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Drone-Assisted Secure Healthcare with AI/ML Algorithm and Big Data Analytics for 6G Wireless Communication in the Future

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Abstract: *Over the next ten years, expect to witness the emergence of a Sixth Era (6G) of innovation owing to the explosive expansion of 5G applications and rising demand for even faster communication solutions. Many researchers predicted that the 6G remote arrangement standard may appear around 2030. The Sixth Era (6G) organization, which is anticipated to be the next major amusement changer in the media transmission sector, is now the focus of attention in both academia and business. The use of rambles in healthcare will further help to lower healthcare expenditures. The need for expensive ground transportation is eliminated by using rambles to deliver the medical supplies. Additionally, the use of rambles in the inquiry and collecting of therapeutic information will reduce the need for expensive human labour. As the information gathered can be easily and swiftly analysed, this will also reduce the time and costs associated with therapeutic drugs. Long-term improvements in healthcare outcomes and lower healthcare expenditures will follow from this. Numerous organizing hubs and terminal devices provide services for use in the healthcare industry, but this requires a spine system to consider the time-consuming advantage. For future 6G age healthcare frameworks using ramble by machine learning computations with big data. Without being explicitly altered, the framework may provide the ability to memorize and advance spontaneously through machine learning from experience. AI can accurately recognize data, treatment approaches, and generally produces superior, quiet outcomes. It is essential to verify their quality and identify the appropriate linkages for big data analytics to be useful inside the healthcare industry. to ship haematological supplies, defibrillators, and immunizations via drone. The reference layered communication system for hubs and devices in real-time communication, which is part of the suggested approach, demonstrates cutting-edge healthcare application for persuasive treatment and clever integration of benefit provided by 6G distant systems.*

Keywords: 6G technology, 5G technology, Drone, Machine Learning algorithms, Big data, Healthcare.

I. INTRODUCTION

The well-being data innovation (IT) incorporate encouraging communication between well-being care suppliers; progressing medicine security, following, and announcing; and advancing quality of care through ramble to and adherence to rules utilizing 6G. The 6G robotization frameworks will give exceedingly dependable, versatile, and secure communications utilizing high-data-rate and moo idleness systems. The 6G framework will also arrange astuteness since it guarantees error-free information exchange without any information misfortune between transmission and gathering.

1.1 6G Wireless Network

By 2030, the projected 6G communication technology may have surpassed all current methods of communication. It will rule too many distinct segments, not so much the health sector. Healthcare is one of the many sectors that 6G is predicted to change. Healthcare will be completely AI-driven and regulated by 6G communication innovation, which has the potential to transform how we decide what to do with our lives. The main barriers to health care right now are

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time and space, and 6G will be able to get over these limitations. Additionally, 6G will be shown to be a game-changing breakthrough for the healthcare industry. As a result, from this vantage point, we envision a healthcare infrastructure for the era of 6G communication innovation. To improve our quality of life, various underutilized strategies must also be presented. These include Quality of Life (QoL), Clever Wearable Devices (IWD), Brilliant Web of Restorative Things (IIoMT), Hospital-to-Home (H2H) administrations, and Underutilized Trade Show. We further explore the role that 6G communication innovation plays in telesurgery, the plague, and pandemics. The current direction of the sophisticated healthcare system contains drawbacks including the potential for disappointment, security, and security. Healthcare will be entirely AI-driven and dependent on 6G network developments, which will alter how we make decisions about our way of life. To get there, creative solutions must be offered to advance our way of life, including smartly wearable technology, hospital-to-home services, a clever web of therapeutic items, quality of life (QoL), and contemporary business methods. Three main elements make up the proposed smart healthcare framework: hospital environment, remote medical treatment.

1.2 Drone (UAV)

The use of 6G healthcare rambles will improve the healthcare sector in several ways. Rambles will be able to obtain and analyse therapeutic data more quickly and precisely because to the expanded capabilities of 6G technologies and the faster information transmission speeds they provide. This can help provide much better healthcare services to remote areas, which are frequently underserved. The use of rambles in healthcare will also help to bring down healthcare expenditures. The need for expensive ground transportation is eliminated by using rambles to bring healing materials. Additionally, the use of rambles will reduce the need for costly human labour in the collecting and analysis of therapeutic information. As the information gathered can be easily and quickly analysed, this will also reduce the time and costs associated with restorative drugs.

