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Review on Identifying and Detecting Real –Time Objects Using Drone Camera

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Abstract: The abstract of a paper on a "drone camera" might go something like this: "This paper introduces a novel underwater camera system, termed as the 'drone camera,' designed to capture high-resolution images and videos in aquatic environments. The camera employs advanced waterproofing techniques and cutting-edge imaging technology to withstand underwater pressures while delivering clear and vibrant visuals. Additionally, the drone camera integrates features such as depth sensing and real-time image processing for enhanced underwater photography. The design, development process, and performance evaluation of the drone camera are discussed in detail, highlighting its potential applications in marine research, underwater exploration, and recreational activities text.

Keywords: Deep learning , Object tracking , Surveillance , Agriculture , Environmental monitoring , Challenges , Applications .

I. INTRODUCTION

A drone camera is a type of unmanned aerial vehicle (UAV) equipped with a camera for capturing aerial imagery or video footage. These cameras can be remotely controlled or programmed to fly autonomously, providing versatile perspectives for photography, videography, surveillance, mapping, and various other applications. Drone cameras have become popular in industries such as filmmaking, agriculture, construction, real estate, and emergency services due to their ability to capture high-quality footage from unique angles and locations. A drone, in a technological context, is an unmanned aircraft. Drones are more formally known as unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UASes). Essentially, a drone is a flying robot. The aircraft may be remotely controlled or can fly autonomously through software-controlled flight plans in their embedded systems working in conjunction with on board sensors and GPS.

In the recent past, UAVs were most often associated with the military, where they were used initially for anti-aircraft target practice, intelligence gathering and then, more controversially, as weapons platforms. Drones are now also used in a wide range of civilian roles ranging from search and rescue, surveillance, traffic monitoring, weather monitoring and fire fighting to personal drones and business drone-based photography, as well as videography, agriculture and even delivery services.

Origin of a drone can be traced with special techniques to provide relevant information to the military. The very first aircraft with reusable type radio control mechanism was designed in the 30s and it worked like a base model for all new advancements of today's world. Later, the military drones were developed with classic sensors and camera units and now they have been fixed inside missiles too. With so much advancement in technology, now you can easily find so many variants of drones. Few are used for military applications but others are finding the potential role in many big companies.

As per a recent new update, Google and Amazon are developing their drones so that parcels can be delivered by air with ease. One more interesting concept is presented by Facebook as they are thinking to develop some giant drones that can carry the signal to remote locations for direct internet access. Drones in today's world have also been an important part of the film industry and news reporters are also using them to carry information from inaccessible locations.

A typical unmanned aircraft is made of light composite materials to reduce weight and increase manoeuvrability. This composite material strength allows military drones to cruise at extremely high altitudes.

UAV drones are equipped with a different state of the art technology such as infrared cameras, GPS and laser (consumer, commercial and military UAV). Drones are controlled by remote ground control systems (GSC) and also referred to as a ground cockpit.

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IMAGE

Several components are required for a drone camera setup:

1. Drone: The main flying platform equipped with motors, propellers, flight controllers, and navigation systems.
2. Camera: The imaging device mounted on the drone to capture photos and videos.
3. Gimbal: A stabilizing mechanism that helps keep the camera steady and level during flight, reducing shake and vibration for smoother footage.
4. Transmitter/Controller: The handheld device used to pilot the drone and control its movements, including the camera functions.
5. Receiver: Part of the drone that receives signals from the transmitter/controller to execute commands.
6. Battery: Power source for both the drone and sometimes the camera and gimbal.
7. Propellers: Rotating blades that generate lift and propel the drone through the air.
8. FPV (First Person View) System: Optional but common for drones, allowing the operator to see a live video feed from the camera in real-time on a screen or goggles.
9. Storage: Memory cards or onboard storage to save captured photos and videos.
10. GPS Module: Provides location data for the drone, enabling features like automated flight paths, return-to-home functionality, and geo-tagging of images.
11. Telemetry System: Monitors and transmits data about the drone's performance, including altitude, speed, and battery level, to the controller.
12. Propeller Guards (optional): Protective covers around the propellers to minimize damage

II. PROCEDURE

1. Pre-flight Check: Inspect the drone and camera for any physical damage or issues. Ensure batteries are fully charged for both the drone and controller.
2. Power On: Turn on the drone and the remote controller.
3. Connect: Establish a connection between the drone and the controller, usually done via Wi-Fi or radio frequency.
4. Calibration: Calibrate the drone if needed, especially if it's your first flight or if you've changed locations.
5. Camera Setup: Ensure the camera is securely attached and properly positioned. Adjust camera settings like resolution, frame rate, and exposure if needed.
6. Flight Planning: Plan your flight path and determine the shots you want to capture.
7. Take off: Lift the drone off the ground using the controller's take off button or manual controls.
8. Flying: Navigate the drone to the desired location and altitude. Keep an eye on battery levels and environmental conditions.
9. Capture Footage: Use the controller to adjust the drone's position and orientation for capturing desired footage or images.
10. Monitoring: Keep an eye on the live feed from the drone's camera to ensure you're getting the shots you want.
11. Landing: When finished, safely land the drone using either manual controls or an automatic landing feature.

12. Power Off: Turn off the drone and controller once the flight is complete.
13. Post-flight Check: Inspect the drone and camera again for any damage and ensure everything is properly stored for the next use.

Always follow local regulations and guidelines for drone operation, including airspace restrictions and privacy concerns.

