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## **ROLE OF UNMANNED AERIAL VEHICLE IN CINEMATOGRAPHY**

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### **ABSTRACT**

(Unmanned aerial vehicle has been used to any type of cinematography activities. It is widely used for today's time where in most of cinematography activities used drones for aerial shots, that is more convenience and easy to use than man power. Controlling a drone while lining a cinematography activity such as movies, dramas, action and also photography. On the other hand, it is typically requiring a large number of skilled human operators. To optimize shooting creativity and efficiency while minimizing production costs, it must be untextual aware and adaptive. This purpose necessitates the use of drone vision. It is at its core, an investigation of how to improve human creativity, expressiveness, and experience sharing. This study aims to determine and to Find out the minor and major function of unmanned aerial vehicle in terms of cinematography as drone plays vital role to the history of cinematography together with the intelligent and abilities behind drones. This paper introduces the usage, data analysis, the drones used and the data collected throughout the study. The result presented in this study shows how unmanned aerial vehicle is important to any industrial sector especially in cinematography when it comes to the roles in cinematography world. Here we also see about the comparison of drones between cinematography and other sectors.

**Keywords:** cinematography, drones, shooting, innovative, Function, production.

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### **1. INTRODUCTION**

Unmanned aerial vehicles (UAVs), sometimes known as drones, are aircraft that are operated alone without presence of a human pilot, crew, or passengers. Unmanned aircraft systems (UAS) include a ground-based controller and a communication system with the UAVs. As a remotely piloted aircraft (RPA), UAVs can fly under the control of a human operator, or with varying degrees of autonomy, from autopilot assistance to fully autonomous aircraft with no human intervention. The purpose of the unmanned aerial vehicle made a great impact to the environment, human, and any kind of industry. Drones currently perform a wide range of tasks, including climate monitoring search and rescue operations during natural catastrophes, cargo delivery and especially the focus of this study which is the cinematography together with photography and videography. However, dimes are also used in military's most well-known and contentious application for reconnaissance, surveillance, and targeted assaults. In this study it focuses on how drones are work in the world of cinematography.

Unmanned aerial vehicles (UAVs) share an important role in the lives and works of production team and actors. It has huge contribution to a team through shoot the shots, the convenience easy to capture and video with the use of drones together with drones' operators. A tool that gave huge effort and notes in the industry behind all the hard works of artists, and the people behind the success in cinematography.

#### **History of Unmanned Aerial Vehicle:**

You may have seen some unbelievable shots taken and capture in films and movies, that's the power of drones. You may think that they are using tracks, helicopters, or any Fancy film equipment in order to make the impossible shots in recent movies but they were shot using drones in film making.

Early films didn't used drones as aerial vehicle while filming rather they used planes and any other flying objects. Drones aren't the only plying device that has been used for filming. The first movie to employ planes in its production was **wings**, released in 1927. The stuntmen and cameramen sacrifice themselves and resulted to death and injuries. Later, helicopters have been used in the production of various blockbuster film. over the years. Drones, in the other hand have made aerial shots even more affordable for smaller films. Some unbelievable scenes that were taken in some famous movies and films such as sky Fall, Star Trek: Into Darkness and oblivion. Later at 2014, drone filming became legal in the United States and most drone shots were taken in other countries other countries also used drones in filming actions, sports films, and other scenes that we saw in impossible situations.

