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TARGETED SURVEILLANCE DRONE WITH INTEGRATE FACIAL RECOGNITION AND LOCATION ALERTS

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ABSTRACT
Nowadays, security applications are becoming increasingly popular and are being used in many real time scenarios. Visual surveillance is a promising method that allows for the detection, tracking, and recognition of certain objects using computer vision technology. While many methods have been developed for recognizing faces from images, new techniques have also been introduced for detecting faces in videos. These video-based methods provide additional information that can enhance security systems. "The use of facial recognition and location tracking technology on surveillance drones could greatly improve public safety and help law enforcement. This paper looks at the current state of research on these drones, including their main features, benefits, and challenges. his research utilized a structured development and testing approach, broken into multiple phases: system design, algorithm training, software integration, flight testing, and performance evaluation. Emphasis was placed on modular development to allow independent testing and upgrades of components (e.g., facial recognition, GPS tracking, alert system).

INDEX TERMS: *Unmanned Ariel Vehicles (UAVs), Facial recognition, surveillance drone, Artificial intelligence, location alerts.*

I.INTRODUCTION

The rapid advancement in unmanned aerial vehicle (UAV) technology, coupled with developments in artificial intelligence and computer vision, has opened new possibilities in automated surveillance systems. Drones equipped with facial recognition capabilities offer a powerful tool for real-time monitoring, especially in high-security areas, public events, and border control operations. This paper presents a targeted surveillance drone system designed to autonomously identify individuals of interest using facial recognition, while simultaneously providing live location-based alerts. The goal is to enhance situational awareness and response capabilities in critical security scenarios, while also considering the ethical and legal implications of such technology.

II. METHODOLOGY / WORKING MODEL

Step 1: Surveillance & Detection
The drone flies autonomously or via remote control, capturing visuals using onboard cameras. Object detection algorithms filter out non-human objects.
Step 2: Facial Recognition: When a human face is detected, facial features like eye distance, jawline, and nose structure are extracted and compared with a preloaded database using CNN and Face Net.
Step 3: Target Tracking & Alerts Upon positive identification, GPS coordinates are tracked and sent to authorities with time-stamped.

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III.MODELING AND ANALYSIS

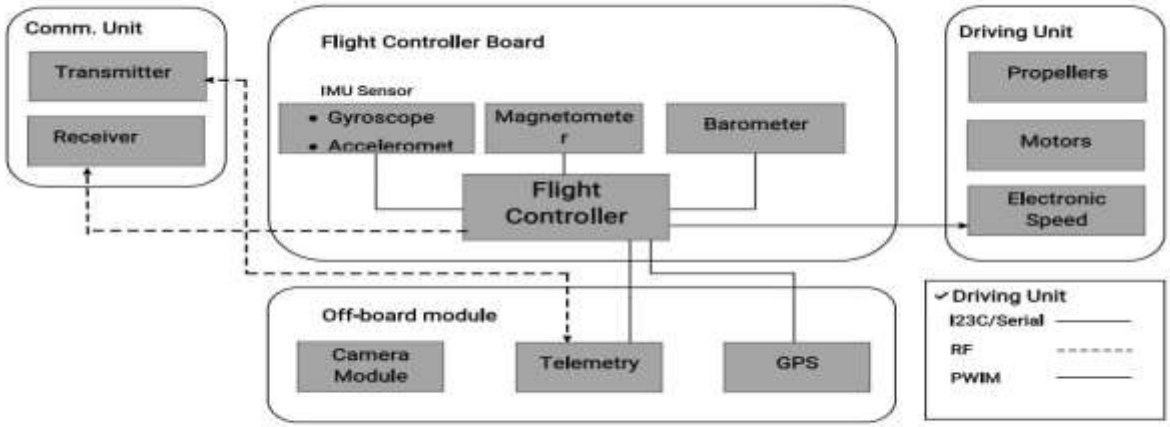
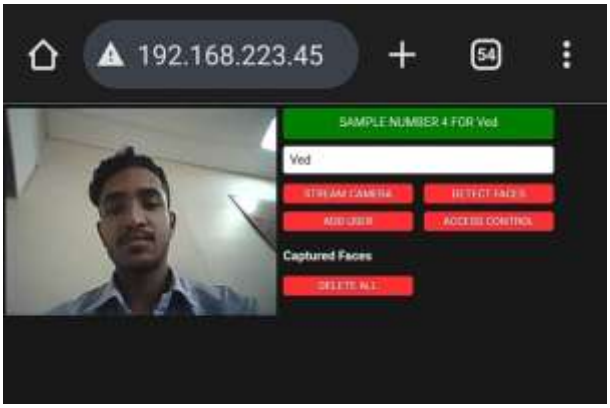


