3 to 6.5 VDC
- Communication Interface: I2C (up to 400 kHz) or SPI (20 MHz)
- Dimensions: 0.85 X 0.80 in (2.16 X 2.03 cm)

III. INTERFACING CAMERA MODULE:



Capturing high-definition video is a challenge for any project, but a great way to see where you're project has been, especially if it's something like an autonomous robot or a high-altitude balloon. The downside is that traditional video cameras can be heavy, difficult to mount, and triggering them to record can require some hacking. So why not use a video camera that was *designed* for hacking? The HackHD is a bare-bones camera that records 1080P video at 30 frames-per-second. Just attach a 3.7V Li-Po battery or other 3.7V source and a pushbutton and you have a fully functional camcorder. Because recording is triggered with a simple button-press, it can easily be controlled using a microcontroller or simple sensor.

FEATURES OF THE CAMERA MODULE:

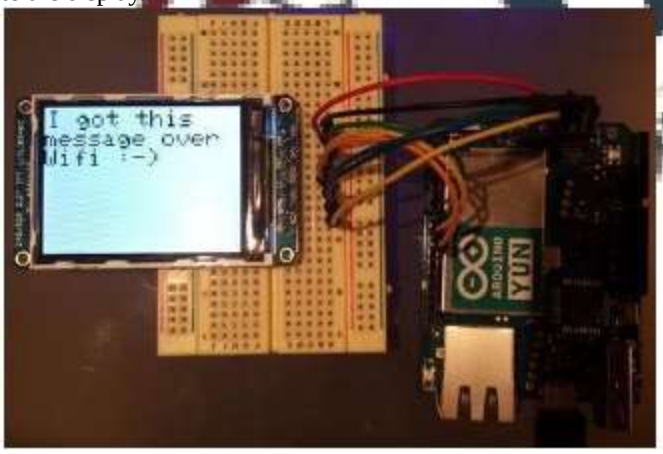
- Resolution: 1080P HD
- Frame Rate: 30 FPS (frames per second)
- Coding: H.264
- Aspect Ratio: 16:9

- File Format: AVI
- Storage: External micro SD Card (2GB - 32GB)
- Lens: 2.5mm (EFL), F2.8, 160 degree (diagonal) wide angle lens
- Control Input: Single contact momentary switch
- Video Output: Composite video
- Status Indicator Output: Single color LED driver
- Power Supply: External 3.7V, 1100mAH minimum
- Power Output: 3.7V DC, 500mAH
- Working Temperature: -10°C to +45°C
- Storage Temperature: -20°C to +70°C

IV. THE RECEIVER:

ARDUINO YUN MESSENGER

The Adafruit TFT display is a breakout board with a 2.2" color display. It interfaces with the Yun via SPI. On the Arduino UNO or the SPI pins are made available on the digital pins 13, 12, 11 and on the ICSP header but on the Leonardo and Yun they are only available on the ICSP header. A male-male connector helps to wire conveniently to the display.

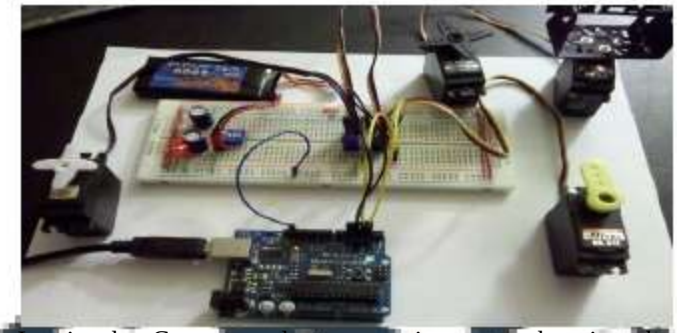


HEAT AND WATER RESISTANCE:

Parylene is the material used for water resistance. Waterproofing material is vapor permeated. The entire setup is kept in a vacuum chamber and then introduce an ionized plasma bearing the hydrophobic substance. The plasma gas penetrates inside the setup (everywhere that air can go) and thus coats everything inside and out, including inside the headphone jack, dock connector, etc. The coating allows electrons to pass through it but water does not "touch" it, so even though your charge port is under water the pins do not short out, yet normal behavior of the system takes place.

Silicones are inert, synthetic compounds with a variety of forms and uses. Typically heat-resistant and rubber-like, they are used in sealants, adhesives, lubricants, medical applications, cooking utensils, and insulation. This type of material is used for temperature resistance and it is coated by applying over the components.

SUBMERGER:



In air, the Copter needs no attention over changing the rotors to particular position. In Quad rotor mode, the bot has the propellers facing upwards. But if the bot is submerged in the water then the bot needs to move in the water and using these rotorswhich are faced upwards it is of no use to move the bot. Rather in the same place if the rotors are turned from upward direction to the horizontal direction it keeps the bot moving inside water. Such a rotation of the axis of the rotor is possible by a servo connected to the end of the rotor frame that is turned by the Arduino Uno. Four servos are installed for four rotors to change the face of them.

THE MIND:

The Artificial Intelligence given to this robot is the practical implementation of a software that is useful for saving the people and it is a real time entity. The AI used here makes the Analyzer as AIduino which is an upcoming technology that requires much of coding for the hardware control and providence for information sharing about the scenario to the near-by base station.

CONCLUSION:

This system is the base for futuristic development with artificial intelligence. Research over such area is infinite but life can be saved with found data during times of accidents and war. Such projects can be manipulated using simple circuits and open source electronics. Further this system can be upgraded to the upcoming technology. Thus, this is a flexible technology.

REFERENCES:

- www.arduino.cc
- http://en.wikipedia.org/wiki/Robotics
- http://arduino.cc/en/Main/Robot