II. ARTIFICIAL INTELLIGENCE

From 2030 onward, 6G may be a projected advancement in communication that makes wireless healthcare a reality. There is a lot of optimism that the use of artificial intelligence (AI) will significantly improve all aspects of healthcare, from diagnosis to therapy. Most people agree that AI tools won't replace the job of physicians and other healthcare workers as such; rather, they will stimulate and improve human labour. AI is prepared to assist healthcare professionals with a variety of tasks, including regulatory process, clinical documentation, ongoing outreach, and specialized assistance with picture analysis, restorative device robotization, and persistent observation. A few of the most significant applications of AI in healthcare will be covered in this chapter, including those that are directly connected to healthcare as well as those that are part of the healthcare value chain, such Medicare advances and assisted living environments. The task of translating information that emerges in the form of an image or a video might be difficult. To be able to recognize therapeutic events and, on top of that, to efficiently learn underused substances as new research and data become available, specialists in the field must train for a very long period. In any event, there is a severe shortage of experts in the industry and the need is always growing. As a result, a new strategy is needed, and AI promises to be the tool that can fill this vacuum in the market.

III. MACHINE LEARNING

Utilizing ML-enabled tools to analyse rehabilitative reports and images, machine learning in healthcare may be used for better decision-making. For instance, a machine learning computation can do superior design recognition and predict a condition based on training in similar circumstances. A prominent research area leading to the construction of a system that mimics human intellect is machine learning innovation. It is possible to relate machine learning to the healthcare industry. Although technology cannot replace actual physicians, it can provide better solutions to healthcare problems. The first and most important area to consider while developing computational methods is machine learning. In this chapter, we review recent research on advancing healthcare arrangements using machine learning innovation. However, we also consider limitations, difficulties, and opportunities in the healthcare sector using machine learning innovation. Machine learning technologies may be used to determine, speculate on, and ultimately provide therapy for the identified ailment in the healthcare industry. Medical professionals can benefit from machine learning innovation by giving them

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access to speedier and more precise arrangements. Users will understand the fundamentals and dynamic improvements inside the cutting-edge machine learning-based framework for healthcare in this chapter. In any event, the innovative scenario created by the evolving nature of medicinal research and innovation requires careful and comprehensive consideration. This chapter highlights innovative and excellent research-work offers in healthcare that are supported by machine learning techniques. Healthcare firms are focusing on improving the management of machine learning since it takes a significant amount of data into account every day.AI/ML-enabled channel estimation and range management will create opportunities for fully utilizing the extraordinary performance of ultra broadband techniques like terahertz communications. Additionally, by using AI/ML-based techniques, issues brought on by extremely large-scale access in terms of vitality and security may be mitigated. Additionally, judicious asset allocation and administration will guarantee the supreme consistency and moo inactivity of services. This article discusses some cutting-edge approaches based on AI/ML and its use in 6G to support ultra-broadband, ultra-massive access, and ultra-reliable and effective idleness management.

IV. BIG DATA

Massive data are crucial for information mining and analysis to identify disease causes in the diagnosis process. Preventative medicine for preventing illness via preventive analysis and research into inherited, lifestyle, and societal factors, pharmaceutical accuracy for Utilizing all available data to provide highly personalized treatment, doing restorative research for data-driven therapeutic and pharmaceutical inquiry to treat sickness and locate underutilized meds, reduction of harmful pharmaceutical events for Using a wealth of data to identify medical errors and identify potential adversarial investment funds, Reduced cost for Distinguished evidence of esteem that divests superior calm results for long-term investment funds, populace health for analysing vast amounts of data to identify disease trends and medical practices based on socioeconomic, geological, and socioeconomic factors.

V. HEALTH CARE

The main drawback of open healthcare is delays and long waits. The health care authorities delay many individuals due to lengthy wait times. Excellent service, Moo Healthcare wireless communication requires maintaining the safety, security, and privacy of patient information. Electronic protected health information, or EPHI, demands extremely high levels of safety and security. Encryption of data. Excellent authentication. Healthcare 6G rambles have a bright future. The speed and functionality of rambles will significantly increase once 6G systems become more widely available. This will enable rambles to obtain and analyse medical data more quickly and accurately, enabling them to provide better healthcare services to remote areas. The use of rambles in the healthcare industry will also help to lower healthcare expenditures. The use of 6G healthcare networks will also give healthcare suppliers new opportunities. Drones can be used to deliver therapeutic services remotely, enabling healthcare providers to reach more patients. This will result in improvements in healthcare outcomes and lower healthcare expenditures.