Figure No:01

1. Communication Unit (Comm. Unit): Transmitter: Sends control signals from the user (remote controller or ground station) to the drone. Receive: Receives those signals and sends them to the Flight Controller. Connection: Communicates via RF (Radio Frequency) with the receiver.
2. Flight Controller Board: The brain of the drone. It interprets input from sensors and the receiver to control the motors and stabilize the drone.
3. Driving Unit: Electronic Speed Controller (ESC): Regulates the speed of the motors. Motors: Provide thrust. Propellers: Convert motor spin into lift and movement. Controlled by: The Flight Controller using PWM.

IV.RELATED WORK



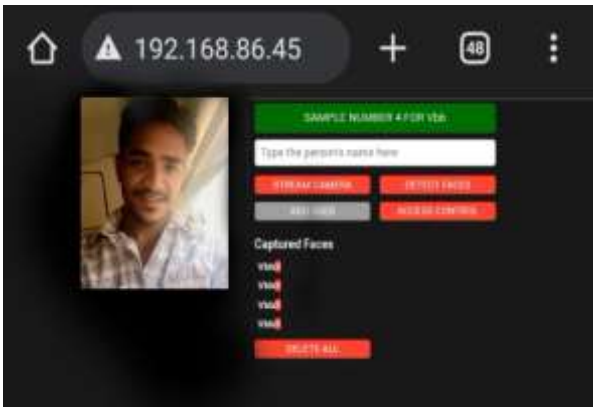


Image No.01 **Image No.02**

this study proposes a real-time face recognition and geospatial alert system designed for security applications, leveraging the ESP32-CAM module. The framework employs algorithms to detect and identify individuals using a multi-sample enrolment strategy, where 7 facial images per subject are captured during registration. These samples encompass variations in pose, illumination, and expression to enhance recognition robustness, addressing challenges posed by environmental variability. Enrolled identities are assigned user-defined names (e.g., "Ved"), enabling intuitive identification during alerts and database management. Upon detecting a flagged individual (e.g., a criminal), the system triggers a location-based alert by integrating geospatial data. Coordinates are derived either from a GPS module or approximated through network geolocation using the device's IP address (e.g., 192.168.223.45). These coordinates are dynamically displayed on a web-based interface, visualized via mapping APIs such as Google Maps, allowing security personnel to monitor detections in real-time. The alert mechanism includes critical metadata such as the recognized name, timestamp, and location, formatted for seamless integration with communication protocols.

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V.RESULT AND COCLUSION

Still Images: This involves using photographs to identify someone



Image No. 03



Image No. 04

Live Video: This involves recognizing faces in real-time, such as during a video call or surveillance.: The very first step in the face recognition process is called face detection. Before the system can identify who someone is, it needs to locate the face within the image or video. This means the system scans the input (whether it's a photo or a video stream) to find the face. This initial step is crucial and is referred to as either face detection or face acquisition. It's like the system saying, "I need to find the face first before I can tell who this person is." Once the face is detected, the system can then compare it to a database of known faces to identify the individual.

CONCLUSION

The integrated drone system demonstrates significant potential in automated surveillance by effectively identifying individuals and delivering real-time location alerts. The proposed system successfully combines advanced image processing, AI-powered facial recognition, GPS tracking, and real-time alert mechanisms to enhance situational awareness and response capabilities.

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