

A Short Reviews on Drone Application in 21st Century

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ABSTRACT

This article focuses on applying Unmanned Aerial Vehicle (UAV) used in agriculture, technically called a drone. Nowadays, the high-tech revolution has been rapid growth in this modern era, especially in agriculture. The Drone can benefit the farmers, such as the time, costs, minimize the workers quality production, avoid an accident in the high-risk workplace, etc. Before this, the Drone is only used by the military, but nowadays, it is widely used in commercial or personal interest as a hobby. The Drone can easily control and fly with no limits and may fulfil the selected industries requirement. By using this technology, hopefully, these findings will contribute to good development in the future. This paper briefly explores the use of drones in agriculture.

Keywords: Unmanned Aerial Vehicle (UAV), Drone.

1. INTRODUCTION

An Unmanned Aerial Vehicle (UAV) or Drone, is a human-guided robotic aircraft that carries no human or passengers [1] and these drones often controlled by human pilot or airmen from the ground and required reliable wireless communication control [2]. A small and lightweight physical feature coupled with the ease of controlling drones and using remote-control devices or aircraft control software installed in smartphones are highly popular with the younger generation.

1.1 History of Unmanned Aerial Vehicle

A short brief on the flying machine is worth knowing the history of this kind of technology that is fascinating. Flying machine history started around 1783, when its maker used hot air balloons or named aerostats to fly [3]. Besides [4] also wrote in his diary that on June 4 1783, it was the most historical occurrence in France since it was the first and foremost event and the history of air conquests experienced by humans. There has never been a technical or scientific discovery that

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has a significant effect on society. An aerostat is the first ever to combine the achievement of glorious human development with the cumulative knowledge of that era. The advancement an aviation studies year by year with a significant discovery in October 1902, in which the invention of airloon modelling was turned into a prototype of a glider built by The Wright Brothers' [5]. This significant achievement in glider engineering includes two components of flight control and three-axis flight control. The benefit of this invention is that the glider can be managed for cornering and landing purposes. This study's findings have successfully paved the way for the discovery and development of a more powerful aviation past by developing larger aircraft requiring the use of engines.

Research in aeroplanes' field significantly grow and successfully lead to the creation of flying jet aircraft used in war and transportation. Thus, with the vast technology was involved in the flying machines, it's become a demand by all over the world regardless its functions for military or commercial airlines. From a positive point of view, this technology has benefited a lot in tandem with this increasingly modern development. The first of drone deployment occurred during the First World War. It was first gained reception in 1913 and received support from the military from the United States of America [6]. The official name of this Drone is known as the "Liberty Eagle" but more often referred to as Kettering "Bug" – named in honour of its creator, Charles F. Kettering. According to the previous study [6] in his thesis, although it is almost a century for the United States as the pioneer of drones, now it is no longer their expertise since several other countries are also rapidly developing the drone industry especially China.

The Cold War in 1990s, was the most critical period for drone expansion. Therefore, for determinism technology, the undoubted belief in new technologies' ability to solve societal problems occurred in this new age. It can be seen there are some inevitable issues and misconceptions in the use of drones because the previous model was unsuccessful. Nevertheless, the eagerly pursued efforts help the birth of a successful Predator (Drone manufactures in China). During the Cold War, drones faced numerous resistances, including technological limitations, expensive spending, and competition from air-conditioned surveillance (competition from manned aerial surveillance) (U-2) and satellites. On the other side of coin, military aviation assures that the usage of these drone technologies is inevitable and likely to be increased for air war especially in another decade, where a third of all warplanes are expected to be Unmanned Aerial Vehicle. Besides, most of the pilots who originally trained only on combat aircraft and bombers have now are taught how to operate a drone [7].

1.2 Drone in 21th Century

Drones are currently being used in a significant number of fields. In addition, there are no limitations on the use of this as an example of an operator license. This area of application, which promotes the use of drones, is also growing worldwide. The micro Drone, in particular, has been widely used lately due to its small size. The researcher [8] state that the advent of drone technology is capable of increasing production, reducing total time and costs for a mission, no matter what the sector struggles, it has proven to have a high positive impact. Drone technology provides countless help and cost savings with the support of extensive landscape photos. In other words, the use of drones is very suitable for an area that is difficult to enter or an area that is difficult to get location navigation for example in flooded areas. Furthermore, the Drone has shown the best performance to access in terms of overhead perspective on 360° shaped panorama in conveying a real time picture (precision time). With this input, the engineering team can prioritize their approach.

