IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Locality Disaster Management Control Drone

[1]Dhanasekar J, [2]Pavan Kalyan Reddy, [3]Nagasiva K, [4]Ravi Teja B, [5]Balachandra
[1]Assistant Professor, [2,3,4,5] UG Student
Department of Mechatronics
Bharath Institute of Higher Education and Research, Chennai

Abstract:

In our country we're facing many natural calamities like earthquake's, floods , fire accidents in industries. Many of the people lost their lives during these calamities including staff like NDRF . This proposed model overcomes these problems which helps the people to be safe and NDRF staff to identify the people. This model helps us to carry the first aid kit if needed. This model carries small kids and save their life during calamities. This system uses VEGAAS1061 microcontroller to control the unnamed aerial vehicle (UAV'S) which is made up with aluminium alloys. It contains robotics arms I.e. manipulators which is controlled by the robotic controller that means this proposed model contains two layer controller . To increase the degree of freedom the proposed model uses adaptive control system. This model consists of camera to identify the people and UAV helps the people by understanding the situation using the new age technologies likes computer vision and conventional neural networks . During floods the people inside the water can be identified by the sensing using LIDAR sensors. By using this system there'll be reduction of human loss and which helps the ndrf staff to identify people so they can save many lives including them.

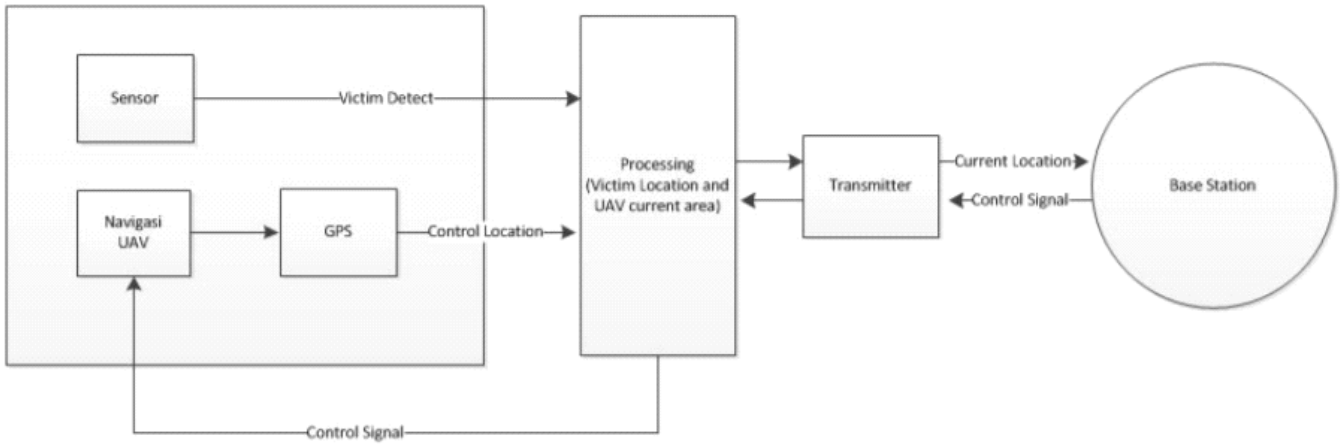
Introduction:

India is a unique geo-climatic condition and high social economic vulnerability. The climate is all responsible for increased natural disasters and the inflator in industries leads to fire accidents etc... According to the global climate risk index 2019, India is the 14th most valuable country in the world. However we can't save the wealth which is constant in the calamities but we can save lives. This proposed system saves the lives of people. It works with NDRF officers and locality emergency Not Applicable Not Applicable VEGA AS1061 protection and helps them in fulfilling their tasks. UAV with lipal helps in identifying the people drowning in floods. UAV carries the medicines and at the same time it calls people. The model consists of a camera with ML integration and emotional intelligence to understand the situation of people (or) the new age technologies like computer vision is used to identify people's needs. In this proposed system we are using computer vision for better results. By using this proposed system there will be reduction of human loss

This device is developed based on the artificial intelligence as well as machine learning to pre identify the disaster over the locality/industries which warn the resident of the locality (or) worker of industries before the disaster effect person in the residence/Industry as well as locality at the same time recuse the person from the disaster directly or indirectly. It always pre identifies the disaster before it occurs and warns the resident of the locality to be alert, in case of medical emergency it informs the nearest hospitals to take action over the patient and rescue at the same time it updates the information of the patient to their family and relatives. This proposed system saves the lives of people. It works with NDRF officers and locality emergency protection and helps them in fulfilling their tasks. UAV with lipal helps in identifying the people drowning in floods. UAV carries the medicines and at the same time it calls people. The model consists of a camera with ML

integration and emotional intelligence to understand the situation of people (or) the new age technologies like computer vision is used to identify people's needs. In this proposed system we are using computer vision for better results. By using this proposed system there will be reduction of human loss.

Methodologies & modeling:-



This section explains the UAV model dynamically of the UAV carrying a suspended load. The system is composed of the two robotics arms which act as grippers. The grippers hold the load. The payload can be considered a mass point. The system should be within a longitudinal plane. The dynamic model is described by using the Euler Lagrange equation for the UAV and the load.

