

ТЕХНОЛОГІЇ ДИСТАНЦІЙНО КЕРОВАНИХ ЗАСОБІВ. ДРОНИ, ЇХ ВИДИ, ЗАСТОСУВАННЯ ТА ВПЛИВ НА ЖИТТЯ ЛЮДЕЙ

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Анотація

У цій статті йдеться про технологію дистанційно керованих засобів (дронів), їх види, застосування та вплив на сучасне життя людей

Ключові слова

Дрон, технологія, безпілотний, використання

Abstract

This article is about the technology of remotely controlled vehicles (drones), their types, applications, and impact on people's modern life

Keywords

Drone, technology, unmanned, usage

Introduction

This study is an investigation into the concept of drones. It encompasses and elaborates on the history of drones, uses of modern drone and types of drones.

Over the past 80 years, we have experienced a monumental surge in technological innovations that has profoundly impacted humanity. Among the most significant breakthroughs is the inventions of drones. The term "drones" encompasses a very wide array of unmanned machinery. These mostly unmanned vehicles are destined to revolutionize various aspects of our lives, from fundamental and most basic civilian infrastructure to both heavy and lightweight military equipment. Their evolution spans from the conceptual pilotless aircraft of World War I to the development of fully autonomous factories that may require only a minimal workforce on-site to maintain the machinery in good working condition and for safety measures.

Unmanned vehicles (UVs), which can be classified as unmanned ground vehicles (UGVs), unmanned aerial vehicles (UAVs) and unmanned underwater vehicles (UUVs), depending on their working environments, are widely used in various fields. In particular, UAVs and UGVs play a major role in many practical applications due to their strong potential in high-risk missions [1]. These high-risk missions require many parameters of these drones to be fully utilized, often in close synergies with one another.

Unmanned ground vehicles

An unmanned ground vehicle (UGV) is a vehicle that operates while in contact with the ground and without an onboard human presence [2]. These vehicles are usually outfitted with sensors to monitor their surroundings and can either autonomously make decisions regarding their actions or transmit data to a human operator situated

remotely, who then guides the vehicle through teleoperation. UGVs represent the land-based counterpart to unmanned aerial vehicles, unmanned underwater vehicles, and unmanned surface vehicles. Unmanned robotics are currently undergoing extensive development for both civilian and military applications, with the primary aim of undertaking a diverse array of tasks considered monotonous, hazardous, or challenging.

Unmanned aerial vehicles

An unmanned aerial vehicle (UAV) is defined as a "powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload" [3]. Beyond military uses, UAVs are employed in various civil aviation roles, including aerial surveying of crops, capturing aerial footage for filmmaking, conducting search and rescue missions, inspecting power lines and pipelines, wildlife monitoring, and delivering medical supplies to remote or inaccessible areas. The classification of UAVs can be somewhat ambiguous, with distinctions made based on their ability to carry payloads, fly autonomously or under remote control, and whether they are expendable or recoverable.

Unmanned underwater vehicles

Unmanned underwater vehicles (UUVs), also known as uncrewed underwater vehicles and underwater drones, are submersible vehicles capable of operating underwater without human presence. Starting in 1957, the first unmanned underwater vehicle (UUV) was classified as an autonomous underwater vehicle (AUV) and was created in the United States to research the Arctic waters. The Special Purpose Underwater Research Vehicle (SPURV) was used by the University of Washington to collect oceanographic data until 1979 during which the development of SPURV II began to provide better movement performance and better sensing capabilities [4].

Concept of autonomous drones

The term "autonomous drone" refers to a UAV capable of operating without human intervention, meaning it can independently execute take off, missions, and landing procedures. In the context of autonomous drones, mission coordination and aircraft piloting are managed by communications management software instead of human operators. Most drones operate with combined levels of automation and autonomy, with a recent focus on developing reliable and safe detect and avoid, detect and navigate, and emergency landing technology [5]. This is possible through AI systems that gather data from sensors, satellites, cameras, and videos and then use that data to make decisions.

Drones in e-commerce

E-commerce, an industry characterized by its emphasis on speed and convenience, is undergoing a transformative shift. With next-day delivery now considered the norm, drones are emerging as a prominent innovation, poised to revolutionize logistics and customer service capabilities. Drone delivery services are no longer a futuristic concept; they have become a reality, revolutionizing last mile logistics. Major companies, such as Amazon and Google, have already begun testing drone delivery systems, with more businesses expected to follow suit. As regulations continue to evolve and technology advances, we anticipate further growth in drone delivery services, making it a top trend to watch in 2023.

Drones in rescue & firefighting

Drones offer many advantages for search and rescue operations, making them increasingly indispensable in such missions. One primary benefit is the heightened aerial coverage they provide compared to relying solely on a human rescue team or even a team with access to a helicopter. Moreover, utilizing drones for search and rescue missions proves cost-effective compared to employing a sizable rescue team or resorting to helicopter-based searches from above. One more advantage is the size and portability of drones. These devices can be compact and lightweight, making them easily transportable for teams that need to cover considerable distances on foot. The ability to carry a drone in a backpack or a small case ensures that the rescue team can bring the necessary equipment without adding excessive burden to their journey.

Drones in law enforcement

The usage of unmanned systems, commonly referred to as drones, by law enforcement agencies has become increasingly prevalent. Numerous departments and public safety officials recognize the advantages of integrating police drones into their daily operations. Despite the numerous potential benefits associated with drone use in law enforcement, challenges inevitably arise with the adoption of this new technology. Law enforcement

agencies keen on harnessing the capabilities of drones should also anticipate and address obstacles and potential liabilities that may arise.

Drones in modern warfare & the military: UCAVs

An unmanned combat aerial vehicle (UCAV), commonly referred to as a combat drone, battlefield UAV, or simply drone, is an unmanned aerial vehicle (UAV) employed for intelligence, surveillance, target acquisition, and reconnaissance missions. Additionally, it carries aircraft ordnance such as missiles, ATGMs, and bombs on hardpoints for drone strikes. With no onboard human pilot, UCAVs are remotely operated from a terminal by operators. This eliminates the need for equipment required for a human pilot, resulting in reduced weight and smaller size compared to manned aircraft.

The ongoing war in Ukraine has demonstrated the many advantages of drones, as they have evolved to become smaller, more lethal, easier to operate, and accessible to a wide range of users. They play a crucial role in reducing the time from target detection to destruction. Moreover, drones enhance a military's capability to reconnoiter the forward edge of the battlefield. Drones with extended endurance profiles can conduct prolonged reconnaissance missions, facilitating precision strikes by more advanced drones deep within enemy territory. Additionally, certain drone models allow individual soldiers to monitor adversary movement without risking lives or compromising their positions.

Conclusion

In conclusion, the future of drones holds immense promise and potential across various domains, including military operations, humanitarian efforts, and international law enforcement. As drones continue to evolve, becoming smaller, more lethal, and easier to operate, they are increasingly accessible to a wide range of users. Aside from usage in modern warfare, drones have permeated many civilian sectors, including law enforcement, emergency response, and humanitarian aid.

Looking ahead, the future of drones presents boundless opportunities and challenges. While their rapid technological advancements promise unparalleled capabilities in terms of speed, coverage, and accessibility, concerns regarding privacy, ethical use, and regulatory frameworks necessitate careful consideration. Striking a balance between innovation and accountability will be paramount in realizing the full potential of drones while mitigating associated risks and safeguarding ethical standards.

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