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Pharmaceutical UAV

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Abstract:- Delivery drones have developed into a potentially feasible option for a multitude of industries and uses, such as e-commerce, logistics, and emergency services. The primary objective of employing delivery drones is to automate the delivery process in order to increase efficiency and save expenses. The ability of delivery drones to avoid gridlock and get at the location quickly is a significant advantage. In particular for remote or difficult-to-reach places, this can considerably cut down on delivery time and expense. Last but not least, delivery drones can be employed in emergency services to swiftly and effectively bring medical supplies, gear, and personnel to disaster areas or other emergency circumstances. The idea would include creating unmanned aerial vehicles (UAVs) that could fly to a certain place, deliver packages, and then fly back to a warehouse or distribution center.

I. INTRODUCTION

Pharmaceutical UAVs (Unmanned Aerial Vehicles), often known as medical drones, are unmanned aircraft designed and equipped to transport medical supplies, pharmaceuticals, and other healthcare-related items to remote or challenging-to-reach regions. These UAVs are becoming more and more well-liked because they provide life-saving medical supplies quickly and efficiently, especially in emergency situations where access to medical facilities is limited. Pharmaceutical UAVs are equipped with cutting-edge technology, including as GPS, sensors, and cameras, allowing them to easily reach remote sites and manoeuvre through difficult terrain. Also, they are designed to maintain a suitable temperature for the delivery of medical supplies that require a specific temperature, including blood and vaccines.

➢ *Existing System:*

Drone delivery systems will keep track of the consumer's current location and guarantee that the right person and place will receive the package. GPS A drone delivery system will use GPS to find the customer, identify their current location, and deliver the package properly and on-time, according to the delivery date. The drone will have built-in GPS, and a live tracking device will locate the user's device. The drone will pick up the package from the warehouse that is closest to the delivery area; there will be a main warehouse and some sub-warehouses. It will function like any home delivery app, allowing both the consumer and the dispatcher to track the package's real-time whereabouts.

➢ *Drawbacks:*

The existing system design does not have temperature monitoring feature and authentication for customer order verification.

➢ *Proposed System:*

The proposed technology accomplishes the delivery using quadcopter drones. A web application is used to set the destination. The DHT11 sensor and Raspberry Pi Cam will be used by the management to monitor the temperature and surroundings, respectively. When a user registers to open an account, they must authenticate themselves. The proposed drone, in contrast to the AR Drone 2.0, can support up to 150 grammes of weight. GPS (Global Positioning System) is necessary for unmanned aerial vehicles in order for the pilot to be able to operate them remotely and for autonomous flight without a pilot.

➢ *Advantages:*

- It can monitor the temperature of medicines which need to kept at certain temperature.
- Live stream video from Pi cam for surveillance.
- The system design has both website and customer order (OTP) authentication.

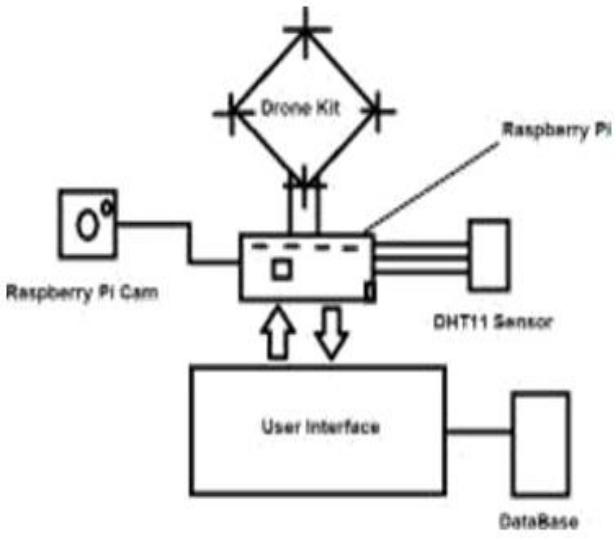


Fig 1 Architecture of the Proposed System

II. EXPERIMENTAL TOOLS

➢ *Adrupilot APM 2.8*

Based on the Arduino Mega platform, Ardupilot Mega (APM) is a high-quality IMU autopilot. Fixed-wing aircraft, multirotor helicopters, and conventional helicopters can all be piloted with this autopilot. It is a complete autopilot with the ability for way-point-based navigation, autonomous stabilisation, and two-way telemetry using Xbee wireless modules. supporting 4 serial ports and 8 RC channels.

