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Design and Development of Action Camera Mount for Drones

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ABSTRACT*: The goal of this project is to create an action camera attachment for drones that can record excellent video while in the air. The mount will be built to safely attach to the drone and offer a secure surface for mounting the action camera.The project will get started with a detailed examination of the constraints of currently available drone camera mounts. Several prototypes will be made during the design phase, and each one will be tested in order to choose the most efficient and reliable design. To ensure sturdiness and stability, the final design will be 3D printed with premium materials.The action camera attachment will be tested on numerous drone models after the design is complete to verify compatibility and stability while in flight. To make sure that the camera stays stable and delivers high-quality video footage, the mount will also be put through a variety of flight scenarios.The design procedure, the materials utilised, and the testing procedure will all be carefully examined in the final report. In order to further improve the design's performance, it will also offer suggestions for future enhancements and changes. Overall, this project will help create an action camera mount for drones that is dependable and efficient and allows users to record high-definition video from an unusual angle.*

KEYWORDS: *3D Printed, Camera, Mount, Drones*

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I. INTRODUCTION

Over the years, drones have gained popularity due to their wide range of uses, which include everything from photography to surveying and monitoring. The lack of a sturdy platform for cameras to be mounted on, however, is one of the primary drawbacks of drones and can lead to shaky and unstable video footage. For action cameras, which are made to record frantic and dynamic footage, this is especially difficult

.This project intends to create an action camera mount for drones that can offer a sturdy platform for the camera to be put on in order to overcome this constraint. The mount will be built to tightly fasten to the drone and lessen any shaking or vibrations during flight. The final product will be high-quality video that may be used for many different purposes, including sports and other frantic activities.

The development of many prototypes that will be evaluated for stability and efficacy will be part of the design process, as well as a full investigation of the shortcomings of the current camera mounts for drones. After the final design is created, it will be 3D printed with premium materials to guarantee sturdiness and stability. The finished item will undergo extensive testing to guarantee compatibility and stability during flight, and the resulting footage will be examined to assess its calibre and potency.

Overall, this project will help create an action camera mount for drones that is dependable and efficient and allows users to record high-definition video from an unusual angle. This technology has several uses in a variety of industries, including sports, filmmaking, and more, and has the potential to completely change how we record and observe fast-paced activity.

II. FRAMEWORK

We have designed our idea using SolidWorks. SolidWorks is an application for solid modelling in computer-aided design and engineering. As of 2013, the publisher estimates that SolidWorks was used by more than two million engineers and designers across more than 165,000 businesses.