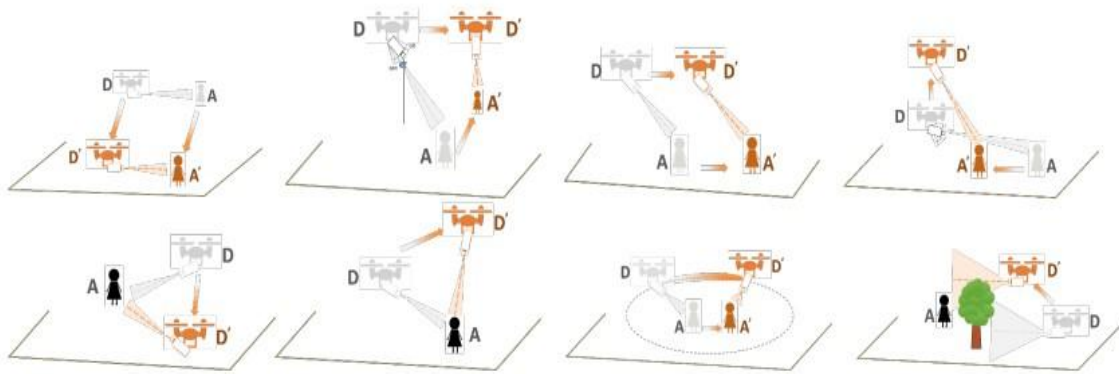


Figure 1: From left top to bottom right: Lateral Tracking Shot (LTS), Moving Aerial Pan with Moving Target (MAPMT), Chase (CHASE), Pedestal Shot with Target (PST), Fly-By (FLYBY), Fly-Over (FLYBY), Orbit (ORBIT) and Reveal Shot (RS)

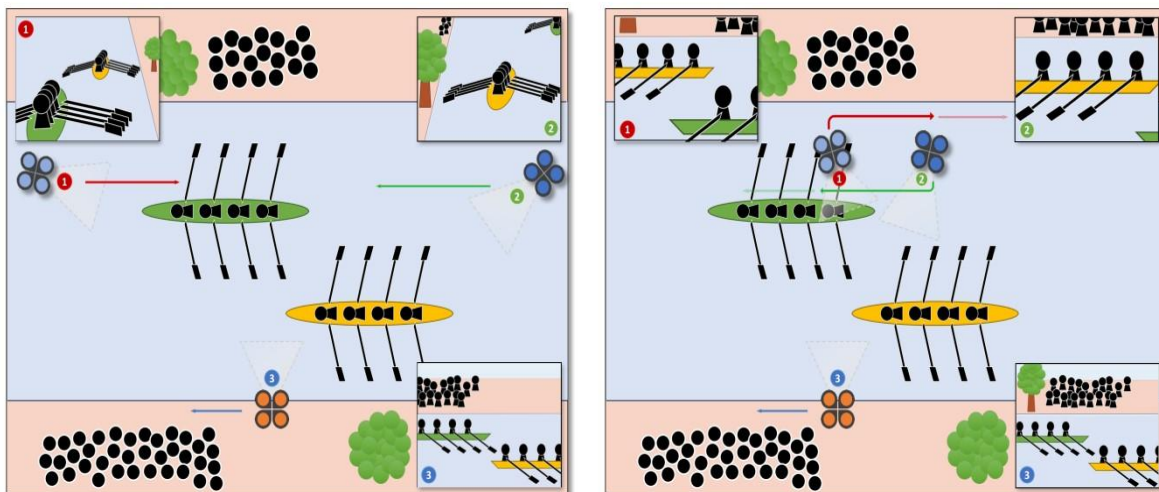


Figure 2: The "Dancing Drones" scenario.

Abraham Karem was the first man who made drones and he also known as the founding Father of UAV (drone) technology in 1951. The first unmanned aerial vehicle was developed in year 1783 and was used for low battle Field, bug, camera for surveillance, radio and photography & Unmanned aerial vehicle has a great impact and contribution to films and cinematography in capturing scenes that gets easy convenience, and affordable.

#### Types of Drones Used in Cinematography:

There is a lot of types of drones according to how they work, the following type of droner are associated to cinematography.

**DJI Mavic 2 Pro** - This type of drone is the best consumer drone for filmmaking. This drone is complete package, affordable and have quality. This results in video that is appropriate for advanced grading and editing software. With cinema cameras, the footage or the capture scene by this drone & looks great. It is also a fantastic small drone that is affordable to use. It boasts a top speed of 44 mph, a flight time. OF 31 minutes, Ocusync 2.0 with a 5-mile range and Active Track 2.0.



