LAND AREA CALCULATION USING UAV

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Abstract:

Research related to UAV is Growingrapidly, the challenges that lie ahead is solved with the help of advancement in technology. Now-a-days Still we are using the old technique for Calculating the Area. The Utilization of UAV to gather data for Slope Mapping become easier as it is easier, reliable, cost-effective. There will be Image capture by the UAV and with the help of software, The measurement of selected area can be determined easily. This modern method of mapping the area will be more effective in term of cost, Time consuming, less man power.

Keywords: *Unmanned Aerial Vehicle (UAV). K.K.2.1.5 Flight Controller. MATLAB.*

I. Introduction:

The interest in using unmanned aerial vehicles (UAVs) or simply drones in many different fields has increased significantly over the time and is continually growing. UAV is an aircraft which is piloted remotely by operator or by autonomous (fly-by-wire) system (ground station). They are used not only in military but also in a wide variety of civilian applications like surveillance, remote sensing, mapping, search and rescue, etc.

Many industries require surveyors to provide maps of areas of land. From establishing the general grade of an area to creating detailed maps of every square foot, drone surveying makes the job easier, faster and safer for surveyors.

The UAV is equipped with sensors such as GPS, distance sensors, and cameras, which gather data about the land. The drone is also equipped with actuators such as motors and servo motors, which allow it to move and change direction. It is also safer, as it eliminates the need for humans to physically traverse rough or dangerous terrain. Overall, a land area calculating UAV is a powerful tool for land surveying, mapping, and other related applications. Drones can scan acres of land in a fraction of the time it takes to manually survey on the ground, especially in areas of challenging terrain.

II. Related Work:

""Slope Mapping using Unmanned Aerial Vehicle (UAV) (2021)" Muhammad Farhan Zolkepli1, Norlina Mohamad Rozar 2, Mohd Fakhru Razi Ishak3*, Mohamad Hazeem Sidik4, Nurul Amira Shubhada Ibrahim5, Muhammad Shamsul Imran Zaini. [1] describes “Weather Forecast prediction for agriculture”. This paper discusses the applications of unmanned aerial vehicle (UAV) for slope mapping and also its important parameters including perimeter, area and also volume of certain selected area. With the development of modern technology, the utilization of UAV to gather data for slope mapping becoming easier as it is quick, reliable, precise, cost-effective and also easily to operate. Modern UAV able to take high quality image which essential for the effectiveness and nature of normal mapping output such as Digital Surface Model (DSM) and Digital Orthophoto. This photo captured by UAV will later transfer to commercial software to generate full map of study area. With the help of established software, the measurement of selected study areas can be determined easily which can be considered as the main interest in this study. In addition, another outcome of this study is, this

modern method of mapping will be compare to traditional method of mapping which proven to be more effective in term of low costing, low time consuming, can gather huge amount of data within short period of time, low man power needed and almost no potential risk of hazardous effect to man.

""Deep Convolutional Neural Network-Based Autonomous"" (2019) Drone Navigation K. Amer, M. Samy, M. Shaker and M. ElHelw Center for Informatics Science Nile University Giza, Egypt.[2] This paper presents a novel approach for aerial drone autonomous navigation along predetermined paths using only visual input form an onboard camera and without reliance on a Global Positioning System (GPS). It is based on using a deep Convolutional Neural Network (CNN) combined with a regressor to output the drone steering commands. Furthermore, multiple auxiliary navigation paths that form a navigation envelope are used for data augmentation to make the system adaptable to real-life deployment scenarios. The approach is suitable for automating drone navigation in applications that exhibit regular trips or visits to same locations such as environmental and desertification monitoring, parcel/aid delivery and drone-based wireless internet delivery. In this case, the proposed algorithm replaces human operators, enhances accuracy of GPS-based map navigation, alleviates problems related to GPS-spoofing and enables navigation in GPS-denied environments. Our system is tested in two scenarios using the Unreal Engine-based AirSim plugin for drone simulation with promising results of average cross track distance less than 1.4 meters and mean waypoints minimum distance of less than 1 meter.

Tannant, D.D., Giordan, D. and Morgenroth, J. (2017). ""Characterization and Analysis of a Translational Rockslide on a Stepped Planar Slip Surface"" Eng. Geol. 220, 144-151.[3] In 2014 a small stepped-planar rockslide blocked a road near the town of San Germano Chisone in northwest Italy. Photographs of the rock cut that failed above the road were taken before and after the rockslide occurred. Some photos were acquired with the assistance of a UAV. These photos were used to conduct a forensic analysis of the rockslide. With the aid of photogrammetry software, it was possible to characterize the slope geometry and the larger geological structures that influenced the slope behavior. A stepped-planar slip surface and the shape of the slabs of rock that failed were defined by discontinuities and these were well documented in the 3D photogrammetry models. The effective dilation angle was estimated from an assessment of the roughness of the discontinuity surfaces forming the slip surface. The stability of the rockslide was analyzed as a stepped translational failure mechanism. A two-block force equilibrium model of the rockslide was developed. With this analytic model, both deterministic and probabilistic methods were used to study the influence of water pressure as well as time-dependent shear strength degradation along the discontinuities and corrosion of rock bolts. The analysis suggests that the rockslide was caused by a combination of inadequate rock support, time-dependent shear strength degradation, and water pressure in the joints resulting from above average rainfall.

