Drone Based Search and Rescue Operation in Flood Affected Area

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Abstract - *Flood emerge regularly because of overwhelming precipitation all around the globe. The prompt and primary effect of flooding is the elusive loss of human life. A Drone is a rising innovation that can fly over difficult to reach places and effectively controllable. A Drone is financially savvy when contrasted with some other saving vehicles like helicopter and boat. In our proposed model, distinguishing proof of individuals in the flooded area is done by a Drone with the assistance of the camera and voice recognition module and addresses a similar area to rescue the team with the assistance of a GPS framework. Premier to give lifesaving jackets to them through a drone with the end goal that the victim can be saved at first. Further safeguarding activity is done by helicopter or boat according to the prerequisite. From this model, activity is done in a shorter time where the activity time matters in this disaster.*

Key Words: *Drone, Voice recognition module, lifesaving jackets, Flood, Search and Rescue.*

1. INTRODUCTION

In Indian geology, we will confront overwhelming precipitation from June to September inconsistently, which is known as the stormy season. Stormy season happens at various times in various areas of the world according to their common weather. As a rule, a flood is known as a Natural disaster. In the late year, in India, we had seen the calamity brought about by flood. Which way on the loss of human and creature life and it harms the structure, sewage framework, extension, streets, and water way 's. Likewise, it influences the electric force distribution. These cause an aberrant effect on the economy of the nation, where it requires immense time to defeat harm caused and to settle down.

In 2018, a flood has occurred in Malaysia which caused huge damage to the loss of human life. Flood is most common in countries like India, the USA, Suriname, Netherland, Monaco, etc,. To overcome this disaster, Drone or UAV's has developed for search and rescue operation in such flooded area with their different techniques to save human life. Some

of those research papers are taken as a reference and have been discussed in further parts.

In flood-influenced territory, individuals hurried to the housetop or inside the tree limbs to spare themselves from the flood. If there is overwhelming precipitation, at that point there substantially more possibility of sinking and loss of their life. Additionally, huge numbers of creatures lose their life due to this calamity by sinking into the overwhelming progression of water. The individuals in the flood-influenced region require the crisis administration and speedy reaction. On the off chance that there is no fast reaction, at that point, there is a progressive possibility of losing their life. For a snappy reaction, search and salvage activity in the flood-influenced territory is done by utilizing drone technology.

A Drone is raising innovation in flying. Which had a colossal effect on applications like in military, agribusiness, looking through purposes, and so forth. The drone can be constrained by both robotizations and by human working with a correspondence medium like a transmitter. The trip of drones may work with different degrees of self-rule. In this task, we have two primary destinations to build up the model of automaton conveyed for search and salvage activities in flood-influenced regions. Here we can control the drone by the pilot in flood-influenced areas and it tends to be constrained via computerization by utilizing a few programming.

By utilizing drones, we can react to the victim in an overwhelmed region immediately contrasted with helicopter and boat. A drone is more favorable than some other safeguarding vehicles because, on the off chance that we use the helicopter, at that point their fuel cost and in general flying cost will be more and with use of the boat, sinking chance will be more so that there will be loss of life. If there should be an occurrence of helicopter and boat the reaction time will take more and cost is additionally more contrast with the drone.

In the proposed model, it comprises of significant hardware like Ardu Pilot Mega(APM) control board for control activity of the drone, GPS/GSM module for correspondence reason and for knowing the area, camera for distinguishing the victim in overflowed area, voice recognition unit to perceive the voice of human if there should be an occurrence of the undetectable individual in visuals, transmitter, and beneficiary for correspondence.

In this model, we lift the crisis medication and life sparing coats by utilizing the Drone. The model will be assessed dependent on the reaction from the demand message and the precision of the area transmitted by the GPS module.

2. LITERATURE SURVEY

[1]. Seethalakshmi V, Sowndharya N, et al., "Development of Amphibious Drone for flood and forest rescue", IJIRSET, Journal of Electronics and Communication Engineering, 10.1560.2019. In different fiascos, both normal and man-made, rambles are utilized to convey genuinely necessary supplies to regions that would some way or another be out of reach. This paper approach could be utilized for building up a little and conservative measured waterproof Amphibious Drone which can be utilized to complete salvage tasks. The Amphibious Drone is a UAV that can land both in-ground and water surface. The Amphibious Drone has more Efficiency than other choices.