VI. RELATED WORK

The shortcomings of the 5G mobile system in enabling Internet of Everything (IoE) applications are currently driving research efforts around the world to concentrate on the sixth generation (6G) wireless technology. IoE has huge potential that is always expanding. As the fifth industrial revolution approaches, IoE projects are evolving into more complicated industrial Internet of Everything (IoE) initiatives that are ultimately transforming into a significant technology for all industries that is providing new opportunities. This work is a synthesis of a thorough literature evaluation that advances information to enable the creation of theories in the areas of 6G, IoT, IoE, and IIoE. A brand-new theoretical foundation for the 6G-enabled IIoE system—henceforth referred to as 6GIIoE—was created for the first time. The optimal methodology for this growing discipline's study is judiciously sequential.[15].

The next-generation cellular network will attempt to overcome the limitations of current Fifth Generation (5G) networks and will be prepared to address future challenges. Currently, academia and industry are focusing on the Sixth Generation (6G) network, which is expected to be the next big game changer in the telecom industry. Because of the COVID'19 outbreak, the entire world has shifted to virtual meetings and live video interactions ranging from healthcare

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to business to education. However, due to a lack of supporting technology, we are unable to provide an immersive experience. Experts predict that, beginning with the post-pandemic era, the performance requirements of technology for virtual and real-time communication, as well as the rise of several verticals such as industrial automation, robotics, and autonomous driving, will increase.[16].

Most healthcare providers are unaware of the extraordinary opportunities for implementation in healthcare which can be enabled by 5G wireless networks. 5G created enormous opportunities for a myriad of new technologies, resulting in an integrated 5G 'ecosystem'. Despite the enormous new opportunities in healthcare, medicine is slow to change, as evidenced by the scarcity of new, innovative applications based on this ecosystem. As a result, there is a need to "avoid technology surprise" - both laparoscopic and robotic assisted minimally invasive surgery have been delayed for years because the surgical community was either unaware of or unwilling to accept a new technology.[17].

The next generation of telecommunications networks will incorporate the most recent technological advances and emerging advancements in telecommunications connectivity infrastructures. In this article, we will look at how the fifth generation (5G) mobile network and internet of things technologies are transforming and convergent, leading to the emergence of smart sixth generation (6G) networks that will use AI to optimize and automate their operation.[18].

Drone technology has advanced rapidly in recent years. As the number of them increases and the missions involving Drones vary, new research issues emerge. An overview of existing research areas in the drone domain has been presented, along with the nature of the work classified into various groups. These research areas are divided into two main streams: Technological and operational research areas. Technology research is divided into two categories: onboard and ground technologies. Organizational level, brigade level, user level, standards and certifications, regulations, and legal, moral, and ethical issues are the research areas in operations. This overview is intended to serve as a starting point for fellow researchers new to the domain, to assist researchers in positioning and identifying their research.[19].

In recent years, the drone domain has seen rapid development. New research issues emerge as the number of drones increases and the missions involving them vary. An overview of existing research areas in the drone domain has been presented, including the nature of the work classified into different groups. These research areas are classified into two categories: technological research and operational research. Technology research is divided into onboard and ground technologies. Organization level, brigade level, user level, standards and certifications, regulations, and legal, moral, and ethical issues are the research areas in operations. This overview is intended to serve as a starting point for fellow researchers who are new to the domain, as well as to assist researchers in positioning their research and identifying potential collaborators.[20].

Big Data analytic has the potential to improve patient outcomes, advance and personalize care, strengthen provider-patient relationships, and reduce medical spending. This paper provides an overview of healthcare data, big data in healthcare systems, and the applications and benefits of Big Data analytic in healthcare. We also discuss big data technological advancements in healthcare, such as cloud computing and stream processing. Big Data analytic challenges in healthcare systems are also discussed.[21].