(DJI Mavic 2 Pro)

**Parrot Anafi** Based on the review of the 7 Best Drones for Filmmakers (Steiner, S. C. 2019) Parrot Anafi Found quite easy to use for film making With the Anafi. Parrot demonstrated this. It shoots in 4K, has a log recording mode, and a high-resolution 21 MP 1/2.4 sensor that allows for sharp stills and lossless digital zoom in video. The Anafi's main feature is its ability to tilt upward, which allows Filmmakers to create incredibly unique shots that would be impossible to achieve with almost any other drone.



(Parrot Anafi)

**Autel EVO.** This type of drone used with the fold-up that took off a year ago with 4K video at up to 60 frames per second(fps), this drone stands out from the crowd. The built-in 3.3" 720p OLED night on the accompanying remote controller is another smart design choice, it is also operating at up to 4.4 miles away and has a 12MP 1/2.3" sensor to get the job done.



(Autel Evo)

**DJI Matrice 600.** This drone is a hexacopter that professionals want. This model of drone that use for film making gains the hexacopter designation and can lift a 34-pound payload, and allowed to bring serious gear. It works with zennuse systems, and also shines with Ronin-MX and the quality of result is unvated.



(DJI Matrice 600)

**Power Vision Power Ray ROV.** Power Vision is a wonderful choice for underwater film making, you can start it by dropping it into water from your boat, dock, or even the edge of pool. Working or filming underwater has a number of challenges, therefore. this ROV is outfitted with LED lights and other capabilities to help.



(Power Vision Power Ray ROV)

**DJI Mavic Mini.** This type of drone is possible to capture stunning aerial Footage for Films or vlogs. It's small, weighing only 249g and a non-commercial Fliers don't need registration. It may not be a perfect for video with maximum resolution of 2.7K and a still resolution of 12MP, but with proper technique, can surely can get decent pictures for films.



(DJI Mavic mini)

**DJI Inspire 2.** It is a big drone with big cameras and that means the bigger the cameras the bigger the sensors and better videos. It is belonged to the most popular drone uses in cinematography for a high-quality capturing of video, video clips, and short films.



(DJI Inspire 2).

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## 2. RELATED LITERATURES AND STUDIES

**Capitan, J. et.al.** (2019) introduced autonomous cinematography with teams of drones for films, and commercial platforms. Defining shooting missions with teams of drones, setting of flight controllers in order to perform the autonomous drones addressing the building drone teams for autonomous media production.

**Cunha, R. et.al.** (2017) proposed a multidrone approach for autonomous cinematography planning, it introduced the application for cinematography, and the challenges. The paper introduces the main features for this architecture regarding for the autonomous cinematography planning. Those main features are the focused of the study that needs plan for the use of multidrone for cinematography.

**Fleureau, J. et.al.** (2017) came up with the idea of automated cinematography with unmanned aerial vehicles and increasing cinema industry for the creation of dedicated tools for filming and capturing live scenes. The result shared that the paper demonstrated the capacity of tool used to capture live movie scenes.

**Adams, C. et.al.** (2018) provided an investigation into the role of drones in journalism together with contemporary media and roles industry. The article examines video used by drone shots in different country. The finding shows that drone journalism is potentially rich field of academic study and provided news context than content.

**Mademlis, I. et.al.** (2018) introduced the challenges in autonomous UAV cinematography as an overview of the study. It involves the providing global perspective to multiple domain-specific research communities. The challenges are issues regarding UAV cinematography that includes considerations, ethical, legal, production, and limitations.

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### 3. RESEARCH METHODOLOGY

The utilization of the data gathered was done by collecting information's and sources about the roles of unmanned aerial vehicle towards cinematography.

The tool that used for data analysis is a pie graph that shows the usage of drones in cinematography and it is a basis of the roles of UAVs to cinematography industry.

#### **Data Analysis:**

Unmanned aerial vehicles (UAV's) or drone has different use and roles in different industry sectors such as security, agriculture, infrastructure, management, mining and aerial cinematography. The data below shows the percentage on the in following industry sectors that using drones.

#### **Role of drones in security:**

Drones are faster and less expensive to deploy than helicopters, and they can access areas that are deemed too dangerous and high-risk for humans. Drone technology can give security agencies with a more secure and flawless method of efficiently securing international boundaries.