➢ *Raspberry Pi 4 Model B*

The Raspberry Pi Foundation and Broadcom collaborated to create a line of compact single-board computers (SBCs) called Raspberry Pi. The initial focus of the Raspberry Pi project was to encourage the study of fundamental computer science in classrooms and in underdeveloped nations. The initial model sold outside of its intended market for applications like robotics and was more widely used than planned. Due to its low price, modular construction, and open design, it is extensively employed in a variety of fields, including weather monitoring. Because to its support of the HDMI and USB standards, computer and electronic enthusiasts frequently utilise it.

➢ *Raspberry Pi HQ Camera*

The Raspberry Pi HQ camera outperforms the current Camera Module v2 which is used to take the sharp pictures with a UAV in terms of resolution (12.3 megapixels compared to 8 megapixels) and sensitivity (almost 50% more area per pixel for increased low-light performance).

➢ *Node MCU*

Node MCU is an open source firmware which is used for open source prototyping board designs. Node and MCU are combined to form the moniker "NodeMCU" (micro-controller unit). In a strict sense, "Node MCU" only refers to the firmware and not the related development kits. The designs for the prototyping boards and firmware are also open source. The Lua programming language is employed by the firmware. The firmware was created using the Espressif Non-OS SDK for ESP8266 and is based on the eLua project. It makes extensive use of open source programmes like SPIFFS and lua-cjson. Users must choose the components necessary for their project and create a firmware specific to their requirements due to resource limitations. Moreover, support for the 32-bit ESP32 has been included.

➢ *Arduino IDE*

The Arduino Integrated Development Environment, also known as the Arduino Software (IDE), includes a text editor for writing code, a message box, a text console, a toolbar with buttons for basic functions, and a number of menus. In order to upload programs and communicate with them, it connects to the Arduino hardware.

➢ *Mission Planner*

A ground control station for ArduPilot is called Mission Planner. It offers assistance with setup, flying, and reviewing recorder flights.

➢ *Flask*

A Python package called Flask serves as a web framework that makes it simple to create web apps. Its core is compact and simple to extend; it's a microframework without an object relationship manager or similar capabilities.

➢ *MySQL*

Structured Query Language (SQL), which is a popular language for maintaining and accessing database entries, forms the foundation of MySQL, a relational database management system. Under the terms of the GNU licence, MySQL is free and open-source software. It is supported by Oracle Company.