Drone have had a rapid escalation in manageability and affordability, which can be exploited in healthcare. We conducted a systematic review of the use of drones for medical purposes. Medline, Embase, Global Health, Scopes, CINAHL, and SciELO were all searched. If the population included human subjects, the intervention was the use of Drones, and there was a health-related outcome, experimental studies were chosen. Of 500 results, five met inclusion criteria during an initial search. An updated search yielded four additional studies. For systematic reviews, nine studies were included, all from high-income countries: four addressed out-of-hospital cardiac arrest emergencies, three evaluated drones for identifying people after accidents, one used drone to transport blood samples, and one used drones to improve surgical outcomes.[22].

Healthcare data analysis has emerged as one of the most promising research areas in recent years. Healthcare data comes in many forms, including clinical data, Omics data, and sensor data. Clinical data includes electronic health records which store patient records collected during ongoing treatment. Omics data is a type of high-dimensional data that includes genome, transcriptome, and proteome data. Sensor data is collected from various wearable and wireless sensor devices. To handle this raw data manually is very difficult. Machine learning has emerged as an important tool for data analysis. Machine learning employs a variety of statistical techniques and advanced algorithms to predict the

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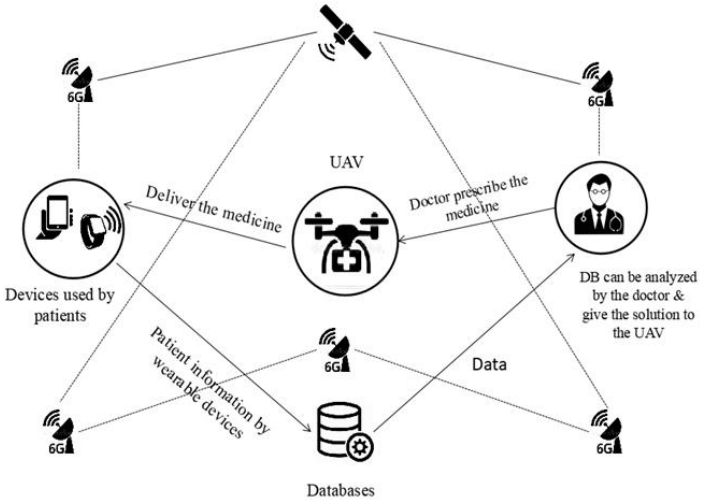
outcomes of healthcare data more precisely. Different types of algorithms, such as supervised, unsupervised, and reinforcement learning, are used in machine learning.[23].

Reference	Privacy	Security	Efficiency	Accuracy	Low Latency	Power Consumption	Stable
Fatimah Al-Jawad et al (2022)	Yes	Yes	No	No	No	No	No
Parvathaneni Naga Srinivasu et al (2022)	No	No	Yes	No	No	Yes	No
Shimaa Abdel Hakeem et al (2022)	No	No	No	Yes	Yes	No	No
Faiyaz Ahmed et al (2022)	Yes	Yes	No	No	No	No	Yes
Mohammed Najah Mahdi et al (2021)	No	No	Yes	No	Yes	No	No
Lidong Wang et al (2019)	Yes	Yes	Yes	No	No	No	No
Arwinder Dhillon et al (2019)	No	No	No	Yes	No	No	No
Carrillo Larco et al (2018)	No	No	No	Yes	No	No	Yes

VII. SYSTEM MODEL



(1) Sensing Module:
Real-time body signals collection from a user's smart portable and the wearable observing device happens in this layer. A smartphone can collect a patient's action information. The information is additionally collected from users in clinics and after that the 6G organize sends all assembled data to the enormous restorative information cloud.

(2) Personalized Module
This layer utilizes persistent details like heart rate, blood weight, blood oxygen level, body temperature, ECG (optional) and breathing rate into cutting edge machine learning models for precise malady examination and expectation.

(3) Data Sharing Module
Patients can share the data to the application in case of a crisis. The Specialist can track different patients in real-time for assistance. Patients exist in isolated locales and utilize different clouds to store their information.

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Algorithm:

Data Transfer Among the nodes

Input parameters include: data, data offset, key, and trans id.

Data exchange: Boolean value (success/failure).