#### **Role of drones in agriculture:**

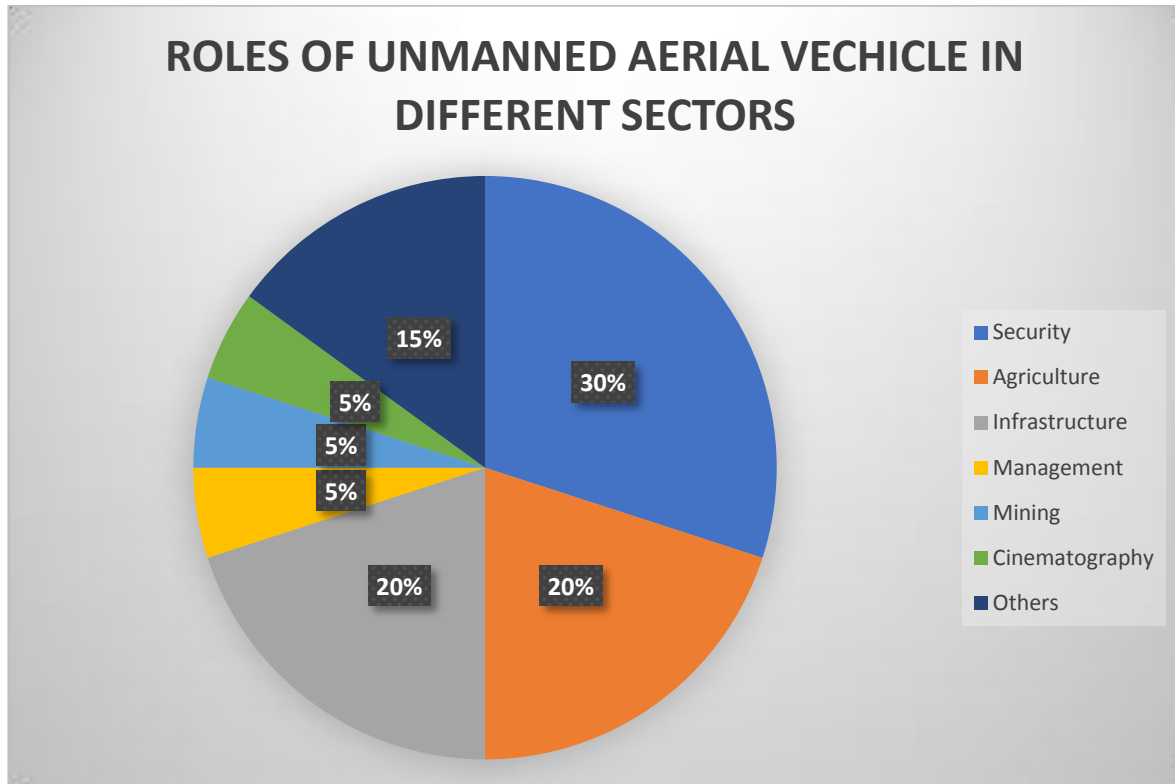
Drones in agriculture allow farmers to adapt to changing conditions and make informed decisions as a result. The information collected helps with crop growth, crop management, crop monitoring, watering, field soil testing, and crop damage evaluations. Drone surveys help farmers increase agricultural yields while also saving time and money.

#### **Role of drones in infrastructure:**

The advantages of drone technology, in particular, have altered the entire project life cycle, from conception to completion. To scope out projects, track construction progress, and provide real-time updates, drone pictures, videos, and imagery are used. Drone use in construction will continue to rise as the sector matures and construction projects get more sophisticated.

#### **Role of drones in Mining:**

Drone mining surveying allows a professional to get specialised Aerial data on mining sites for purposes such as increasing productivity, planning, safety, and inventory management. Drone Mining Surveys are UAVs equipped with RGB cameras that capture images of a location from multiple angles in the mining business. The data is then processed by a comprehensive and professional photogrammetry programme to create Geo-tagged 3D Maps, Contour Lines, Digital Terrain Models (DTMs), Digital Surface Models (DSMs), and other geo-tagged maps of the mining site for the operators' detailed study.