III. OUTPUT

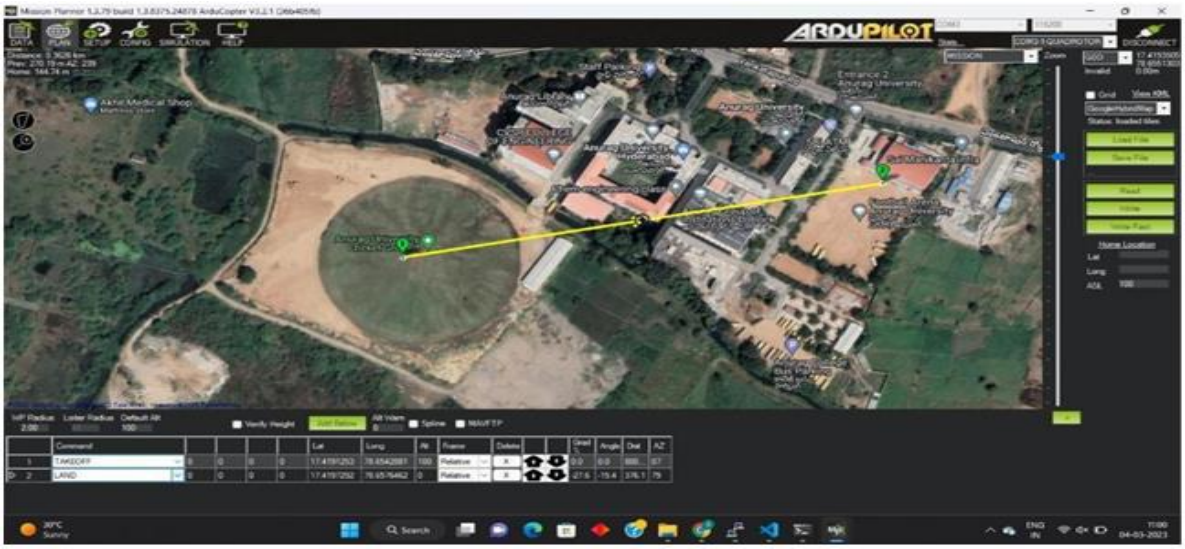


Fig 1 Calibrating Drone

Calibrate the drone using Mission Planner before launching the drone to ensure proper flight and stability.