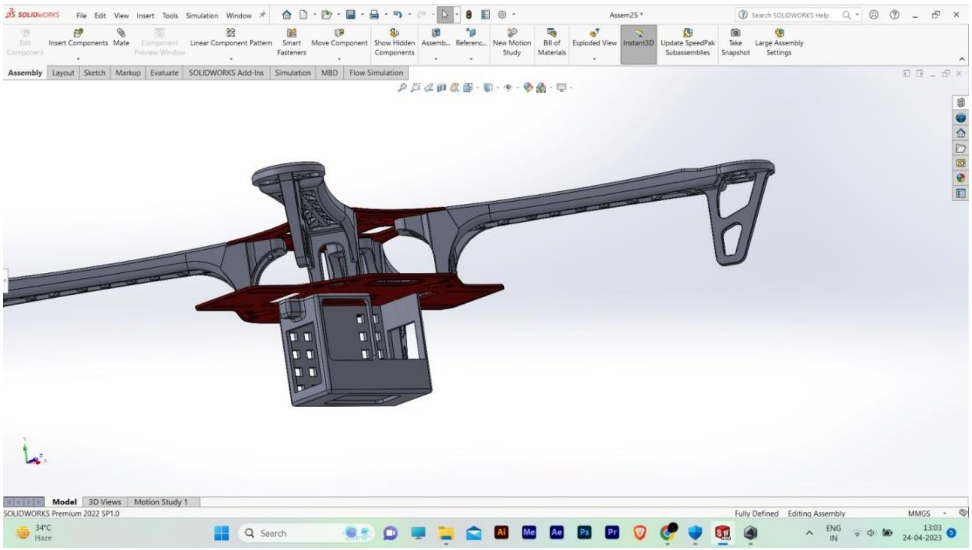

FIG I ISOMETRIC VIEW

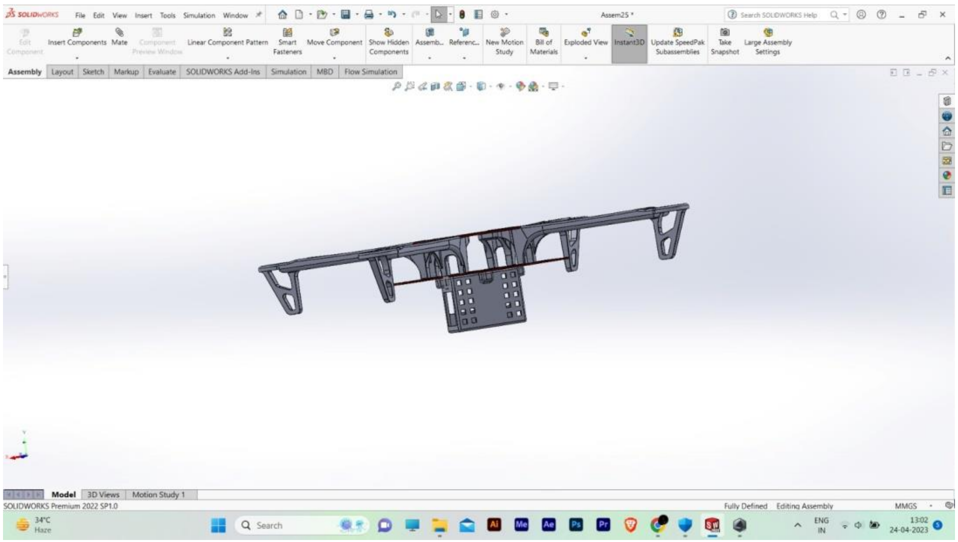

FIG II ISOMETRIC VIEW

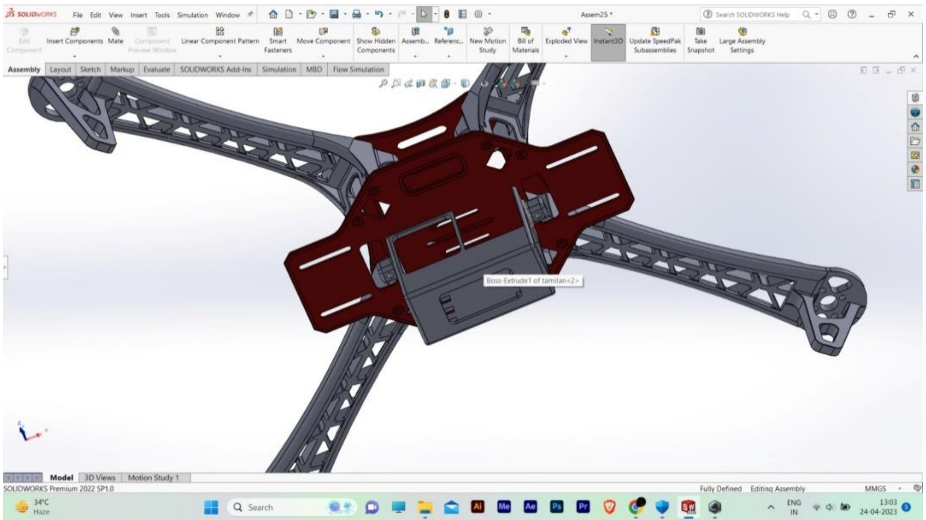

FIG III BOTTOM VIEW

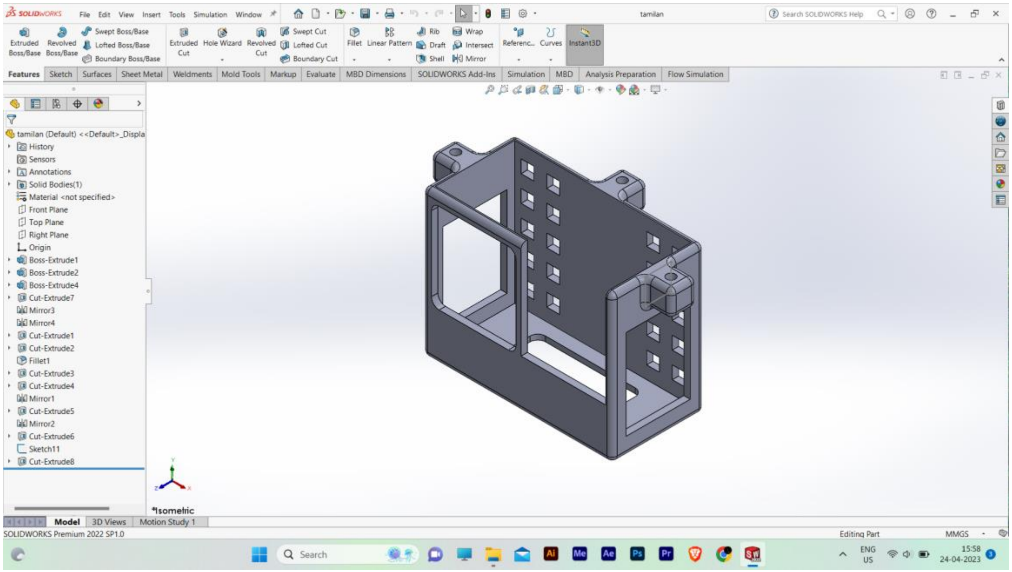

FIG IV CAMERA MOUNT

III. LITERATURE REVIEW

1. In this study, a brand-new, universal drone design is suggested for use in many scenarios. The drone system comprises movable arms and four to twelve rotors that can be changed. A traditional eight-rotor configuration (Octocopter) and a configuration with twelve independently controlled rotors (Dodecacopter) are selected for the proposed universal drone simulations to benchmark the trajectory performance as a comparison study. Additionally, as this drone system has adjustable arm lengths, the impact of various arm lengths on this performance is also looked at. Both systems are put through five different working conditions for comparisons, including no disturbance, periodic disturbance, and non-periodic disturbance. The root mean square of the location errors of the Octocopter and Dodecacopter systems increased by 69.7% and 47.6%, respectively, in the simulations when the amplitude was increased by 100% under the periodic disrupting effect. Similar to periodic disturbances, both systems showed an increase of %13 and %7 for non-periodic disturbances. The octocopter system is partially more stable without a disturbing effect, but as the disturbing effect rises, the dodecacopter system flies more steadily than the octocopter system.

2. This chapter describes a set of biologically inspired algorithms that were successfully applied to the indoor (simulated) deployment of a wireless sensor network based on drones. The algorithms are made to function decentralizedly, with each drone functioning independently and only utilising local (subjective) knowledge of its own position and the implied positions of its neighbours. The chapter's goal is not to suggest these algorithms, but rather to draw attention to an area of study that is currently underrepresented in the field of the Internet of Drones, namely