Begin:

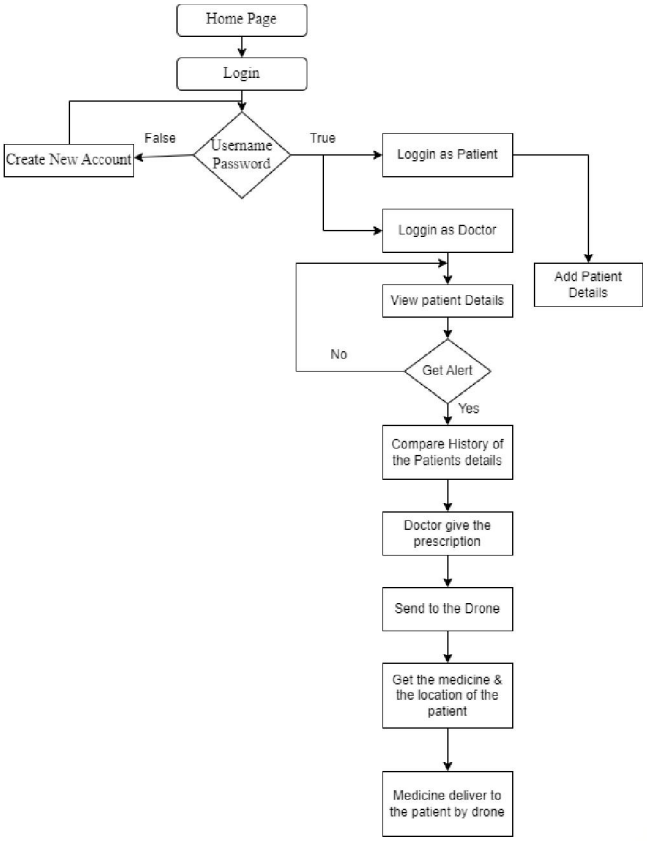
```
while (terminal auth is true)
        if (data_available is false)
          throw;
 else
                update time stamp;
if (connect net-node is successful)
                send [data, key, data offset];
              update.ledger(trans id);
               return true
            else
              return false
            end if else
        end if else
```

End

(4) Delivery Module

A delivery drone is an unmanned airborne vehicle (UAV) utilized to transport bundles that incorporate medical supplies and other goods. Any implies or handles for passing on an item or benefit to an understanding in unreachable regions

VIII. IMPLEMENTATION FLOWCHART



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Algorithm:

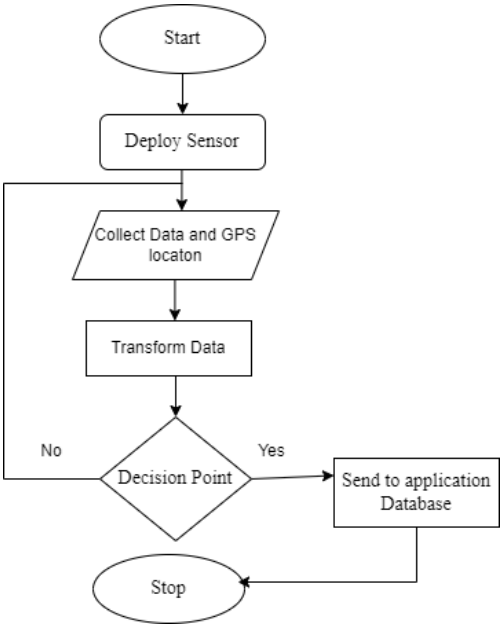
Step 1: Start the process
Step 2: Get into the home page.
Step 3: Login to the account. If new user, Then Create new account.
Step 4: Put Username and Password.
Step 5: If you are patient, then login as patient.
Step 6: Else login as doctor
Step 7: As patient, Add the details in the corresponding account .
Step 8: As a Doctor, View patient details.
Step 9: Get alter from the patient by their networking devices.
Step 10: Compare the patients details with the history of the patient.
Step 11: After that doctor gives the prescription to the patient through drone.
Step 12: The prescription is sent to the drone engine for delivery.
Step 13: The drone engine gets the medicine & the GPS location of the patient by its sensing module.
Step 14: After that immediately the medicine where delivers to the patient's location by the drone.

As the world continues to progress, so does technology. In recent years, drones have become increasingly popular for their ability to carry out a wide range of tasks. One such task is the delivery of medicine to patients in need. With the development of a doctor application, doctors can easily prescribe medication to patients and have it delivered to their places via drone.