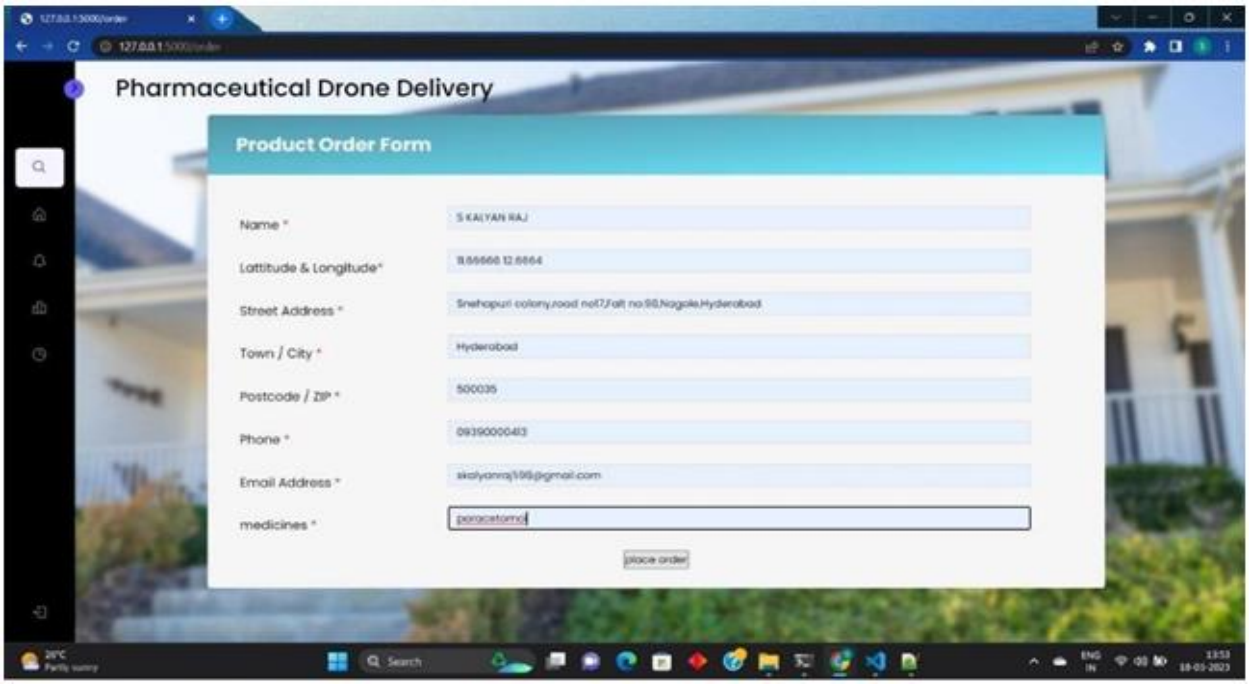
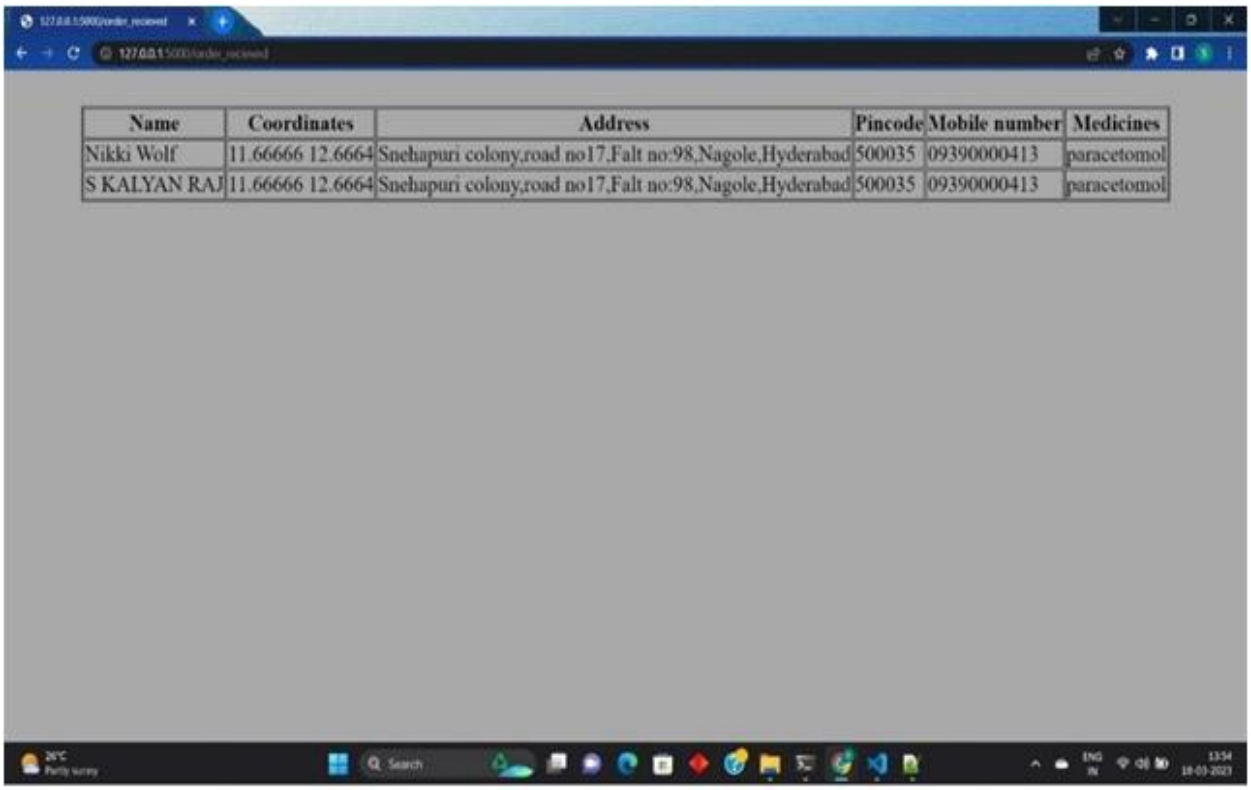


Fig 2 User Order Page

User logs in through his account and orders the required medicines which will be sent to the admin page and stored in the database.



Name	Coordinates	Address	Pincode	Mobile number	Medicines
Nikki Wolf	11.66666 12.6664	Snehapuri colony,road no17,Falt no:98,Nagole,Hyderabad	500035	09390000413	paracetomol
S KALYAN RAJ	11.66666 12.6664	Snehapuri colony,road no17,Falt no:98,Nagole,Hyderabad	500035	09390000413	paracetomol

Fig 3 Orders Received by Admin

Admin views the orders and inputs the coordinates into the drone along with medicines.

