THE ROLE OF DRONE TECHNOLOGY IN AGRICULTURE

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https://doi.org/10.5281/zenodo.7927731

Abstract: Drone technology is increasingly being used in agriculture to help farmers manage their crops more efficiently and effectively. Drones equipped with cameras and other sensors can provide farmers with real-time data on crop health, soil moisture, and other factors that affect crop growth and yield. One of the key benefits of drone technology in agriculture is its ability to collect large amounts of data quickly and easily, allowing farmers to make more informed decisions about how to manage their crops. For example, drones can be used to create detailed maps of crop fields, identifying areas that need more or less water, fertilizer, or pesticides. Drones can also be used to monitor crops for signs of disease or pest infestations, allowing farmers to take action before the problem becomes widespread. This can help to reduce crop losses and improve yields. Another advantage of drone technology in agriculture is its ability to cover large areas of land quickly and easily, even in difficult terrain or weather conditions. This can save farmers time and labor costs, as well as reduce the need for heavy equipment and other resources.

Keywords: Drone, Farmers, Field, Food, Hawk, Robots, Signals

РОЛЬ ДРОНОВ В СОВРЕМЕННОМ СЕЛЬСКОМ ХОЗЯЙСТВЕ

Аннотация: Технология дронов все чаще используется в сельском хозяйстве, чтобы помочь фермерам более эффективно и результативно управлять своими культурами. Дроны, оснащенные камерами и другими датчиками, могут предоставлять фермерам в режиме реального времени данные о состоянии урожая, влажности почвы и других факторах, влияющих на рост урожая и урожайность. Одним из ключевых преимуществ технологии дронов в сельском хозяйстве является ее способность быстро и легко собирать большие объемы данных, что позволяет фермерам принимать более обоснованные решения о том, как управлять своими культурами. Например, дроны можно использовать для создания подробных карт полей сельскохозяйственных культур, определяя области, которым требуется больше или меньше воды, удобрений или пестицидов. Дроны также можно использовать для наблюдения за посевами на наличие признаков болезней или заражения вредителями, что позволяет фермерам принимать меры до того, как проблема станет широко распространенной. Это поможет снизить потери урожая и повысить урожайность. Еще одним преимуществом дронов в сельском хозяйстве является их способность быстро и легко покрывать большие площади земли даже в условиях сложной местности или погодных условий. Это может сэкономить фермерам время и трудозатраты, а также снизить потребность в тяжелом оборудовании и других ресурсах.

Ключевые слова: Беспилотный летательный аппарат, Фермеры, Поле, Еда, Ястреб, Роботы, Сигналы

INTRODUCTION

In Uzbekistan, agriculture is a significant area of our economy yet, it is far shy of western nations with regards to adjusting the most recent innovations for better ranch yield.

Farmer in the world have begun utilizing horticultural robots furnished with cameras to improve the cycle of yield treatment. With the field convey at a record-breaking unreasonable and product costs at an absolute bottom in light of expanding wishes in dinner assembling and utilization, the advanced cultivating industry is at an intersection [1]. There is a more noteworthy need than any time in recent memory sooner than for ranchers and agronomists all through the globe to upgrade valuable asset oversee in response to fixing spending plans, while the "homestead to fork" development has noticeable developing pressing factor for more prominent suitable item discernibility, as clients come to be extra curious about the start of the products they purchase and the way they were developed.

Drones, also known as unmanned aerial vehicles (UAVs), are increasingly being used in agriculture to improve crop yields, reduce costs, and increase efficiency.One of the main applications of drones in agriculture is crop monitoring. Drones can be equipped with high-resolution cameras and other sensors that can capture images and data of crops from above. This data can be used to create detailed maps of fields and identify areas of crops that require attention, such as those affected by pests, diseases, or nutrient deficiencies.Drones can also be used for precision agriculture, which involves using data and technology to optimize crop production. For example, drones can be used to apply fertilizers or pesticides precisely where they are needed, reducing waste and maximizing yields. They can also be used to monitor soil moisture levels, which can help farmers manage irrigation more efficiently. Another application of drones in agriculture is in the area of livestock management. Drones can be used to monitor herds of animals, identify sick or injured animals, and track their movements. Overall, the use of drones in agriculture can help farmers make better decisions, increase efficiency, and improve crop yields, while reducing costs and minimizing environmental impact.

