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CONSTRUCTION SITE INSPECTION BY USING DRONE OR UAV

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Abstract-**The objective of this paper is to perform the innovative idea for the new structures of Constructure Site inspection, in civil sector, currently ongoing constructions sites are monitored manually which time consuming and also need human energy, time & cost, so to overcome this problem we are trying to develop this system. Our Construction Site Inspection by using Drone or UAV is based on organized real- time data that is gathered using a variety of cutting-edge instruments, such as drone, sensors, camera, and site photos etc. here advanced software is used to analyses the data, enabling better operations, planning and adjusting.**

Keywords— **Construction Site, Inspection, Monitoring, Drone.**

I. INTRODUCTION

Construction site inspection drone or unmanned aerial vehicle (UAV) is based on organized real-time data that is collected using a variety of cutting-edge tools, including a drone, sensors (photo/video camera, imaging camera, and sensors, etc.) A weekly, biweekly, or advance information preparation of the construction of work progress control over and compliance monitoring for workplace safety and security is necessary to obtain the high-resolution photos and videos. We are developed this system since the monitoring of active construction sites in the civil sector at the moment is labour-intensive, time-consuming, and expensive. Using drones for construction site inspection can provide several benefits compared to traditional methods. Drones can capture high-quality images and videos from various angles and heights, allowing for a more comprehensive view of the construction site. Drones can capture high-resolution images and videos of the construction site from various angles, which can be used to create 3D models and maps. These models and maps can be used to track the progress of the construction project and identify any delays or issues that may arise. Drones can capture information about the construction site quickly and efficiently, which can save time and reduce costs compared to traditional inspection methods. Additionally, drones can be used to identify potential issues early on, which can help to prevent costly delays and rework. Overall, the use of drones or UAVs for construction site inspection provides a range of benefits and can help to improve safety, quality, and efficiency on construction project.

II. LITERATURESURVEY

"An overview of using drones for construction site inspections" by J. Seo and M. Al-Hussein. This paper provides an overview of the benefits of using drones for construction site inspections, including increased efficiency, accuracy, and safety."Drone-based monitoring and inspection of construction sites: A review" by H. Rahimi and H. Shahrokni. This review paper summarizes the recent advancements and challenges in the use of drones for construction site monitoring and inspection, including data processing and analysis techniques. Unmanned aerial vehicles for construction site monitoring and inspection: A review of applications and technologies" by A. Alharbi et al. This paper presents a comprehensive review of the different applications and technologies used in the field of drone-based construction site monitoring and inspection."A review of unmanned aerial vehicle applications for construction site inspection" by S. Shakya et al. This review paper discusses the various applications ofdrones in construction site inspection, including site mapping, progress monitoring, and safety inspection."A case study of drone-based construction site inspection for quality control" by B. Yang et al. This paper presents a case study of the use of drones for quality control inspections on a construction site, demonstrating the benefits of using drones for identifying defects and reducing inspection time."Application of drone-based inspection for construction safety management" by Y. J. Kim et al. This paper discusses the use of drones for construction site safety inspections, including identifying hazardous conditions and monitoring workers' compliance with safety regulations. "Integration of drone and BIM technologies for construction site inspection" by Y. Li et al. This paper proposes an integrated approach using drones and Building Information Modelling (BIM) technologies for construction site inspections, including automatic defect detection and documentation.

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III. PROPOSED SYSTEM

In order to overcome limitations, the proposed system is work like**,** first we collect pictures and videos through drone as input then we generate 3D/2D model using that collected data which is current ongoing construction site model, then we compare current model with actual 3D model of site which is generated by civil contractor or by supervisor and generate result as in form of report that indicates percentage of work done then user can access that report via UI (User Interface).

1) Research stage.

The method of the research is quantitative research to comparison of data collected manually and actual data created by civil engineers or by contractors. It is essential to establish regular air routes over and around the construction site for real-time performance assessment as the project continues to realise the constructor's vision. Contractor, Supervisor and everyone else involved in the construction process can benefit from this data. The company encourages monthly site visits to monitor progress towards reaching major moments.

2. Data Collection

2.1) UAV technology

Unmanned Aerial vehicle is method for gathering data is through quantitative observation. UAV technology is directly used in the project area, dam construction, building construction, and highway construction. Drones collect data by allowing users to take pictures, videos, maps, surveys, and inspections in places where people are physically unable to get. This provides a wide range of sectors with real-time information.

2.2) Building Information Modelling (BIM)

The secondary data come from BIM module where we design model which will going to be constructed. The process of creating and managing 2D, 3D, 4D, and 5D information for a construction project across several disciplines is known as building information modelling (BIM).

3) Drone Platform

Drones are airborne vehicles that may be flown remotely or autonomously and are not dependent on a human pilot to control them. The size of a drone can range from a few inches to over 200 feet, and its flight varies from a few feet to miles. Often, small drones are used in civil infrastructure since they are simpler to use and more adaptable for tasks involving infrastructure.

4) Systems for Identifying and Surveying

For the majority of drone applications in civil infrastructures, detection or surveying systems must be used. The most often used cameras are high resolution visual ones since they may be used for a variety of purposes, including monitoring construction sites and inspecting infrastructures.