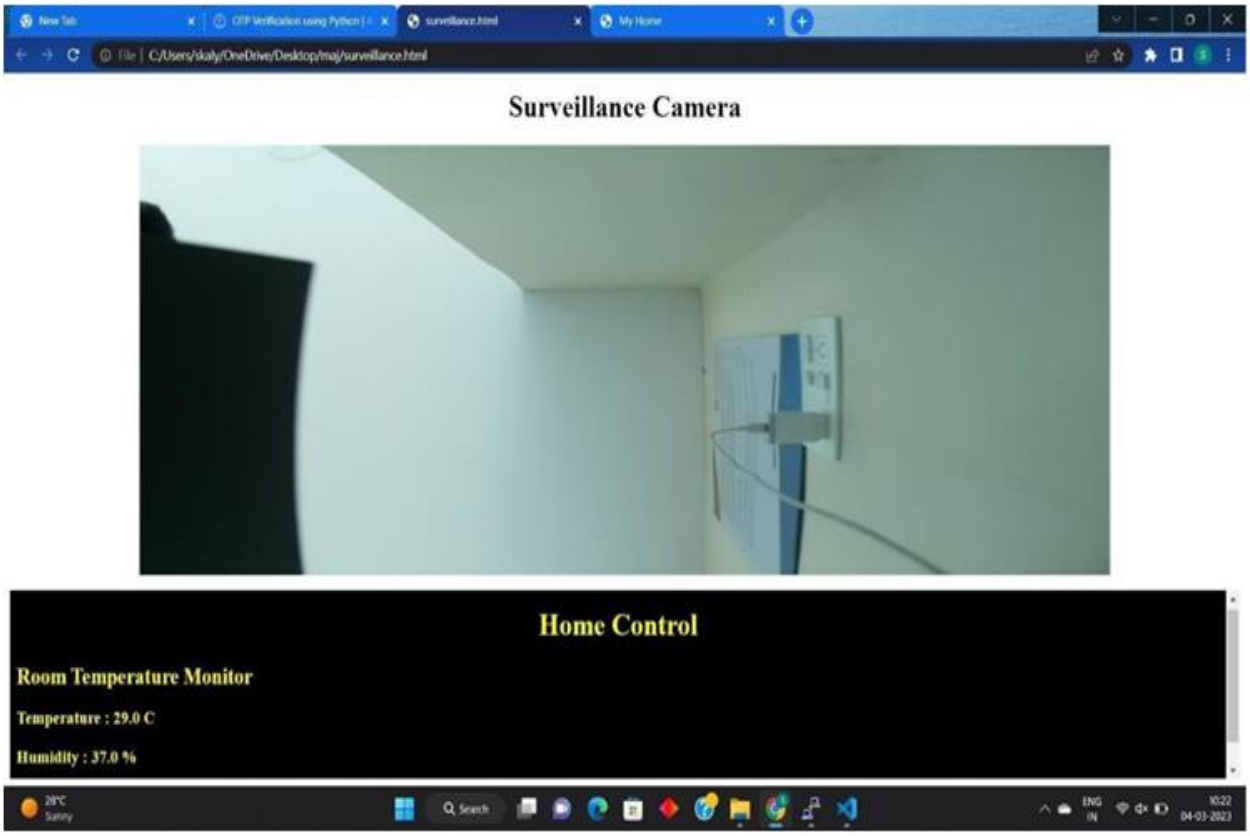


Fig 4 Surveillance and Temperature Monitoring

Monitoring the drone through the camera and making sure the temperature is adequate for the medicines using DHT11 sensor.