[2]. Ahmad sobri Hashim et al., "Development of Drone for Search and Rescue Operation in Malaysia Flood Disaster" IJET, Journal of Computer and Information Science, 7(3.7).9-12.2018. In this paper, the advancement of Drone for Search and Rescue Operation was a triumph even with some defects. In any case, in genuine circumstance execution, study and investigation should be finished. Innovation can be fused into search and salvage activity, during a flood as well as other looking through strategic it can assemble pictures and information over a tremendous zone rapidly, limit the time and the number of rescuers required for activity.

[3]. Pooja Srivastava et al.," Quadcopter for Rescue Missions and Surveillance", IOSR Journal of Computer Engineering (IOSR-JCE), 2017. This paper presents a methodology that could be utilized for building up a little and minimized measured quadcopter which can be utilized to complete salvage activities and give sound/video help to the individuals in trouble. It could likewise be utilized for live video spilling. Quadcopters offer preferences for some applications when contrasted and they kept an eye on partners spare human pilots from flying in perilous conditions that can be experienced not just in military applications.

[4]. Mr. B. Vinoth Kumar, S. Kalaiyarasan, et al., "Quadcopter Based Gas Detection System", IOSR Journal of Electronics and Communication Engineering, 11(1), 64-68, 2016. This paper portrays another methodology for the gas spillage discovery framework at a low fixation. The spillage is recognized with the assistance of the MQ-6 gas sensor. The sensor imparts a sign to the microcontroller. The microcontroller imparts a functioning sign to other remotely associated gadgets. Through this model, we can decrease the loss of human life instead of the underground seepage framework and in mine zones.

[5]. Vimal Raj, Sriram, Ram Mohan, Manoj Austin, "Design and fabrication of inclined arm miniature-sized quadcopter UAV", IOSR Journal of Mechanical and Civil Engineering,13(5), 73-76,2016. This paper concentrates on insights regarding the requirement for a quadcopter in different fields particularly in the spot of a remote region where the street transportation office is exceptionally less. This is for the most part utilized for observation reason and concealed exercises can be caught.

[6]. S. Bernardini, "Planning the behavior of low-cost quadcopters for surveillance missions," presented at the 24th International Conference on Automated Planning and Scheduling, Portsmouth USA, 2014. In this paper, they depict our way to deal with utilizing mechanized arranging to evoke elevated level savvy conduct from independent MAVs occupied with reconnaissance applications. They show our methodology by concentrating on the quadcopter and Search and Tracking missions, which include looking for a portable objective and following it after it is found.

[7]. Sturm.J, Cremers, D. "Camera-based navigation of a low-cost quadrocopter." In Proc. Of the International Conference on Intelligent Robot Systems (IROS) 2012. In this paper, they depict a framework that empowers an ease quadrocopter combined with a ground-based PC to explore independently in beforehand obscure and GPS denied situations. exhibit that our framework can explore in beforehand obscure conditions at a flat out scale without requiring fake markers or outer sensors.

[8]. Y. Naidoo, R. Stopforth, and G. Bright, "Development of a UAV for search & rescue applications.," presented at the IEEE AFRICAN 2011, Zambia, 2011. In this paper, the improvement of an unmanned flying vehicle (UAV) expected for search and salvage applications. The framework was demonstrated scientifically, a control system was actualized to accomplish solidness. They researched by making a MATLAB Simulink numerical model, which was utilized to run reproductions of the framework.

[9]. S. Share, "Supporting Search and Rescue Operations with UAVs," presented at the 2010 International Conference on Emerging Security Technologies (EST), Canterbury, 2010. Search and salvage activities can enormously profit by the utilization of self-ruling UAVs to overview the earth and gather proof about the situation of a missing individual. In this paper, they talk about how these parameters can influence the hunt errand and present a portion of the exploration roads we have been investigating.

3. METHODOLOGY

In this model, we had assembled Drone utilizing ramble innovation. We had utilized Ardu Pilot Mega (APM) control load up for overall flight control of automaton development

utilizing Electronic Speed Controller (ESP) module, which controls the speed of the engine by providing a required measure of capacity to the Brushless DC engine which can pivot in fast with 10,000rpm and area is distinguished utilizing Global Positioning System (GPS) module which is associated with APM with the utilization of telemetry of transmitting the equivalent careful area of the drone. Live visuals are caught utilizing cameras which aides are controlling of drone and to distinguish the victim in overflowed territories. The Voice recognition module detects the victim's voice and conveys it to the rescue team by utilizing the GSM module. Change's according to the necessities to move in more scope of territory.