The sum of kinetic energy of UAV:

$$k_{total(uav)} = \frac{1}{2}I\theta^2 + \frac{1}{2}Mx^2 + \frac{1}{2}Mz^2$$

Where θ is the angle of rotation. x and z are the moon of the UAV direction. And the robotic arm payload kinetic energy is :

$$k_{total(Payload)} = \frac{1}{2}Mx_p^2 + \frac{1}{2}Mz_p^2$$

Where xp = x(secα) zp = (z − lcosα)

Where l = length of robotic arm The potential energy of the system is the sum of potential energy of quad rotor and robotic arm.

$$p(\epsilon) = Mgz + Mg(z - lcos\alpha)$$

Now total energy i.e. langranges may be written as

$$k_{total(uav)} = \frac{1}{2}(M+m)x^2 + \frac{1}{2}(M+m)z^2 + \frac{1}{2}I_0\theta^2 + \frac{1}{2}Ml^2\alpha^2 + Ml\alpha x cos\alpha + Ml\alpha z sec\alpha$$

$$- Mgz - Mg(z - lcos\alpha)$$

The translation motions

$$fsin\theta = (M+m)x + mlcos\alpha - ml\alpha^2 sin\alpha$$

$$fcos\theta = (M+m)z + mlsin\alpha - ml\alpha^2 cos\alpha + (M+m)g$$

where f are nominal of wings

We need to subtract the air resistance with results and the air result is calculated by using the drag equation and the rotation moon is.

$T = I\theta$

Where I is the moment of inertia θ is the rotational angle.

This is about the payload and dynamic modelling of the UAV.

The nonlinear UAV dynamic consists of Force, Moment of Inertia and Kinetic energy.

Controller Design:-

In this section the implementing controllers are conventional PI fuzzy logic PD (FL-PD) fuzzy logic (PD+I), self tuning fuzzy PID(STF-PID) Controllers and fuzzy logic based slide mode and adaptive controller (FLSMAC) design algorithm.

The transfer function is

$$c(s) = k_p + \frac{k_i}{s} + k_d s$$

$$c(s) = k_p(1 + \frac{1}{T_i} + T_d s)$$

Where

k_p - Proportional

k_i - Integral

k_d - derivative gains

T_i - reset time $(T_i = k_p/k_i)$

T_d - rate time $(T_d = k_d/k_p)$

The adaptive control law is designed as

$$u_a = \frac{-s}{||s||+M} p$$

With the adoption law

$$\varphi = \frac{||s||^2}{||s||+M}$$

Gripper Design:-

In this project we are going to implant the impactive grippers which use fingers in contact with people or medical kits to produce necessary gripping force.

UAV Design:-

In this section we will implement the autonomous UAV are gps Internal measurement unit (IMU)a control computer, and a communication link. along with there we required a camera (visible and IR) WHICH helps us to detect the humans in any needy situations. GPS helps to identify the UAV Internal measurement unit (IMU) identifies the change in inertia sends the intimation to the magnetic encoders attached to each axis control computer helps us to control the device. This control computer is XEGAAS1061 with the same extensions of the controller mentioned in the controller design.

Sensors:-

In this section we discuss the sensors we are going to implement in the system. We are using two sensors i.e. LIPAR and face sensor. Face sensors help us to identify the weight of a person/health kit. And if the weight exceeds the threshold limit of the drone . Then computer control alerts the release mechanism composed of a bolt which is inserted in a tube. The bolt is fixed in the tube through a pin, which can be pulled out by a small motor to release the load. This helps / is used for decoupling of the load from the UAV.

LIDAR sensor:-

Bathymetric lidar sensor helps us to identify the people in the floods. the control computer gathers the information from the lidar sensor and gives signals to NDRF people in rescuing the people. If the weight of the person is affordable then the UAV itself weights the man/women. From the drowning takes them to a safe place. Computer vision:- In this section we explain about the implementation of computer vision to the system. We are using open vino toolkit for the computer vision as VEGA AS1061 is FRGA. vino toolkit helps with the pre- liberating of emotional behaviour which makes our tasks easy. We are using computer vision for automation of UAV and to identify the situation of the people.

Camera and functions:-

The system in-built with a camera which helps us to identify the multiple objects in a complex scene and which helps to save more people. The camera captures and with GSM modules and (sim-900). It transmits the video to the NDRF control room. Which makes the NDRF easy.

Conclusion:-

The proposed model overcomes almost all calamities and helps the people to be in a safe place. By using this system there will be reduction of human loss and which helps the NDRF staff to identify people. When ever the disaster happens this will be able to alert the people and NDRF teams for rescue operations,and this drone will be able to handle the task like locating the victims and help them directly or indirectly. There were a lot of research going on in the field of drone technology and lot of new breakthrough are keep changing\expanding the application of drone technology.

References.

1.Design, Modelling, Estimation and Control for Aerial Grasping and Manipulation 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems

September 25-30, 2011. San Francisco, CA, USA.

2.AI-based adaptive control and design of autopilot system for nonlinear UAV Sadhan ¯ a¯ Vol. 39, Part 4, August 2014, pp. 765–783. c Indian Academy of Sciences.

3.UAV-based Sensor Networks for Future Force Warriors International Journal on Advances in Telecommunications, vol 4 no 1 & 2, year 2011.

4.Lift of a Cable-suspended Load by a Quadrotor:

A Hybrid System ApproachPatricio J. Cruz, Meeko Oishi, and Rafael Fierro 2015 American Control Conference

Palmer House Hilton 2015. Chicago, IL, USA

5.IDA-PBC Methodology for a Quadrotor UAVTransporting a Cable-Suspended Payload 2015 International Conference on Unmanned Aircraft Systems (ICUAS)

Denver Marriott Tech Centre

Denver, Colorado, USA, June 9-12, 2015

6.Autonomous Transportation and Deployment with AerialRobots for Search and Rescue Missions

7.Accurate Detection and Localization of UAV

Swarms-Enabled MEC System Jibin Zheng, Member, IEEE, Tianyuan Yang, Hongwei Liu, Member, IEEE, Tao Su and Liangtian Wan, Member,

IEEE

8.Cooperative Quadrotors Carrying a Suspended Load 016 International Conference on

Unmanned Aircraft Systems (ICUAS)

June 7-10, 2016. Arlington, VA USA