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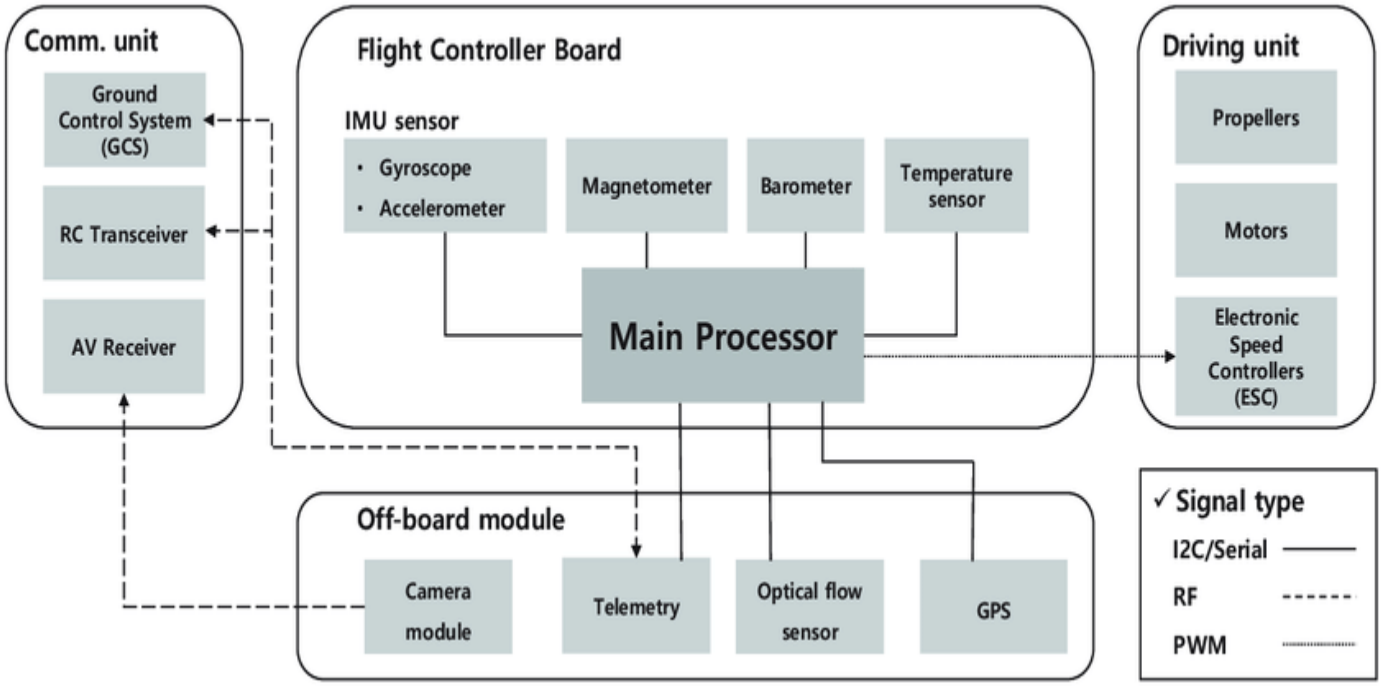
III. WORKING

The working principle of a drone camera involves capturing images or video using a camera mounted on a drone, transmitting the footage wirelessly to a ground controller or onboard storage, and processing the data for viewing or analysis. The camera's sensor captures light, which is then processed by onboard electronics, encoded into a digital format, and transmitted via radio frequency signals to the ground station or stored locally. The operator can control the camera's orientation remotely, adjusting the angle and zoom to capture desired shots.

Block diagram of drone camera



ADVANTAGES

1. Drone can fly
2. Used as logistic
3. Save time
4. Drone require less efforts
5. Easily controllable
6. Quality Imaging and Live Streaming
7. Affordable Cost-Saving Technology

DISADVANTAGES

1.SHORTER LIFE SPAN
2 . Easily hacked
3. Spying
4. Potential Threat to Nature

IV. CONCLUSION

In conclusion, drone cameras have revolutionized various industries by offering versatile aerial imaging capabilities. From filmmaking to agriculture, these devices have provided unique perspectives and invaluable data for professionals. However, their use also raises concerns regarding privacy, safety, and regulation. As technology continues to advance, it is essential to balance innovation with responsible use to harness the full potential of drone cameras while addressing associated challenges.

REFERENCES

Here are some popular references for drone cameras:

[1]. dji phantom series: known for their high-quality cameras and stability during flight.
[2]. dji mavic series: portable drones with excellent camera capabilities, suitable for various purposes.
[3]. dji inspire series: professional-grade drones with interchangeable cameras for advanced photography and videography.
[4]. parrot anafi : compact drone with a 4k hdr camera, known for its portability and unique camera angles.
[5]. autel robotics evo: another option with a 4k camera and obstacle avoidance features.
[6]. sky dio 2: a drone with advanced autonomous flight capabilities and a high-quality camera for tracking and capturing dynamic shots.
[7]. yuneec typhoon h pro: hexacopter with a 4k camera and retractable landing gear for unobstructed shots.
[8]. gopro karma: known for its compatibility with gopro cameras, offering high-quality footage in a compact drone package.
[9]. power vision power egg x: versatile drone with a detachable camera that can also be used as a handheld or underwater camera.
[10]. xiaomi fimi x8 se: affordable option with a 4k camera and long flight time, suitable for amateur aerial photography... available