the study of group behaviour for collectives (swarms) of cyber-physical objects, in this case dronesOnly recently has the availability of device swarms increased to the point where the deployment of such collectives is truly becoming a reality. Due to a lack of legal frameworks and norms, most researchers still find it hard to operate swarms of drones. We will soon notice an increase in papers in the literature that present data gathered not from simulations but from the actual deployment of a swarm in the real world. The argument made in this chapter is that it is time to begin examining such swarms of cyber-physical.

3. The implementation of a novel MAVLink command that enables oblique aerial surveys on the two most popular open source flight stacks (PX4 and ArduPilot) and ground control station (QGroundControl) are shown in this paper. One major benefit of this method is that it eliminates the need for bulkier, more expensive alternatives that use multiple cameras at fixed angles in rigid mounts and are therefore unsuitable for lightweight platforms. Instead, vehicles with a typical gimbaled camera can capture oblique photos in the same pass as nadir photos. Additionally, it enables freedom in how the camera angles are set up. The command combines camera triggering and mount actuation in a synchronised cycle when the fly passes over the area of interest. This is the basic idea behind itIt has also been demonstrated that oblique images improve data accuracy and assist in filling gaps in point clouds and other relevant outputs of surveys with vertical components. In order to demonstrate its advantages, I contrast the outcomes of multiple missions flown using nadir-only surveys against oblique surveys and various camera configurations, both in simulated and real-world trials. Ground control and checkpoints

were utilised in both instances to assess the surveys' accuracy. The vehicle had to fly 44% less with the oblique survey to cover the same area as the nadir survey, according to field tests, which might result in an 80% increase in covered area efficiency per flight.

