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A Review on Computer Vision Based Mechanism for tracking the objects using Surveillance Drone

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ABSTRACT

A drone is a flying robot that can be remotely controlled or fly autonomously through software-controlled flight plans in their embedded systems, working in conjunction with onboard sensors and GPS. Drones are more formally known as unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UASes).This paper presents a comprehensive survey on surveillance drone which is an unmanned flying object. Our focus is of identifying the terrorist with weapons investigating a wide range of drone technologies and categorized it to use for identification and detection by adding some features. Face identification is the thriving technology that utilizes the image processing for the identification of human faces. The goal of this paper is to explore, compare on contrast numerous face identification algorithm. Here Digital image processing is the use of a digital computer to process digital images through an algorithm. Also it is an open source computer vision library basics which is an application designed with the purpose of facilitating the initiation of industrial engineering students in the field of computer vision making the process easier more dynamic and more direct. The main aim of the project is to recognize the face of person using drone camera and load all information about that person sitting in the server room. It is useful for biometric attendance, for military operations at remote areas and for surveillance purpose. Depending upon the criteria more feature can be added.

1. INTRODUCTION

Artificialintelligence (AI)isafieldofsciencewhichaims to automate the activities that require human intelligence. AI is currently deployed atmultiple domains such as guiding robots in the battlefield, driving cars, recommending policies togovernment officials, predicting pregnancies, andclassifying customers. AI has multiple subareas such asmachine learning, computer vision, knowledge-basedsystems, and many more. Advances in micro air vehicles, also known as drones, take advantage of opportunities in the several industrial domains, from agricultural engineering to military missions. The drone market throughout the world is expected to increase. Drone control makes use of attitude control based on a GPS position sensor, which enables a drone to fly to a specified destination. Rapid expansion of the drone industry has surpassed regulations for safe and secure drone operation, which makes them representative means of the illegal and destructive terrors and the crimes. Alsothe increase of drones used for surveillance has given rise to the idea of face recognition drone where the drone recognizes the person next to it.

In recent years, the powerful features of drones have been improving, resulting in drones becoming a major field instrument for researchers. To perform most of the unmanned aerial vehicle (UAV) applications, the computer vision method has a vital role image. Computer Vision refers to techniques that enable a computer to be able to recognize an input imagefromacameraandgive"humanvision"toit.

Computer Vision consists of: image processing, recognition, analysis, and understanding [9]. The most challenging part in computer vision is Face detection. The computer vision method in drone applications ranges from basic and simple aerial imagery to perform super complex task such as aerial refueling or rescue operations. The methods for performing the application accurately require reliable decision- making and precise maneuvering tasks Al-Kaff etal [2]. For Example: Traditionally railway track inspection is carried out using human inspector or through an automated vehicle that is infrequent and a complex process. Due to advancement in technology and demand of effective and better track monitoring has increased the use of computer vision based monitoring system in railways. Hence railway track analysis through drones is studied. Drones provide flexibility to operate at various heights and in adverse terrains where regular inspection methods cannot be applied. Therefore, aerial images from drones provide useful information for analysis[10].

Radar was regarded as a limited solution for drone detection due to inflexible radar cross sections (RCS) [11], but recent radar technology advances enable arbitrary drone detection with acceptable identification rate [12]. Thus, radar is becoming adopted for long range drone detection [13], but its use also suffers from national regulations, such as RF license policies [14]. Growth of population has raised the problem of security where surveillance is an effective measure. In recent study [15] it has been observed drones with autonomous flying capability having Raspberry Pi incorporated to it helps us to capture a live transmission of video that is coming through the drone. It provides a comparison of the drone in various flight mode with variation. A transmitter working on 915MHz is used. In this prototype computer vision acts as an additional part which helps to recognize the people and with GPS in the drone tells the exact location where the prototype is flying.

Next the use of video technology has increased exponentially, making it an essential medium in our lives. Video has the ability to depict real scenes visually, featuring information related to geolocation, special circumstances, and the visual identification of humans.

2. LITERATURE SURVEY:

According to this paper [1] there are many concept about the image processing and the feature of the image processing and also image processing contain leaning phase and feature phase. In learning phase, learning images are converted into feature data, and feature data are converted into learning result data by using machine learning. Then it test and predict the model of the drone according to the given data and information. It use the haarcascade method its opencv files content which have all the detail of the face data and eye data in form of the value and the file format will be xml file .Open CV is face detection method to detect or identity the face of the webcam or in photos. Here they used the predictiondifference environment in which it was collected. Some organizations such as the ISO (International Organization for Standardization)and IEC (International Electro technical Commission) have established standards for video data security to improve social safety and resilience, this is not enough. Even at the national level, policies such as the GDPR (General Data Protection Regulation) have been established to protect people's privacy; however, they are not considered to be thorough countermeasures to prevent advanced crime. Hence found among potential methods to protect video data, intelligent security is the most promising, and it can be defined as a combination of intelligent technologies, such as adaptive and awareness, with security that can actively respond to various threats. It also can enhance the efficiency of overall system functions such as management, transport, and searching[16].