The data collected through the form of pie graph interprets that there are other industry sectors that are not only focus to cinematography that user drones. Only 5% of drones used in cinematography and the most sector that uses drone is for security with 30%.

Drones are important thing that people need in some industry sectors. Here are some roles of unmanned aerial vehicle to cinematography proving the 5% of its uses:

**Enhancing the visual experience.** Drones can capture scenes and their surroundings while maintaining clear vision. They can also capture scenes and photographs in incredible detail and at angles they want. In the movie industry with drones amazing shots will find.

**The drone will choose to take aerial shots.** Drones most common use is for aerial shots. Aerial pictures and clips provide a high perspective with a separate view of the tail folding, giving the audience a visual treat.

**To shoot the best possible scenes.** Drone Footage can record some of the most expensive and advanced methods in movies, since drones are taken from a height, the scenes can be taken full that stunts easy to shot.

**Wow expects.** A cinematography that uses drones allows the film to be taken in the next level. Many well-known films have set the standard for creating memorable shots and use of drones at Cinemas in the Future could be indescribable.

**Huge savings on production budget** drones save lot of time and money to the film makers and making cinematography scenes, and making it easier to shoot. In addition, many drones may freely shoot scenes unlike cameraman.

Here are some differences between before and after usage of drones in cinematography

Before the usage of drones	After the usage of drones
More expensive	Less expensive
To achieve the shots with full-scale alternatives it will cost 5 times than drones.	To achieve the shots with drones it will cost 5 times less than full-scale alternatives.
Non-green technology	Green technology
Requires so much fuel per hour to fill the helicopters and very noisy.	Doesn't require any fuel or don't pollute the air.
Less convenient	More convenient
It is very tough to take shots in remote locations with lot of equipment	

and workers.	In remote locations it is very easy to take shots with drones.
Takes more time Need to get ready all the workers and to set-up the equipment.	Fast set-up Always ready to shoot or take photos anywhere.
More intrusive Takes more time to shoot and with helicopters and it's impossible to artist to tell dialogue with helicopter near by	Less intrusive With an almost unnoticeable down wash, it's far quieter than a full-size helicopter. Directors will be able to record actor discussion in a variety of settings, even if our helicopters are filming nearby.
Non-portable and not easy to carry	Portable and easy to carry anywhere
Non-reliable and not that safe Need to be care full and can't reliable on equipment's.	Reliable and safe We use GPS technology with built-in safety features, such as e.g. The hellicam will return home if the radio signal is lost.

#### 4. RESULT

As the data analysed and interpret, in the form of pie graph it shows that unmanned aerial vehicle has a big help to cinematography industry. It may be one of the least industry sectors that uses drones but the study proved that unmanned aerial vehicle has a great role as a tool in order to give audience a clear, presentable, and impossible shots for their audience's standards in terms of movie, short clips and video, and films and it also use for photography purposes for the best aerial angle. The usage of unmanned aerial vehicle is 5% in terms of aerial cinematography industry. This 5% consist of the roles, uses, and importance of drones in order to capture and shoot motions, actions, and capturing goo's scenes. It is not only the cinematography they use drones but any other industry that uses drones for protection, surveillance, and managing something. In terms of cinematography most of action movies are using drones for better motion of artists. The data gathered shows how the roles of drones are important to cinematography with 5% usage only.

So here by our research suggests that using DRONES In cinematography is very good thing and have so many benefits than using a large equipment's to shoot the movies.

#### 5. CONCLUSION

After the researchers gathered information, data, and sources the researcher concluded that the role of unmanned aerial vehicle in cinematography is very useful and easy to use for capturing and filming movies and films even the usage is only a small one. As the researchers made the paper, all the methods used are pointed out and in a right process together with the graph and interpretation that used as a Data Analysis to prove that drones have a special effect to cinematography industry sector.

Drones are easy to use with the convenience of filming, and capturing sceneries that needs focus and attention to the audience. It gives a powerful weapon to cinematography in order to gain viewers because of the impossible result of drone's shots. Moreover, drones can be used in any industrial sector especially in cinematography for a good quality product.

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