The voice recognition module utilized in this model perceives the words that are yelled by victims and quickly contrasts the info with the voice or message early dumped in it. On the off chance that both the message matches, at that point the message are sent utilizing GSM to the portable of the given number in the coding of Arduino. Each of these activities of voice acknowledgment and GSM is codded in the Arduino board.

The Sufferer is recognized by utilizing a camera and with a voice recognition module if the individual is inconspicuous in visuals because of impediments like structures or trees. At that point by utilizing the voice message of the individual who yells for help and area can be discovered by utilizing GPS which is set in the drone after the adaptation of the individual in that place and a similar area and data is shared to rescue team. Ones the drone arrives at the victim area, with confirmation coat is dropped by the drone to the individual enduring in a flood zone. Which can be considered as an underlying salvage of individuals in peril condition.
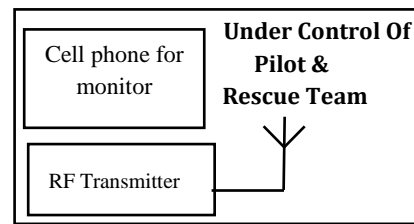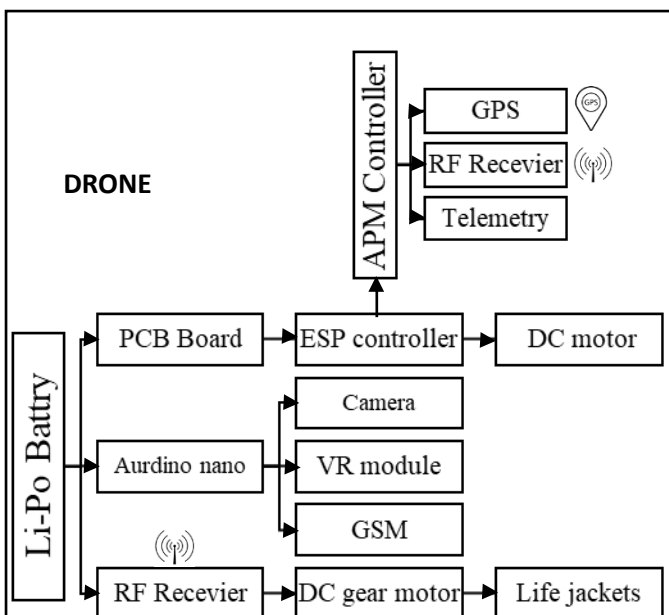
3.1 BLOCK DIAGRAM

DRONE

As shown in the above Fig 1, the Block diagram of our model comprises of two unique parts, one is of Drone and another is of a Rescue team. In the Drone part, it consists of an APM controller, LiPo Battery, ESC, DC motors, Arduino, RF Receivers, and Lifesaving jacket/coat. Here every part has its specifications which adds to do the necessary tasks of drone which will be conveyed between the human and controller utilizing RF receiver and transmitter. In the rescue part, it comprises cells to screen the drone by watching visuals by camera and RF Transmitters to transmit the guidelines to the APM controller to complete the developments of automaton.

3.2 FLOW CHART

The stream begins from the development of drones to the overwhelmed zone to recognize the individuals in peril circumstances and to protect them at first. Live visuals will show up in the cell or screen, according to the necessities the automaton developments can be controlled with a transmitter.
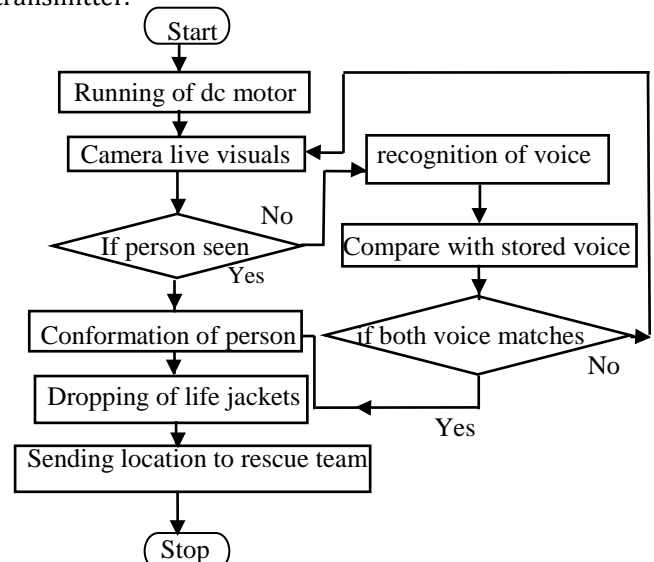

Fig-2: Flowchart.