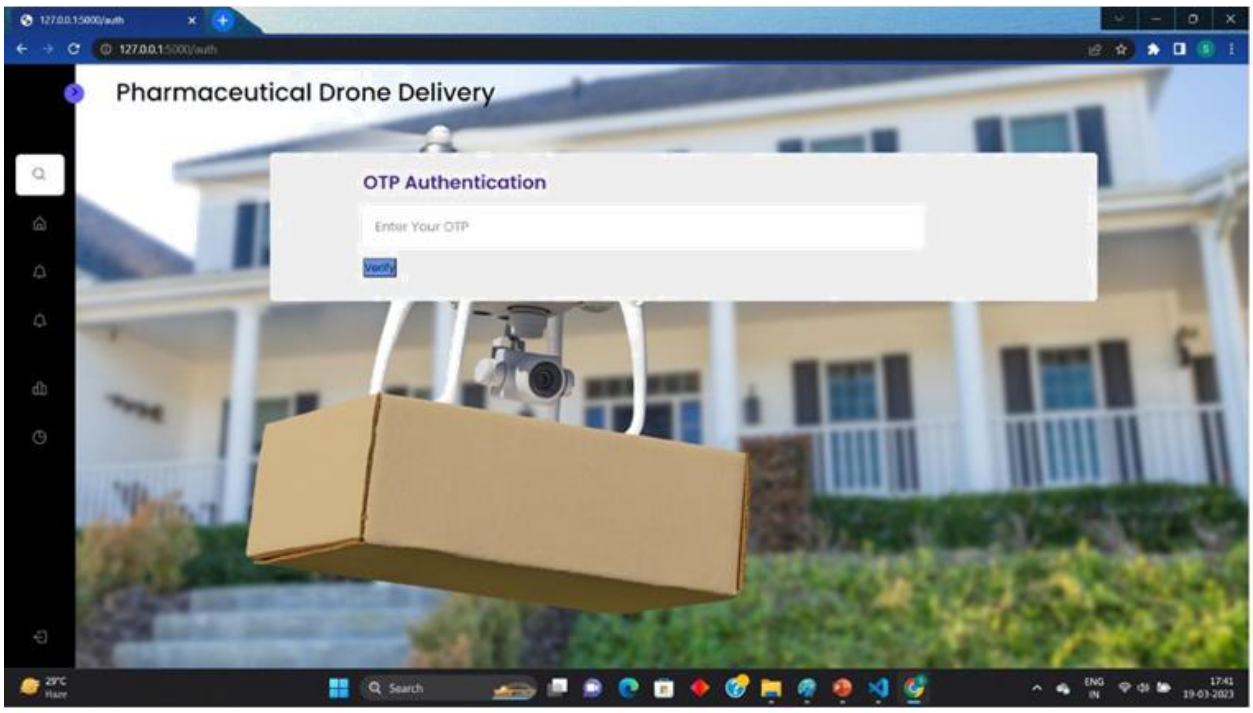


Fig 5 OTP Authentication

When the drone reaches the location, it asks for customer authentication to deliver the package.

Fig 6 Drone

Drone starts flying at a certain altitude when the coordinates are given in the website.

IV. CONCLUSION

In conclusion, pharmaceutical UAVs have the ability to significantly enhance healthcare access and supply chain management, particularly in distant or difficult-to-reach places. They provide a dependable, affordable, and effective way to provide medical supplies and healthcare services, as well as gather information on disease outbreaks and track the transmission of disease. Yet, technological constraints including flight time and cargo capacity, as well as regulatory and safety issues, continue to restrict the usage of pharmaceutical UAVs. To overcome these issues and create more sophisticated pharmaceutical UAVs that can function safely and effectively in a variety of settings and situations, more study is required. Pharmaceutical UAVs are a fascinating area of research and development that, despite these obstacles, has the potential to revolutionize the healthcare sector. With sustained innovation and investment, pharmaceutical UAVs have the potential to make a significant contribution to improving healthcare outcomes and closing the healthcare access gap, particularly in vulnerable and marginalized regions.

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