Here's how the process would work:

- The patient would download the doctor application on their mobile device and create an account.
- The patient would then consult with a doctor through the app. The doctor would diagnose the patient by their history and prescribe the necessary medication.
- The doctor would then send the prescription to a nearby pharmacy, where the medicine would be packaged and prepared for delivery.
- A drone would be dispatched to the pharmacy to collect the medicine.
- The drone would use GPS technology to navigate to the patient's location.

Connection between Sensor and Application



In this, we will connect sensor to application via wireless device. It will sense the patients data and their location. Then transform the data to the decision point which is going to store in database.

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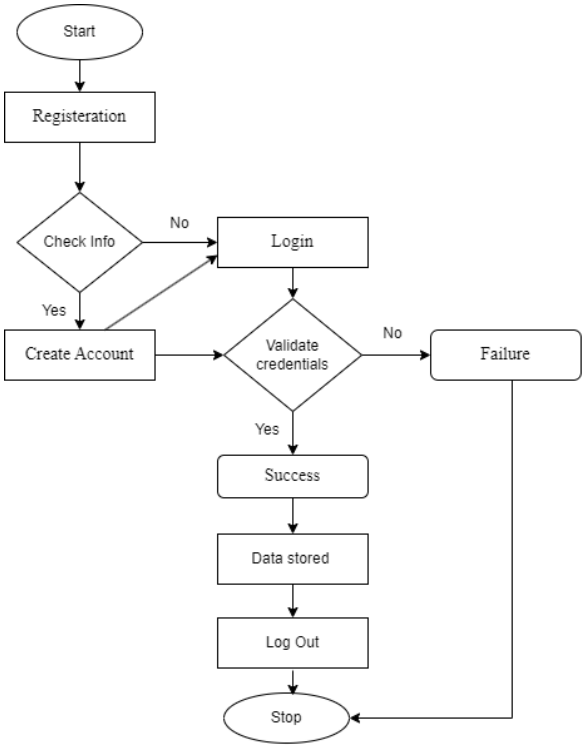
Patient data stored in DB (Application)

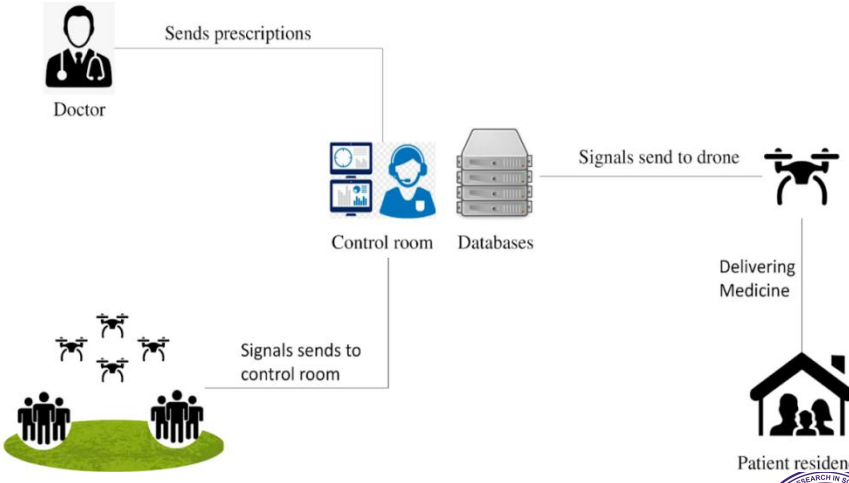


Data Viewed and Analyzed by Doctor

It is common for doctors to receive notifications about their patients, especially if they are using electronic medical records or other digital health systems. Once a doctor receives a notification about a patient, they can then access the patient's medical records and view their details, such as their medical history, medications, test results, and any other relevant information.

After reviewing the patient's details, the doctor can then analyze the information and make informed decisions about the patient's care. This may involve ordering additional tests or procedures, adjusting medications, or recommending lifestyle changes. The doctor may also consult with other healthcare professionals or specialists as needed to provide the best possible care for the patient. Overall, the goal is to use the information available to make the most accurate diagnosis and create a personalized treatment plan for the patient.