4. This study exhibits a quadcopter that was 3D printed and compared to the DJI F450 frame. The quadcopter for this study was conceptualised and designed, the parts were simulated, the parts were 3D printed, and finally the quadcopter was put together and tested. The aesthetic, aerodynamics, ease of assembly, speed of printing, weight, and strength of the chassis all played a role in the design of the drone. The researchers also considered how different electrical parts, such as the Pixhawk flight controller, RC receiver, telemetry, ESC, and power distribution board, were laid out. In terms of stress, displacement, weight, and flow analysis simulation, the researchers modelled the parts. If the simulation produced satisfactory results, it would be appropriate to 3D print the design.

5. This experiment offers a groundbreaking driving simulator study to examine the viability of sedans equipped with displaced side-mounted camera systems (CMS). Background: The positioning of side-mounted cameras has been largely disregarded in the growing number of studies examining the replacement of side-mounted rearview mirrors with CMS. In a driving simulator, user preferences for camera positioning haven't even been tested. The vertical camera position has been demonstrated to have an impact on how far away objects appear in previous research. The rearward camera placement's impact on driver acceptance and performance was examined in a driving simulator experiment. In a last safe-gap paradigm, 36 participants changed lanes numerous times. Throughout the experiment, the camera's position, ego-velocity, and the speed of the oncoming vehicle changed.

6. There have been just too many advances in precision agriculture in recent years to not increase crop output. Over 70% of the rural population relies on agriculture, particularly in developing nations like India. The illnesses cause severe losses in the agricultural lands. These illnesses were spread by pests and weeds, which lowers agricultural output. To improve the quality of the crop, pesticides and fertilisers are used to kill insects and other pests. When applying pesticides manually to agriculture fields, the WHO (World Health Organisation) estimated that one million cases of adverse effects occurred. To prevent human health issues when applying pesticides manually, unmanned aerial vehicle (UAV) aircrafts are utilised. The Unmanned aerial vehicle (UAV) – aircrafts are used to spray the pesticides to avoid the health problems of humans when they spray manually. UAVs can be used easily, where the equipment and labors difficulty to operate. This paper reviews briefly the implementation of UAVs for crop monitoring and pesticide spraying.

7. Unmanned aerial vehicles (UAVs) are developing into an important tool for data collection in many scenarios. They are especially well suited for usage in agriculture because such regions are frequently vast, making ground scouting challenging, and sparsely inhabited, making harm and privacy issues less of an issue than in urban settings. In fact, over the past ten years, the usage of UAVs for monitoring and evaluating farms, orchards, and forests has rapidly increased, particularly for the management of pressures like water, disease, nutrient deficiency, and pests. This article provides a critical overview of the key developments in the field, concentrating on the methods employed to extract the data from the photos taken during the flights. Based on the information found in more than 100 published articles and on our own research, a discussion is provided regarding the challenges that have already been overcome and the main research gaps that still remain, together with some suggestions for future research.

IV. APPLICATIONS

Aerial imagery is ideal for a drone with a camera. Here are just a few of the businesses that profit from drones with cameras: mining, livestock, inspections, military warfare, and more. Finding the finest drone with a camera is essential given the wide range of drones that are now available on the market.

V. CONCLUSION

It takes a lot of work to design and build an action camera mount for drones, and many different aspects, including as weight, stability, compatibility, and aerodynamics, must be carefully taken into account. Our research seeks to design a dependable and efficient camera mount that can deliver stable footage during frantic activities through a careful investigation of existing camera mounts for drones and the construction of many prototypes.

The final camera mount will have many uses in industries including sports, filmmaking, and more, and it might completely change how we record and see these activities. Anti-vibration pads may be utilised to reduce any shaking or vibrations that may occur during flight, and the use of high-quality materials and 3D printing technology will ensure that the final design is both lightweight and robust.

Overall, we believe that our project has the potential to significantly influence the drone videography industry, and we eagerly anticipate developing and testing our final design.

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