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Available online at: www.jrrset.com
ISSN (Print) : 2347-6729
ISSN (Online) : 2348-3105
JIR IF : 2.54
SJIF IF : 4.334
Cosmos: 5.395
Volume 8, Issue 4 - January 2021 - Pages 20-24

Ambulance Drone

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Abstract: Many thousands of the people dying day to day to the delay of the ambulances reaching the accident spot at right time. So this prototype explains clearly about the emergency situation, a drone reaching the accident scenario with the various sensors. The uses of this technology gradually decreases the fatal cases. It is used to save time and helps in patient's survival. The flying medical drone can reach the accidental spot faster than the normal ambulances. It also measures the real time actual situation of the patient and it helps in saving a life of a patient. The proposed prototype model is used as a support the persons who need immediate attention. Recent developments in drone technology have made civilian drones cheap, easy to operate, and reliable. This paper looks into opportunities to use drones to deliver defibrillators to out-of- hospital cardiac arrest victims faster than an ambulance. The main focus is on unifying the needs of emergency response with the rules and regulations required to operate the drones safely.
KeyWords:drones,emergency,lifesaverpatients,survival.

INTRODUCTION

In today's world, there is a lot of traffic on roads which leads to congestion in the whole city. So in the time of emergency crisis situation, an ambulance which travels via road may not be able to reach the destination in time and the patient might lose his or her life. Thus, it is necessary to introduce a distinct means that would take the objective of "saving human life" one step closer. A drone or a quad copter takes aerial route and is not driven by human. Using more number of motors and propellers will produce more thrust. The quadcopter which consists of four BLDC motors and propellers attached to it makes it the optimal design and provides the necessary thrust. Four 2200mAh batteries provide power supply to the drone. The drone comprises of a med box which is capable of reaching emergency situations faster than the ambulance and can measure patient's real time health parameters. The various sensors in this prototype comprises of heartbeat sensor, temperature sensor, and ECG sensor. An ECG Sensor with disposable electrodes is attached directly to the chest to detect every heartbeat. The electrodes convert heartbeat to electrical signal and thus ECG Sensors are able to measure continuous heart beat and gives data of heart rate. The temperature of the patient's body is detected by the temperature sensor. The heartbeat or the pulse rate sensor is used to detect the number of heart beats per minute of the patient. The GSM technology is used to transmit the real time data from the emergency situation spot to the ambulance which is enroute to the destination. The GSM mechanism is simpler and less costly than Wi-Fi system.

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RELATED WORK

We have considered and studied various existing systems that have been developed to solve this issue. With the system we have proposed, we have tried to reduce the overall cost by using better alternatives, giving us almost accurate readings. Josefin Lennartsson , stated that "A drone associated with hospital which is fitted with a defibrillator is used to fly to emergency situations for helping victims suffering from myocardial infarction. It is used in an emergency disaster areas to deliver drugs, vaccines and medical supplies. A medical quad copter which is equipped with oxygen cylinder to relieve from respiration diseases. It is basically used to supply oxygen. The existing methods are only used to measure one parameter. Due to ability of measuring one parameter, it is not able to measure many parameters. The measured health parameters will be intimated to the clinicians immediately. A drone, also called UAV (Unmanned Aerial Vehicle) is a small helicopter that can be operated from the ground. The drone that will be used for the test flight is a drone produced by the German company Height-Tech. In cooperation with the non-profit group Definetz they have come up with what they call the Deficopter, which is a drone carrying an AED (The verge, 2015). The Deficopter can travel at a speed of 70 km/h and within a radius of 10 km. When the emergency call is received the Deficopter will be loaded with data and navigated to the emergency place. The Deficopter is equipped with a camera so that the emergency personnel can spot the scene and know when to drop the AED. The AED falls to the ground with a parachute. When a sudden cardiac arrest happens it is usually because the normal rhythm of the heart is replaced by electrical chaos. The heart starts to beat irregularly (arrhythmia) and cannot pump the blood to the rest of the body (Medtronic, 2011). One kind of arrhythmia is Ventricular fibrillation. When Ventricular fibrillation occurs the lower chambers of the heart, the ventricles, start to contract fast and unsynchronized. They fibrillate instead of beating (American Heart Association, 2014b). For the heartbeat to become regular again an electrical chock is necessary. CPR should be performed while waiting for defibrillation. It does not start the heart back up again but it keeps the circulation of the blood going while waiting for defibrillation. Brain damage can occur already after 3-4 minutes if no CPR is preformed (Hjärt- Lungfonden, 2014b).

PROPOSED SYSTEM DESIGN

Project Overview

The proposed prototype is using GPS module to navigate the victim's location. GSM module is used to send the measured health parameters every minute and the values will be sent to the doctors. Thinks Speak module is used to transmit the measured health parameters. This information will help the doctors to take treat the patients in time. The intimated health parameters will help to track the patient's current condition.