As shown in Fig 2, with live visuals the individuals can be recognized effectively if the individual is seen. On the off chance that the individual not seen however he is available around there because of any snags, at that point, with the assistance of the voice recognition module, the nearness of the individual can be discovered by his voice message. At the point when the individual yells for any assistance, by

Fig-1: Block diagram

utilizing that voice message it will be contrasted and a message which is put away from the get-go in the module. In case both the message coordinate, at that point additionally adaptation is finished utilizing a camera. Later on, the message will be sent alongside area subtleties to the rescue team to complete a further activity. Thus, when the individual found in visuals then additionally compliance ought to be done to check whether the individual is alive or not.

At that point life coats will be dropped to the individual to protect them at first and later utilizing the same area, the rescue team can safeguard them from the debacle with the assistance of helicopter or boat according to the helpful prerequisite. The same stream will be carried out until the rescue operation complete.

At the point when an individual lost in a flood zone, he/she will be discovered distinctly by a reaction to an agreeable. In any case, that will make a defer where the individual perhaps got dried out to death or face additional floods water in that specific deferral and results in loss of their life. By utilizing Drone in this looking and safeguarding tasks, numerous human life can be spared with less timeframe.

The Necessary endurance materials and crisis meds are dropped by the drone to the individual enduring in a flood zone. Accordingly, when an individual lost in the flood zone, he/she might be safeguarded utilizing the existence of coats in an insignificant time.

For all these activities we require a high gifted administrator and every individual ought to have some information on this model. So that being used in this model, each ought to have the option to perceive the model capacities. Else to request the assistance with required message given.

4. RESULT

1. A drone can be fly too difficult to even consider reaching spot and aides in distinguishing the individuals in peril condition utilizing the camera in a tremendous overwhelmed region.
2. Voice recognition module helps in finding the individuals under the nonappearance of them in-camera visuals because of any snags.
3. The area will be watched and send to protect the group utilizing GPS and telemetry fixed in Drone.
4. From adjusting the nearness of individuals in the peril overwhelmed region, life coats are dropped to safeguard them at first.

Fig-3: Overview of prototype.

Fig-4: Functioning of prototype.

From above Fig 3 and Fig 4, the overview of our prototype with fully assembled parts and functioning of a prototype with transmitter and receiver which is handled by an operator can be seen.

5. CONCLUSIONS

In this paper, our model methodologies that drone can be utilized for the inquiry and salvage activity in the flood influenced territory which can fly over difficult to reach places where other saving vehicles like helicopter and boat can't be reached.

It is extremely hard to do the searching operation by utilizing the helicopter and boat for the quick salvage as an underlying salvage. The time has come devouring, expensive and exceptionally talented labor is required for the inquiry and salvage propose to spare the life of the sufferer. We built up a drone model that has an enormous potential where it can convey about 3Kg of weight and travel around a Km scope of a range which is utilized for search and salvage activity.

At first, the Camera is utilized for the distinguishing proof of influenced individuals in the overwhelmed zone by social event by the live visual in cell screen. Voice recognition module is executed into the drone which perceives the voice of the victim on the off chance that he requested assistance by yelling some characterized message, if the message coordinate between the module and the victim voice message, at that point GSM actuate and send the message to rescue team expressing to support the victim.

The area can be seen as the drone moves. At the point when individual's compliance is done, with the equivalent precise area, the rescue team can work with helicopters or boats to salvage them.

The life coat is dropped by the drone utilizing gear motor in control with RF transmitter for protecting the individual who is yet to soak in water. With the end goal that the individual can be spared or reduced at first. Also, further activity is completed by the rescue team by utilizing the area shared by

utilizing the GPS module. Drone spare victim during basic emergency productively.

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