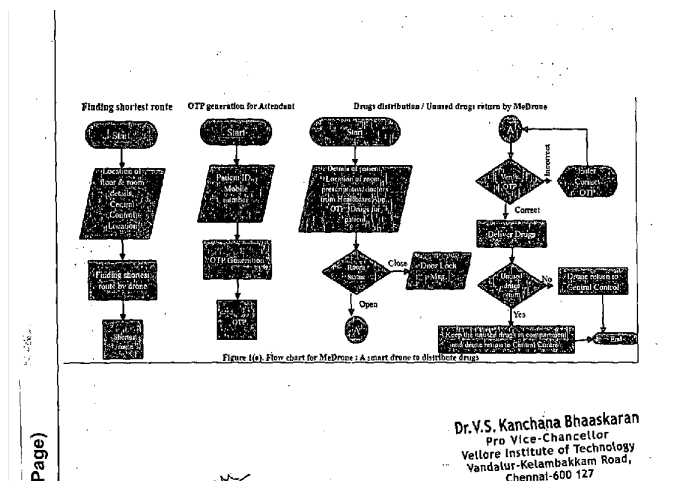


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(54) Title: MEDRONE-A SMART DRONE TO DISTRIBUTE DRUGS AVOID HUMAN INTERVENTION AND SOCIAL DISTANCING TO DEFEAT COVID-19 PANDEMIC IN HEALTHCARE

(57) Abstract: Many healthcare centers generally have a centralized unit-dose drug distribution system (CUDD). The in patients drugs are stored in a central area of the pharmacy and dispensed at the time the drugs are due for the patients. The drugs are transferred from the pharmacy to the patient by either the nurse or attendant. The attendant often collects the medicine from the pharmacy. This process is quite time-consuming and in this COVID19 pandemic should maintain social distancing by the attendant in the pharmacy. In a field where time is of great importance and can save lives and also, human intervention which in turn need to maintain social distancing, we can use MeDrones that will dispense medicines to the designated patient(s) location which will avoid human intervention and social distancing to defeat COVID-19 pandemic which is the need of the hour. The drone will be designed to deliver payload (tablets / saline) within / across the hospital premises. Apart from delivering medicines to the respective patients, the drone will be equipped to decide the optimal path to reach patients and also prioritized attending to critical patients based on the hospitals central database. The drones can be customized to return the unused medicines from the patients location to the pharmacy.



7. ABSTRACT OF THE INVENTION

Many healthcare centers generally have a centralized unit-dose drug distribution system (CUDD). The in-patients drugs are stored in a central area of the pharmacy and dispensed at the time the drugs are due for the patients. The drugs are transferred from the pharmacy to the patient by either the nurse or attendant. The attendant often collects the medicine from the pharmacy. This process is quite time-consuming and in this COVID-19 pandemic should maintain social distancing by the attendant in the pharmacy. In a field where time is of great importance and can save lives and also, human intervention which in turn need to maintain social distancing, we can use MeDrones that will dispense medicines to the designated patient(s) location which will avoid human intervention and social distancing to defeat COVID-19 pandemic which is the need of the hour. The drone will be designed to deliver payload (tablets / saline) within / across the hospital premises. Apart from delivering medicines to the respective patients, the drone will be equipped to decide the optimal path to reach patients and also prioritized attending to critical patients based on the hospital's central database. The drones can be customized to return the unused medicines from the patient's location to the pharmacy.

5. CLAIMS

I/ We Claim:

1. The proposed smart MeDrone is a user friendly drone designed to deliver medicines to and fro the patient(s) location and across/inside the building to avoid human intervention and consists of:
 - The drone
 - interactive user interface (UI) application software
 - database
 - RFID
 - Storage Box
 - image processing techniques
 - GPS Tracking system
 - Battery
 - Docking Area
2. The drone system mentioned in claim(1), is connected with an interactive user interface deployed on a mobile or a computer system through which the drone can be controlled.
3. The database mentioned in claim(1), helps to store all the necessary information about the locations, and other necessary information for the drone propagation.
4. The docking area mentioned in claim(1), provides a platform for the drones to charge the battery on periodic basis or when the battery goes below a set threshold.
5. The image processing techniques mentioned in the claim(1) , helps to identify the obstacles around the drone.
6. The obstacle detection mentioned in claim(5), is carried out using distance calculation algorithms that helps the drone to avoid obstacles and find the shortest path between source and target destinations.
7. The location of the drone mentioned in claim(1), can be tracked using the GPS tracking module embedded in the drone.
8. The drone mentioned in claim(1) is provided with a Storage box for holding the medicines with OTP/ RFID based authentication.
9. The RFID mentioned in claim(1) is used to authenticate the correct target location/ or user to whom the medicine needs to be delivered.

FORM 2

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THE PATENTS ACT, 1970
(39 of 1970)

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THE PATENTS RULES, 2003
PROVISIONAL/COMPLETE SPECIFICATION
(See section 10 and rule 13)**1. TITLE OF THE INVENTION: MeDrone- A smart Drone to distribute drugs to avoid human intervention and social distancing to defeat COVID-19 pandemic in healthcare****2. APPLICANT(S)****1. VELLORE INSTITUTE OF TECHNOLOGY(VIT)****3. PREAMBLE TO THE DESCRIPTION****PROVISIONAL**

The following specification describes the invention

COMPLETE

The following specification particularly describes the invention and the manner in which it is to be performed.

4. DESCRIPTION**1. TITLE OF THE INVENTION: MeDrone- A smart Drone to distribute drugs to avoid human intervention and social distancing to defeat COVID-19 pandemic in healthcare****TECHNICAL FIELD OF INVENTION**

[001] The proposed work focused to develop a user friendly smart MeDrone which can be used to deliver medicines to and fro the patient(s) location to avoid human intervention and social distancing during Covid'19. It also aims to train the drone that can navigate across/inside the building and open spaces to reach the desired location.

BACKGROUND AND PROBLEM WITH EXISTING ART

[005] Despite the growth of modern technology, some things still remain constant. Although some tasks must not change with technology, certain daily-activities must evolved with time and technology. These improvements will help us to save time and efforts. One such important, yet basic service is drug distribution to patients within the hospital. In the case of elderly attendant with the patient, he/she has to come to the Pharmacy which may be located far away from their patient room/bed to collect their prescribed medicines.

[010] Every second matters in a life or death situation and hence time is of high importance in the field of medicine. Instead of going to the pharmacy directly in person to collect the medicines, the complete process of collecting the medicines can be automated. There are many possibilities of UAV (Unmanned Aerial Vehicle) to get deployed in many commercial application like Aerial photography, Shipping and delivery of goods, Geographic mapping, Disaster management, Weather forecast, Wildlife monitoring, etc.

[015] In addition to the existing applications, this work aims to deliver the medicines as payload in the health care centres through drones.

SUMMARY OF THE INVENTION

This invention aims to develop a user friendly smart MeDrone which can be used to deliver medicines to and from the patient(s) location to avoid human intervention and social distancing during Covid'19. This can be achieved by designing an autonomous flight drone and developing relevant application software for MeDrone such as development of interactive user interface (UI) and creating and integrating the associated database with UI.

[020] It also ensures security and authentication by generating OTP / RFID authentication to guarantee the correctness of drug delivery. It helps in returning the unused medicine from the patient's room/bed to Pharmacy. This drone can navigate across/inside the building and open spaces to reach the desired location. The work targets to design a Storage Box for holding the medicines providing appropriate security for the medicine container. After dispatching the medicines the drone will return to ground station. Through image processing techniques the drone analyses the path/obstacles and identifies the shortest route for dispatching the medicines inside/across the hospital premises.

[030] The current position of the drone could be tracked/monitored by the attendant/operator through GPS tracking system.

LIST OF PREFERRED AND OPTIONAL FEATURES

1. Notification to the operator when there is a delay in delivering the medicine to the destination.
2. The drone can also be controlled by remote whenever required by the operator.
3. This work aims to monitor the battery status periodically and make necessary routing of drone to docking area for charging the battery.