Doctor Prescription to Drone



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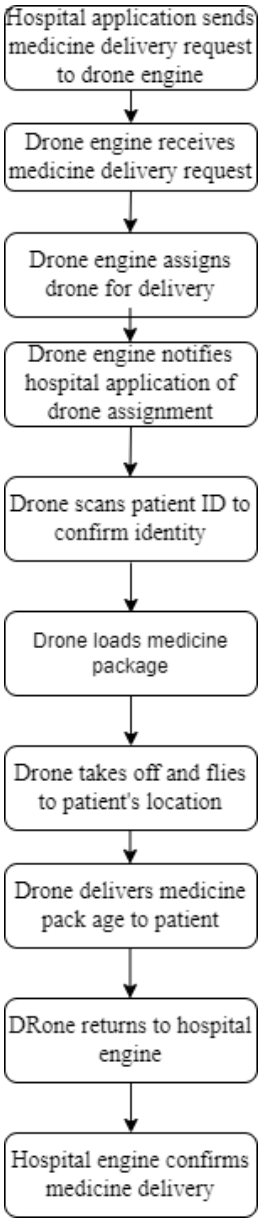
After viewing the history of patient details, the doctor writes a prescription for a patient, they can typically send it directly to a nearby pharmacy electronically. The pharmacy would then receive the prescription and begin preparing the medication for the patient. If the patient prefers to use a specific pharmacy, they can provide this information to the doctor, who can then send the prescription directly to that pharmacy. The patient may also decide to pick up the prescription themselves and take it to their preferred pharmacy. It's crucial to remember that some prescriptions might need to go through extra hoops or authorizations before the pharmacy can fill them. When a doctor prescribes medication for a drone delivery of medical supplies, the doctor will normally write a prescription for the drug, indicating the dosage and usage instructions. The prescription would then be transmitted to a pharmacy or dispensary, where the medication would be prepared and packaged for delivery. Once the medication is packaged and ready for delivery, it would be loaded onto the drone, and the drone would be programmed with the delivery information, including the patient's location and any necessary flight instructions or permissions. The drone would then fly to the designated location and deliver the medication to the patient.

Drone deliver the medicine to patient



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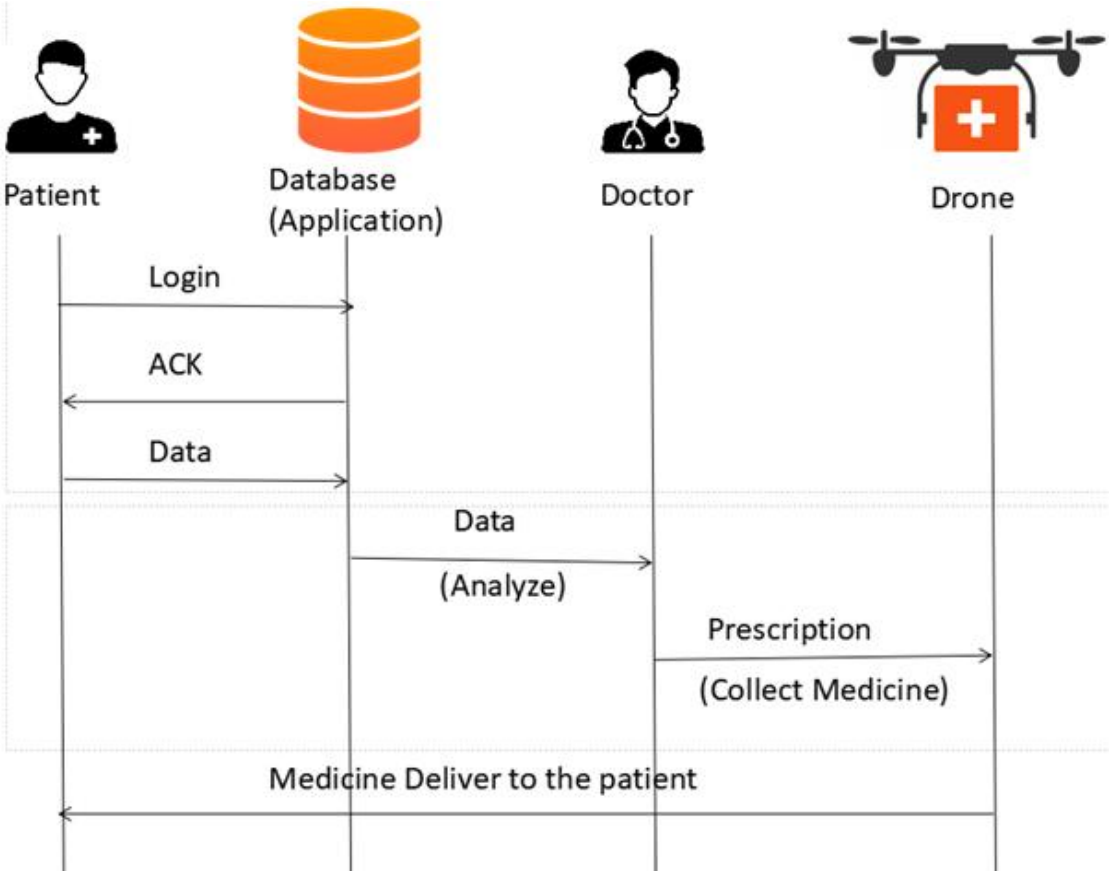
Pharmacy sends delivery requests to drone engines: The pharmacy would typically send the prescription and delivery information to the healthcare provider, who would then coordinate with the drone operator to arrange for the delivery. Drone engine receives delivery request: Once the healthcare provider has arranged for the delivery, the drone operator would receive the delivery request and prepare the drone for the mission. Drone engine assigns drone for delivery: The drone operator would select an appropriate drone for the delivery based on factors such as distance, payload, and weather conditions. Drone engine notifies hospital management of drone assignment: The healthcare provider would be notified of the drone assignment, and the pharmacy or dispensary would prepare the medication for delivery. Drone scans patient ID to confirm identity: The drone would not typically scan the patient's ID, as this would require additional equipment and technical capabilities. Instead, the patient's identity would be confirmed by the healthcare provider or pharmacy prior to the delivery. Drone loads medicine package: The pharmacy or dispensary would typically package the medication, and the drone operator would load it onto the drone. Drone takes off and flies to the patient's location: The drone would follow the designated flight path to the patient's location, guided by GPS and other sensors. Drone delivers medicine package to patient: The drone would either drop off the medication or lower it down to the ground using a winch or other mechanism. Drone returns to hospital engine: Once the delivery is complete, the drone would return to its home base. Healthcare application confirms medicine delivery: The healthcare provider or pharmacy would confirm that the medication was delivered to the patient as expected.