Block Diagram

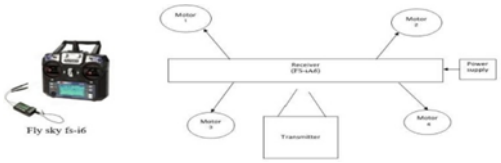

Figure.1: Sensor Configuration block diagram

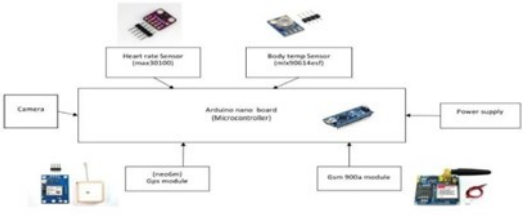

Figure. 2: Drone Configuration block diagram

The block diagram describes the functionality of the ambulance drone in 2 types sections and they are:

Sensor configuration block diagram

Drone configuration block diagram.

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n this block diagram the sensors are connected to Arduino board (microcontroller), which is the main part of this block, the Arduino has the program in which the data is available to operate or control the sensors as the sensors perform their work as monitoring the heart rate, bodytemperature rate that is compared with the Arduino pre-programmed values and sends that data to the server www.thingspeak.com where the management staff and doctors aremonitoring the data from the drone.

HARDWARE DESCRIPTION

Arduino Nano:

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board ina smaller form factor The board can be powered through a type-B mini-USB cable or from a 9 V battery.

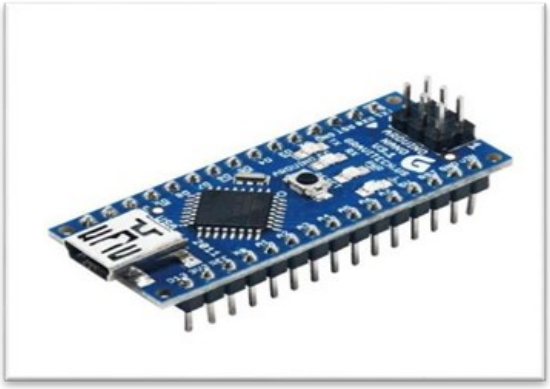

Figure.3: Ardino Nano

GSM 900a Module:

SIM900A GSM Module is the smallest and cheapest module for GPRS/GSM communication. The module offers GPRS/GSM technology for communication with the uses of a mobile sim. It uses a 900 and 1800MHz frequency band and allows users to receive/ send mobile calls and SMS.

Figure.4: Ardino Nano

Neo 6m GPS module:

The NEO-6M GPS module is a well-performing complete GPS receiver with a built-in 25 x 25 x 4mm ceramic antenna, which provides a strong satellite search capability. With the power and signal indicators, you can monitor the status of the module. It can track up to 22 satellites on 50 channels and achieves the industry's highest level of sensitivityi.e. -161 dB tracking, while consuming only 45mA supply current.

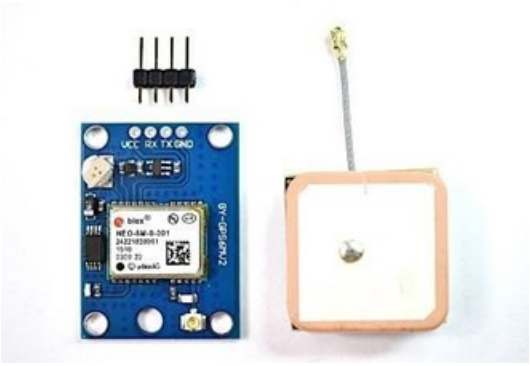

Figure.5: Neo 6m GPS module

3.4 Heart rate sensor (MAX30100):

Heart rate monitors work by measuring electrical signals from your heart. The MAX30100 is a Pulse Oximetry and heart rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals.

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Temperature Sensor(LM35):

The LM35 series are precision integrated- circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. Low cost is assured bytrimming and calibration at the wafer level. The LM35'slow output impedance, linear output, and precise inherent calibration make interfacing toread out or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1˚C in still air. The LM35 is rated to operate over a −55˚ to +150˚C temperature range, while the LM35C is rated for a −40˚ to+110˚C range (−10˚ withimproved accuracy).

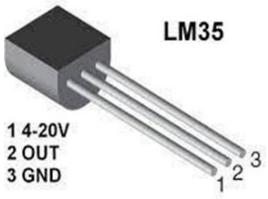

Figure.7: LM35

Controller (Fly Sky fs-i6):

This is the FlySky FS-i6 2.4G 6CH PPM RC Transmitter With FS-iA6B Receiver. It has FS- iA6B receiver a compact 6-channel receiver with a range exceeding 500m. Each transmitter has a unique ID and so when binding; the receiver remembers this ID and accepts data from that transmitter only.This avoids picking up other transmitter signals and dramatically decreases inference and increases safety.