BRIEF DESCRIPTION OF THE DRAWING

Figure 1(a). Flow chart for MeDrone : A smart drone to distribute drugs

Figure 1(b). Flow chart for MeDrone : A smart drone to distribute drugs

Figure 2 (a). The architecture diagram of MeDrone

Figure 2 (b). Prototype of MeDrone

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[045] In a field where time is of great importance and can save lives and also, human intervention which in turn need to maintain social distancing, we can use MeDrones that will dispense medicines to the designated patient(s) location which will avoid human intervention and social distancing to defeat COVID-19 pandemic which is the need of the hour. The drone will be designed to deliver payload (tablets / saline) within / across the hospital premises.

[050] Apart from delivering medicines to the respective patients, the drone will be equipped to decide the optimal path to reach patients and also prioritized attending to critical patients based on the hospital's central database. The drones can be customized to return the unused medicines from the patient's location to the pharmacy.

Finding shortest route

OTP generation for Attendant

Drugs distribution / Unused drugs return by MeDrone

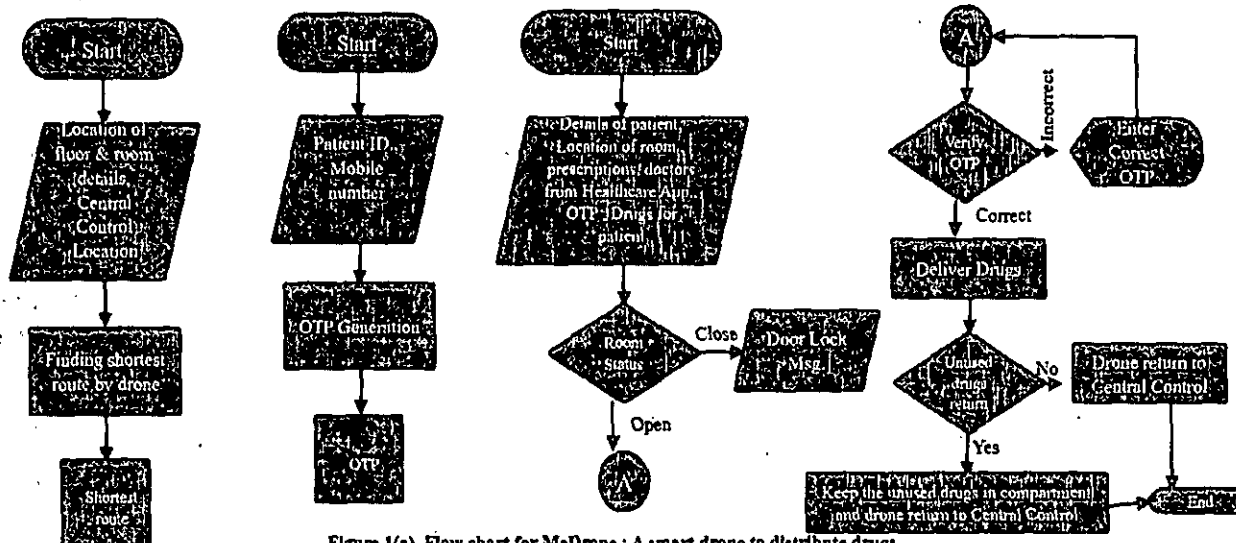


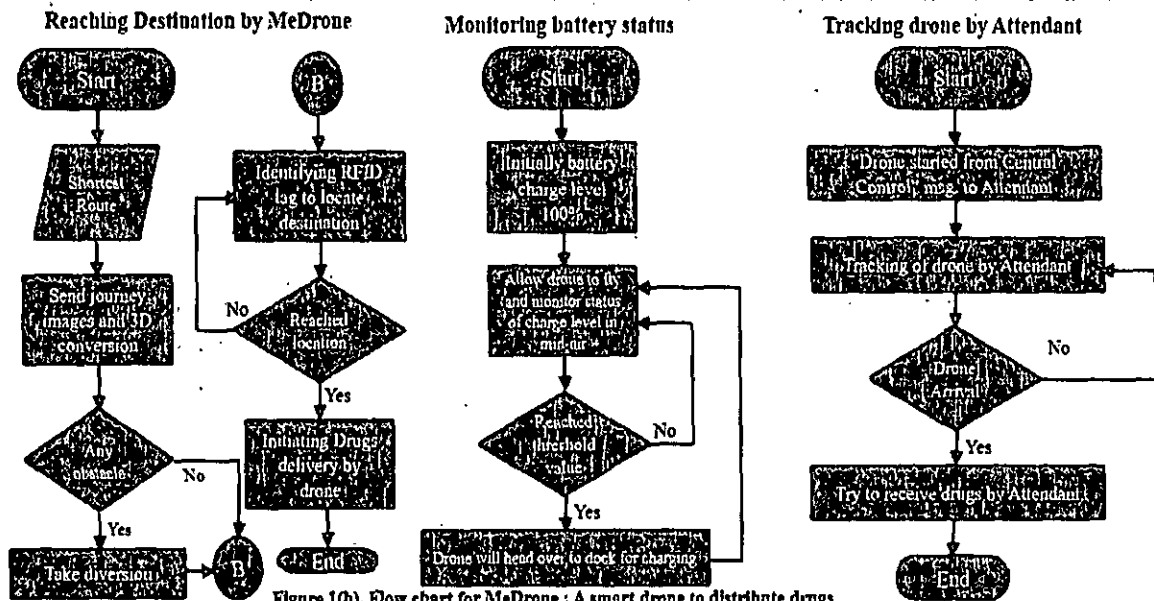
Figure 1(a). Flow chart for MeDrone : A smart drone to distribute drugs

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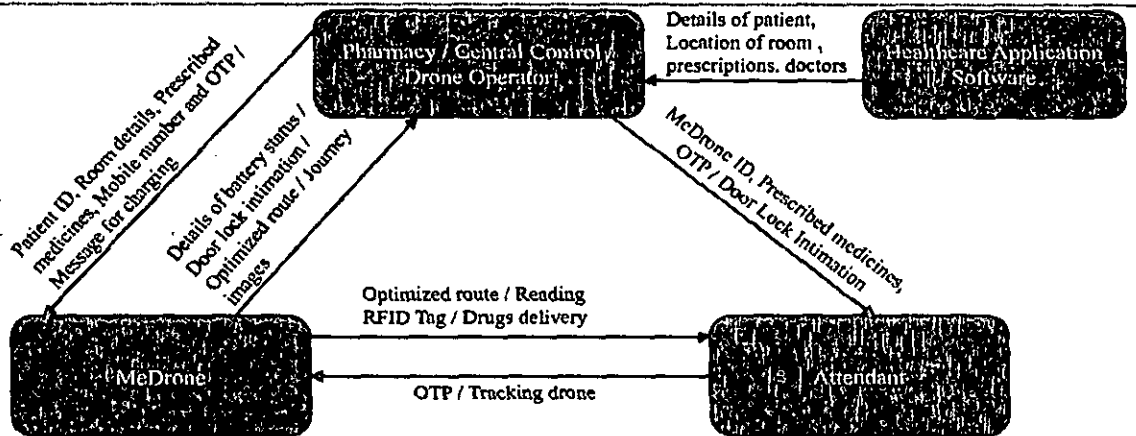


Figure 2 (a). The architecture diagram of MeDrone

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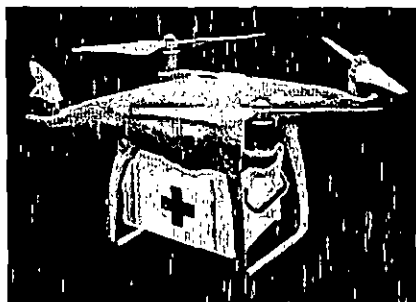
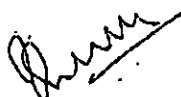


Figure 2 (b). Prototype of MeDrone

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