2. Drone Application

2.1 Agricultural

The use of drone technology in the agricultural sector is gaining popularity and is beginning to make way for modern farmers. As other researcher [9] have mention, this technology is essential to agriculture in order to ensure sustainable agricultural economic growth in order to achieve one of the objectives of national development, which is to increase the income status of farmers.

In the farm sector, drones are used as a precision farming tool to increase crop yields and income while at the same time reducing the amount of input needed for cultivation, such as soil, water, fertilizers and herbicides. As we know, agricultural yields rely on a variety of factors that cannot be managed by farmers, such as access to water, climate change, wind, soil quality and humidity, weeds and insects, and per-plant season, which are erratic. Therefore, in order to resolve the issue, farmers are encouraged to apply drone technology to agricultural methods. According to the [10] by using this technology, it can reduce the usage of chemicals substances, pesticides and harmful fertilizers that can be affecting the users. Moreover, the Drone has capabilities application [11] in agriculture such as; (i) analysis towards land and area, (ii) cultivation, (iii) weed control, (iv) pest control, (v) crop irrigation and (vi) crop health.

2.2 Construction

The involvement of drones has changed the way the construction industry works. The benefit of drones that are able to gather all data at the construction site efficient-ly and simultaneously has been indirectly enabled by the construction management to make decisions immediately after the issues that have arisen have been found [12]. As be stated by [13] in the construction fields, the Drone also have capabilities such as; (i) monitor construction, (ii) site surveying, (iii) aerial photography and surveillance, (iv) visual inspection of hard-to-reach locations, (v) safety inspection, (vi) interaction with workers, (vii) quality take-off and estimation, (viii) and (ix) defect and damage detection.

2.3 Oil and Gas

The offshore environment is also regarded as difficult and demanding. Therefore, it is not surprising that the market for drones has increased considerably. That's [14] noted that the demand for drones in the air, sea and subsea areas has increased recently. Visual inspection of unmanned drones is a cost-effective and straightforward inspection method for sensitive onshore and offshore locations. Drone inspection provides access to otherwise inaccessible structures and details, offering rapid intervention as compared to traditional approaches, time-consuming and costly inspection methods such as rope access, sky lifts, cherry pickers and scaffolding. Drone inspection helps both pilot and NDT workers to separate themselves from hazardous conditions, making it easier to perform a safety inspection in high-risk areas. Furthermore, precise photographs of the critical components can be generated without slowing down or disturbing the manufacturing process. An example of an assignment involving these components is the inspection of the flare and the flare tower on the oil/gas platform with the triggered fit. Here the Drone takes photos or thermographic data of the flare tower's critical components and the flare tower, although the performance remains unchanged. The procedure often occurs in a chaotic and flame-filled environment, while drone pilots, inspectors and employees are at a safe distance from the inspection area. Others capability application in air, on the sea surface and subsea as mention by [15] has included; (i) photography, video recording to support training, information gathering and crisis management, (ii) Inspection of (critical) components such as flare towers in oil and gas, windmills, storage tanks and pipelines, to improve safety, avoid human exposure, reduce costs and improve quality, (iii) maintenance, as an example through subsea drones, supporting human operators, (iv) detection and survey of dangerous emissions or objects such

as explosive gas, sea-ice, environmental pollutions or oil spills, (v) logistics, delivery of critical components or supplies and (vi) plotting and surveys.

2.4 Mapping

Recently, demand for drone mapping has become increasingly widespread. Indeed, UAV photogrammetry [16] and [17] is opening up a variety of new applications in the close-range aerial domain, introducing a low-cost alternative to conventional manned aerial photogrammetry for large-scale topographic mapping or precise 3D ground information recording and being a viable complementary option for terrestrial acquisitions. The recent UAV achievements and developments can explain the spread of low-cost platforms, combined with amateur or SRL digital cameras and the GPS/INS systems needed to traverse the platforms, predict acquisition points and possibly conduct direct geo-references. Many firms are now investing in offering photogrammetric UAV-based aerial imaging products as the ability to use variable-dimensional, low-weight and high-resolution unmanned platforms make for lower-cost flight operations relative to traditional aircraft. There are still issues and pitfalls, but UAVs are a thoroughly competent source of image data for a wide variety of applications.

3. CONCLUSION

As for the conclusion of drone technology, a large number of applications have been identified. Now drones are not limited to military applications, and several businesses are now investing in these machines. Moreover, the drones can be used as toys to fly around and use them for many different hobbies. Because they are lightweight, compact and easy to learn, quadcopters are popular for consumer use. Until now, no sign of slowing down any time soon to this day. Hopefully, the short survey above will support the potential interest to be interested in industry, military, photography, consumer usage, etc.

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