III. Methodology

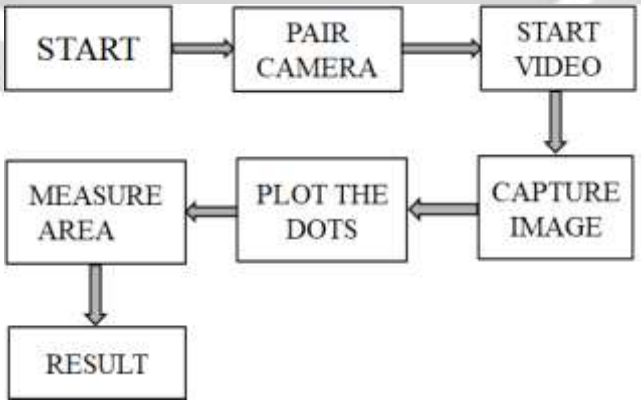

Fig.3.1 Block Diagram

- ✓ **Step 1:** Is to prepare the base on which the parts will be placed.
- ✓ **Step 2:** Attach the Quadcopter Frame and attach them to the base.

- ✓ **Step 3:** Assemble the Flight Controller and Motors.
- ✓ **Step 4:** Solder the Circuits.
- ✓ **Step 5:** Done all the Connections.
- ✓ **Step 6:** Tested the Transmitter and Receiver.
- ✓ **Step 7:** The UAV (Unmanned aerial vehicle) is ready.
- ✓ **Step 8:** After the UAV is ready the camera will start the video and capture the image.
- ✓ **Step 9:** Plot the dot of specific space that the area is being calculated.
- ✓ **Step 10:** Send Image to the MATLAB Software.
- ✓ **Step 11:** The MATLAB Software will give the accurate area of Plotted dot.

IV. Result

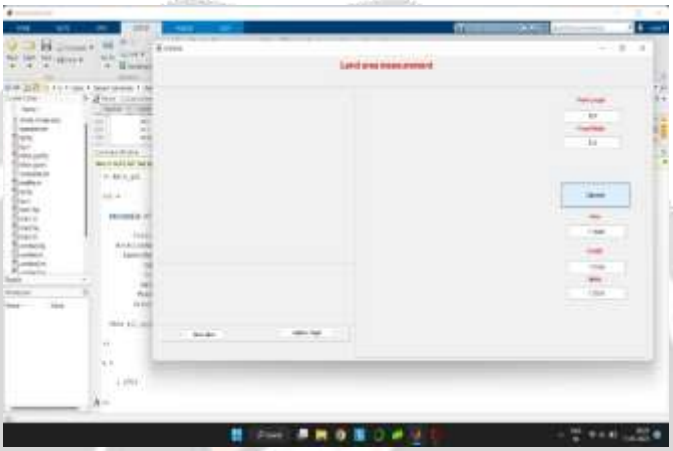

Fig4.1 Area Calculaiton

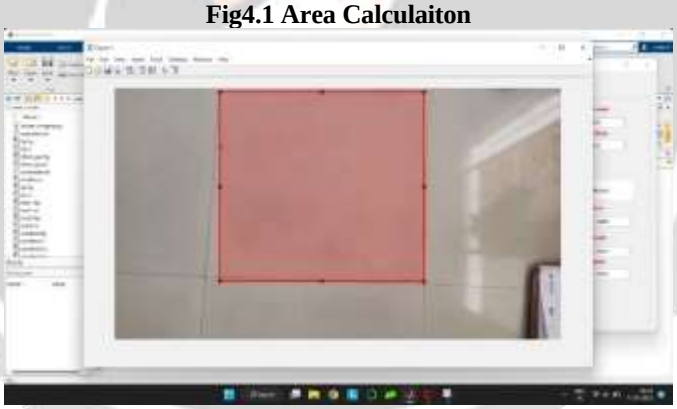

Fig 4.2 Image Capture

Observation and Result Taken from 3 feet

HEIGHT	3.00 FT
PIXEL LENGTH	879 PIXEL
PIXEL BREADTH	813 PIXEL
AREA	1.74469 SQFT

V. Conclusion:

The results indicate that using UAV's, with proper training and techniques, it is possible to obtain high quality

photogrammetric products comparable to ground surveying equipment. Comparing to the time and cost it would have taken to produce such data using traditional equipment, UAV is a more promising alternative for photogrammetric surveying.

VI. References:

1. ""Slope Mapping using Unmanned Aerial Vehicle (UAV) (2021)" Muhammad Farhan Zolkepli1, Norlinda Mohamad Rozar 2, Mohd Fakhrurrazi Ishak3*, Mohamad Hazeem Sidik4, Nurul Amira Syuhada Ibrahim5, Muhammad Syamsul Imran Zaini.

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3. Tannant, D.D., Giordan, D. and Morgenroth, J. (2017). ""Characterization and Analysis of a Translational Rockslide on a Stepped Planar Slip Surface"" Eng. Geol. 220, 144-151.