Message flow and decision algorithm for the system operation



Challenges of 6G

Communication technologies on data privacy and security, technological, moral, and legal concerns are described below:

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1) Protection and Security

The improvement of scrambled transmission inside and on the body proceeds. Various effective confirmation frameworks and cryptography calculations highlighting shorter key lengths are required. Moreover, extra consider is required to address biomolecules' unforeseen reactivity and unexpected disastrous results.

2) Mechanical Perspectives

Communication between body layers empowers the recovery and circulation of basic information to the cloud. Each of these a few hub sorts has altogether assorted communication prerequisites. Combining and connecting information from persistent human body checking is conceivable. Collecting information from an assorted extent of sensors extending between smaller scale to large scale.

3) Moral Viewpoints

Value in getting to healthcare forms is one of the moral challenges that requires citizens to take an interest in forms that request higher wellbeing education; subsequently, including citizens in forms as information proprietors is fundamental for driving forms morally. To maintain a strategic distance from clearing out marginalized citizens behind, a bound together administrative system must be shaped.

IX. CONCLUSION

The utilization of 6G healthcare drones has the potential to revolutionize the healthcare industry. Quicker information exchange speeds and improved capabilities of 6G systems will empower rambles to gather and analyze restorative information more rapidly and precisely. This will offer assistance in giving superior healthcare administrations to inaccessible ranges, which are frequently underserved. Also, the utilization of drones in healthcare will offer assistance to decrease healthcare costs. The implementation of 6G healthcare drones will require modern controls and arrangements to guarantee the security of patients and healthcare suppliers. Furthermore, the taking a toll of actualizing 6G healthcare drones will be a challenge. In any case, the potential benefits of 6G healthcare drones are colossal, and long term of 6G healthcare rambles is bright. The in general objective of the design would be to supply high-quality healthcare administrations to patients in farther and underserved regions, move forward healthcare results, and decrease healthcare costs. The engineering would too prioritize information security and security to guarantee that understanding information is kept secret and protected. A secure healthcare design utilizing Drone's system by AI/ML calculation with huge information for future era 6G remote organize has the potential to convert the healthcare industry by giving proficient, cost-effective, and secure healthcare services to patients in inaccessible and underserved ranges

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