Detection of object [17] with the help of artificial neural network has come out to be another useful way, where GPU are used to process algorithms. Implementation of AI for object detection with the use of Neural network. It helps the system to get knowledge about the

requested object. Digital neurons never get tired as compared to the biological neurons which helps the system to maintain the quality of processing constant. The paper deals with a drone which has its location being directed by GPS giving its exact location. The most important aspect of this paper deals with the detection of unidentified human faces. A database of images will be stored in our system. Small size drones creating less noise are made with Raspberry Pi attached to it which is using Open CV .The proposed face detection system has various step (1) Face detection of the individual (2) Feature extraction and representation of face (3) The extracted feature are classified using support vector machine which will be compared with the database using K-nearest neighbor based classification technique. Between the brightness of two adjacent areas the difference in brightness between the white areas (R_1) and black areas (R_2) are mapped. In [2] they gave clear content about the data acquisition and data pre-processing method. Data acquisition method is considered as a crucial task in computer vision applications.

In paper [4] in order to propose a detailed taxonomy for video data security research has undertaken. Also, they analyzed studies combining video data security and intelligent technology for identifying the trends. Data extraction and Data analysis has been done. The processes of data extraction and data analysis are necessary to provide answers to their research questions. In conclusion, the literature's internal information (addressing RQ1) and external information (addressing RQ2) were used as data for answering the research questions. They first located relevant works on intelligent video data security and then analyzed them. They were able to design a taxonomy mainframe for video data security based on studies extracted through their search strategy. They established the taxonomy's components by reviewing a range of literature related to video data security (user access control, visual security, video data validation). In this study, they have also analyzed not only video but also studies on intelligent visual security focusing on images, but the number of studies that only considered video is rare [4]. The challenge they had is to share information between existing devices and newly distributed devices due to this heterogeneity. To address this challenge, heterogeneous devices require specialized architecture whereby a centralized management server CMS) and the client handle various types of media encoding and connection protocols [19]. Finally, the taxonomy was obtained by examining the diverse research areas of video data security based on their proposed process rather than through the results of analyzing the extractedliterature [4].

In [5], they proposed a deep unfolding super resolution network (USRNet) to bridge the gap between learning-based methods and model-based methods. On one hand, similar to model-based methods, USRNet can effectively handle the classical degradation model. On the other hand, similar to learning-based methods, USRNet can be trained in an end-to-end fashion to guarantee effectiveness and efficiency. To achieve this, they first unfold the model- based energy function via a half quadratic splitting algorithm. Compared to plain learning-based methods, deep unfolding methods are interpretable and can fuse the degradation constraint into the learning model. However, most of them suffer from one or several of the following drawbacks. (i) The solution of the prior subproblem without using a deep CNNisnotpowerfulenoughforgoodperformance. (ii) The data subproblem is not solved by a closed- form solution, which may hinder convergence. (iii) The whole inference is trained via a stage-wise and fine-tuning manner rather than a complete end-to-end manner. Furthermore, given that there exists no deep unfolding SISR method to handle the classical degradation model, it is of particular interest to propose such a method that overcomes the above mentioned drawbacks. The main novelty of the proposed network is that it can handle the classical degradation model via a single model. Specifically, the proposed network consists of three interpretable modules, including the data module that makes HR estimation clearer, the prior module[21] that makes HR estimation cleaner, and the hyper-parameter module[18] that controls the outputs of the other two modules. As a result, their proposed method can impose both degradation constrain and prior constrain on the solution.[8]Paper presents a brief idea about advancements in drones using Raspberry PI. A camera is attached with drone which helps PI to capture images and then PI can process it further to

recognizeperson. Further, Table 1 demonstrates the recent research related to the surveillance drone.

Research papers	Thermal detection	Drone pre-processing	Computer vision
Survey on anti drone system	Available	Unavailable	Available
Accuracy Improvement of Image Recognition	Unavailable	Unavailable	Available
Vision based rail track extraction and monitoring through drone imagery	Unavailable	Available	Available
Face Recognition Drone	Unavailable	Unavailable	Available
Intelligent Video Data Security: A Survey and Open Challenges	Unavailable	Unavailable	Available

Table 1: Recent research related to the surveillance drone.

3. CONCLUSION:

As our idea we are going to take everything as automated even face detection. We can use this drone in various purposes especially for military, police secret mission, etc. Using the face detection method we can detect the face in rural area and even the drone can go places and get information about the personinsecretplacewherehumancan't.Theproject is yet to be done by keeping the idea of surveillance in military areas. It is difficult to run an operation in militaryareaswhereanarmy'slifeisalwaysindanger and such technology can be used for better operation in such areas. This will also helps us to prevent many lives of our soldiers. For further research we can include the thermal image camera, because in night timethenormalcan'tbeused towatchthevision. So we can use the night vision camera or thermal image camera .Hence thermal image is low cost than the night vision camera. Here we use haarclassifer dataset which have complete detail about the face as number value. This will helpful for future research direction for both academician and industrialist.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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