Figure.8: fly sky fs-i6

3.7 KK2.1.5 Multi-Rotor controller

The KK2.1.5 Multi-Rotor controller is a flight control board for multi-rotor aircraft (Tricopters, Quadcopters, Hexcopters etc).Its purpose is to stabilize the aircraft during flight.To do this it takes the signal from the 6050MPU gyro/acc (roll, pitch and yaw) then passes the signal to the Atmega644PA IC. The Atmega644PA IC unit then processes these signals according the users selected firmware and passes control signals to the installed Electronic Speed Controllers (ESCs).

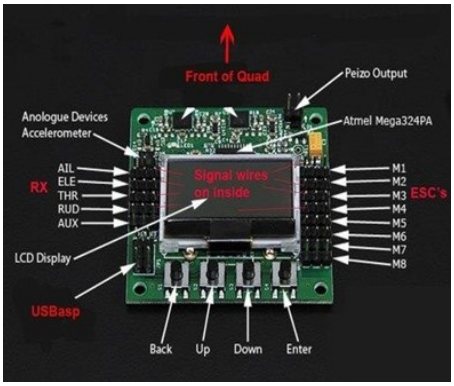

Figure.9: KK2.1.5 Multi-Rotor Controller

SOFTWARE DESCRIPTION

Arduino IDE

Arduino Integrated Development Environment is a publicly accessible software where one can easily write codes and upload them to the board. It makes code compilation very easy. Being a cross-platform application, codes can be written in C and C++ language for Windows, macOS, and Linux.

hingspeak

Thing Speak is an open source Internet of Things (IOT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. Thing Speak enables the creation of sensor logging applications, location tracking applications and a social network of things with status updates.

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METHODOLOGY:

Heart rate monitoring sensor: The heart rate monitoring sensor takes the 3.3v of input voltage andit activated to measure the heart rate of the patient. Once the patient puts his finger on the sensor it starts to measure the heart rate. After the measuring that value is compared with the value in Arduino which has pre-programmed in it. And the final value is transferred to the website through gsm module

Body temperature sensor: this sensor also uses the 3.3v of input source, and it will activated. After the enabled of the sensor it starts the measuring the body temperature of the patient through the infrared sensitive thermocouple detector chip in it. After that value is compared with the Arduino pre- programmed values and the final value is transferred to the website.

Neo 6M GPS Module: It is a well performing complete GPS receiver with a built in ceramic antenna, which provides a strong satellite capability. It collects the accurate latitude and longitude of the drone and sends to Arduino where it is stored and transferred to the website through GSM module.

Gsm 900a module: It is the smallest and cheapest module for GPRS/GSM. It is used as GSM mobile telephone technology to provide the data link to a remote network. As the Arduino collected values of the sensors were uploaded to website using this module and the location of the drone captured by the GPS module is also transferred to the website through this module.

CONCLUSION

This paper aimed to provide a feedback regarding the degree of practicality for the existence of DASS in natural environment. The comparison to regular ambulance and how it can be useful in support of those ambulances rather than replacing them was another aspect take into consideration. Clearly, it was evident that many lives suffer because their urgent need of support from ambulance wasn't met because of ambulance delays. Obviously, we can't ensure that the ambulance will reach them faster, so we thought of rather supporting the patient long enough to cover for ambulance delays by using the Drone.

FUTURE SCOPE

Such type of system can be used in two ways, one isas a stand-alone device as shown above or it can be installed in vehicles. By installing it in vehicles, it could make drivers educated and aware about driving patterns they follow and how it is impactingthe surrounding and increasing the pollution. By adopting better driving habits will in turn lead to a reduction in pollution. It is going to benefit them as well as others by reducing pollution so everyone can breathe cleaner air In the future, more sensors can also be added to this hence extending the system. Further, we can also modify the system by adding a feature of sending SMS to the user when the quantity of any gas in the atmosphere exceeds a certain value. Such systems can also be implemented on a large scale and help in making a smart city.

8.REFERENCES

1. Joseffin lennartsson, “Strategic Placement of Ambulamce Drones for Delivering Defibrillators to out of the hospital Cardiac Arrest Victims”,2015
2. Farin, N. sharif , “An Intelligent Sensor Based System for Real Time Heart Rate Monitoring, Intelligent Control and Automation”, May 2016..
3. M. Caledra, B.Anuradha, T. Surendra, published “A Self Balancing Quadcopter Design With Autonomous Control”, 2014.
4. DLR (2015) “Test flight with quadcopter” at German Aerospace Center in Cologne.
5. A. P. Betson, “The case against a cargo unmanned aircraft system,” Army Sustainment, vol. 44, no. 5, p. 28, 2012.
6. Unmanned k-max tested for firefighting. [Online]. Available: http://www.ainonline.com/aviation-news/business-aviation/2014-12- 11/unmanned-k- max-tested-firefighting.
7. Neya systems awarded phase iii sbir to demonstrate vtol uav control. [Online]. Available: http://neyasystems.com/ 04042014-neya-systems- awarded-phase-iii-sbir- demonstrate-vtol-uav- control.
8. Lockheed tests casualty evacuation mission with k-max drone (updated). [Online]. Available: http:// www.nationaldefensemagazine.org/blog/lists/ posts/post.aspx? ID=1823.