5) Post-Data Processing Systems

Post-data processing systems refer to the technologies and tools used to analyse and extract insights from data that has already been collected and stored. These systems are used to identify patterns, trends, and relationships in data sets that can help construction site inspection to make more informed decisions.

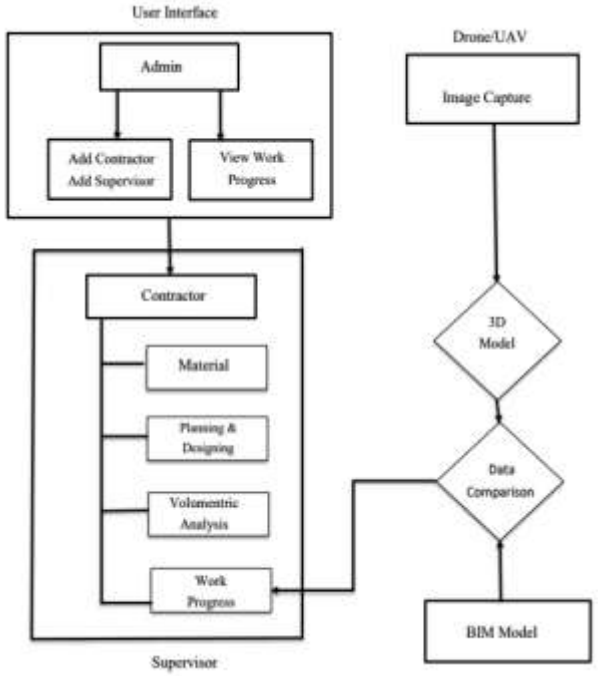

Fig. 1. System Architecture.

IV. METHODOLOGY

1) Image Processing

Image processing plays a vital role in drone technology. Drones are equipped with cameras that capture images and videos of the surrounding environment, and image processing is used to analyse and extract useful information from these images. Drones can capture high-resolution images of the terrain, which can be used to create 2D or 3D maps of the area. Image processing algorithms are used to stitch together the images and create a seamless map.

2) Volumetric analysis

Volumetric analysis of potholes is a process used to measure the dimensions and volume of a pothole. This analysis is important in understanding the severity of the pothole and determining the amount of material needed for repair. There are different methods for conducting volumetric analysis of potholes, but one common approach involves using a 3D scanner or photogrammetry. The scanner or camera captures multiple images of the pothole from different angles,

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which are then processed using specialized software to create a 3D model of the pothole. Once the 3D model is created, the volume of the pothole can be calculated by measuring the dimensions of the pothole in the model. This information can then be used to estimate the amount of material needed for repair, such as asphalt or concrete. Volumetric analysis of potholes is becoming more common in transportation infrastructure management as it provides more accurate measurements of the pothole and helps prioritize repair work based on the severity of the pothole.

3) AWS cloud.
AWS (Amazon Web Services) Cloud provides a range of services and tools that developers can use in coding and deploying their applications. Server less computing: AWS Lambda is a server less computing service that enables developers to run code without provisioning or managing servers. This means developers can write and deploy code without worrying about the underlying infrastructure.

5) BIM Model.
BIM is used to improve the efficiency and accuracy of the design and construction process. It allows stakeholders to visualize the building and make changes before construction begins, reducing errors and conflicts during construction. It also improves communication and collaboration between stakeholders, reducing the risk of delays and cost overruns. Additionally, BIM can be used to manage and maintain the building during its lifecycle, helping to reduce maintenance costs and improve energy efficiency.

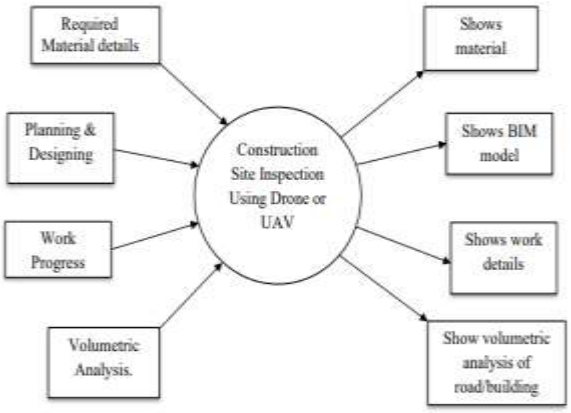

Fig 2: Data Flow Diagram of Construction Site Inspection using drone.

V. CONCLUSION

It is critical to keep all contractor and supervisor involved in the construction process informed. Progress reports are an excellent way to keep track of activities, keep investors involved, and save money by staying on track at all times. Drones collect accurate and timely data, which can then be converted into reports and that report accessed by supervisor and contractor also using user interface. Drones are being delivered to construction companies more quickly than ever due to their numerous advantages. Drones have proven to be an invaluable tool throughout the entire life cycle of a construction project, whether they are used by construction companies for topographic terrain mapping, building surveys, land surveys, construction site inspections, remote monitoring, progress reports, thermal imaging recording, or for integration with laser scanners.

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