LITERATURE SURVEY

A. AGRAS T20 (Intelligent and powerful) T20 haspowerful spraying capacity,it can perform autonomous functions in spraying such as in terraces, farmlands, and also in the big orchards. T20 exists with the feature of Omnidirectional digital radar it is very helpful to keep it steady and stable for the next step or next level of safety for the drone at a highly efficient result [3]. IthasFirst Person View(FPV)camera with a 5.5-inch ultra-bright displaywhichsupports external battery packs which can lastmore in comparisonto another controller. Water and dust resistant device, its design optimized to get a 20% better over a uniformly spraying droplet of fertilizer effective spray of 7 meters. T20 feature is a new four-channel electromagnetic flowmeter (EFM) and able to monitor 4 hoses. A drone can change direction to protect itself when there is obstacles and trees or flying over terrain at a high level of optimum operational safety. The DJI AGRAS T20 is optimized to work in the most complicated environments using off-the-grid power and also it can take upto 20kg of payload The DJI AGRAS T20 can also withstand splashes when cleaning the aircraft body with water, drone packs impressive features into a modular and portable design, making it accessible and scalable for farmers.

B. PHANTOM 4 RTK (Visionary intelligence) The most compact and smooth with absolute horizontal accuracy and providing real time positioning data. Phantom 4 RTK is able to work at a low-level altitude. RTK stands for real time kinematic that uses carrier based ranging technique that allows more precise magnitude by a code processing. Data is collected accurately with the help of Phantom 4 RTK by spectral collection.

Fig. 1. AGRAS T20

Accuracy over map connected via WiFi with a faster processing. It's a quadcopter which is designed to get centimeter level mapping of image met data with a better accuracy [5].Key features: Built on the proven Phantom 4 Pro mapping platform, Survey-grade RTK GNSS (L1/L2), D-RTK-2. Mavic 2 Enterprise Advanced and its cutting-edge thermal and RGB cameras. It also brings centimeter-level positioning accuracy through its RTK module.

Fig. 2. PHANTOM 4 RTK

UNMANNED AERIAL VEHICLE

An unmanned aerial vehicle (UAV), also known as a drone, is a type of aircraft that does not require a human pilot on board. Instead, UAVs are controlled remotely by a human operator or can operate autonomously using pre-programmed instructions. UAVs come in various sizes, shapes, and designs, and can be used for a range of applications, including military operations, surveillance, search and rescue, scientific research, and commercial purposes such as aerial photography and delivery services. UAVs have many advantages over manned aircraft, including the ability to operate in hazardous environments, conduct missions that may be too dangerous for human pilots, and stay aloft for extended periods of time. However, they also present unique challenges related to safety, security, and privacy that must be addressed in their design and operation.

ADVANTAGES OF DRONE

Unmanned aerial vehicles (UAVs) have several advantages over manned aircraft, including:

- Cost: UAVs are generally less expensive to operate than manned aircraft. They do not require a human pilot on board, which eliminates the need for crew-related expenses such as salaries, benefits, and training.
- Safety: UAVs can be used in situations that are too dangerous for human pilots, such as hazardous environments or areas that are exposed to radiation or toxic chemicals.
- Endurance: UAVs can stay aloft for extended periods of time, providing continuous surveillance, monitoring, or data collection without the need for refueling.
- Accessibility: UAVs can access areas that are difficult or impossible to reach by ground or manned aircraft, such as remote or rugged terrain, or areas that are inaccessible due to natural disasters or other emergencies.
- Flexibility: UAVs can be quickly deployed and reprogrammed to perform a wide range of missions, from military operations to civilian applications such as agriculture, mapping, and inspection.
- Efficiency: UAVs can be designed to operate autonomously, using pre-programmed flight plans and onboard sensors and cameras to complete missions with high accuracy and efficiency.

CONCLUSION

Drone technology has the potential to revolutionize the agriculture industry by providing farmers with a cost-effective and efficient way to monitor crops, detect problems, and improve yields. Drones equipped with high-resolution cameras and sensors can capture detailed images and data about crop health, soil moisture, and other key parameters, enabling farmers to make informed decisions about irrigation, fertilization, pest management, and other aspects of crop production. In addition, drones can reduce the time and labor required for traditional crop monitoring methods, such as ground-based scouting or manned aircraft flights, thereby increasing efficiency and productivity. They can also access areas that are difficult or dangerous to reach by ground, such as steep slopes or flooded fields.

Despite these benefits, the widespread adoption of drone technology in agriculture faces several challenges, including regulatory barriers, technical limitations, and the need for specialized training and expertise. However, as the technology continues to evolve and become more accessible, it has the potential to transform the way farmers manage their crops and improve food production around the world.

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