

# **STUDENTS PROJECT PROPOSAL**

*On*

**UNMANNED AERIAL VEHICLE FOR CRIME DETECTION AND RESCUE**

*Submitted to*

**TAMILNADU STATE COUNCIL FOR SCIENCE AND TECHNOLOGY**



## **Students Team**

- 1. Allwin Meshach Hezron T(310620106012)**
- 2. Bhuvaneshwaran L(310620106021)**

**Electronics and Communication Engineering**

**Easwari Engineering college,**

**Chennai 600 089**

# UNMANNED AERIAL VEHICLE FOR CRIME DETECTION AND RESCUE

## INTRODUCTION

In an era characterized by technological innovation and the growing need for efficient disaster management, search and rescue operations, and crime prevention, the development of an **Autonomous Unmanned Aerial Vehicle (UAV)** represents a significant leap forward in addressing these critical challenges. This project endeavours to harness the power of cutting-edge technology to create a versatile UAV system capable of **autonomous flight, real-time data capture, and intelligent analysis** for enhanced decision-making in emergency **crime scenarios**.

This project's mission is to design an autonomous UAV that can adapt to these diverse demands, offering a comprehensive solution for disaster management, search and rescue, and crime detection. Missing Person Detection mode equips the UAV with the ability to scan predefined search areas and identify missing individuals through machine learning analysis of captured images. First Aid Delivery mode empowers the UAV to carry and deliver first aid kits to specified locations, providing immediate assistance to those in need. In Crime Detection mode, the UAV captures images of potential crime scenes and sends them to the server for automated machine learning-based analysis, aiding law enforcement agencies in identifying and responding to criminal activities.

## OBJECTIVE

The primary objectives of this project are to develop an **autonomous drone system** capable of enhancing security through **proactive surveillance** and aiding search and **rescue missions** through advanced computer vision technology. This system aims to improve response efficiency, minimize risks to human personnel, and contribute to public safety by revolutionizing crime detection and response operations.

## METHODOLOGY

The autonomous drone system is designed for search, and surveillance operations. This versatile system operates in two distinct modes, each tailored to address critical scenarios with advanced technology.

**Mode 1:** transforms the drone into a vigilant security patrol vehicle, monitoring particular areas sent via server as GPS coordinates and identifying crimes that have happened. This proactive approach enhances security and reduces risks to human personnel.

**Mode 2:** employs cutting-edge computer vision and facial recognition algorithms to identify and locate individuals in designated areas, providing critical information to ground teams for prompt action, especially in search and rescue missions.

**Key components:** Flight Controller for stability, Raspberry Pi for data processing and communication, Arducam Camera for video capture and efficient power management with a Battery and Battery Management System (BMS). This system revolutionizes rescue operations, and crime surveillance, contributing to public safety and efficient response strategies. It marks a significant advancement in autonomous drone technology for a safer and more secure world.

The UAV's hardware components, including a flight controller, RF transmitter and receiver, rotor blades, Electronic Speed Controllers (ESC), brushless DC (BLDC) motors, a rechargeable battery, battery charger, Battery Management System (BMS), Raspberry Pi 3, Arducam Camera (12MP), first aid kit, and a GSM module, form a robust system capable of executing these critical functions. The Raspberry Pi 3 serves as the central processing unit, controlling the UAV's flight operations, capturing and transmitting images, and executing machine learning algorithms for data analysis.

These drones establish temporary communication networks and monitor environmental conditions to support effective response strategies. For rescue operations, UAVs offer rapid deployment capabilities and assist in tracking missing persons, even in challenging terrains enhancing the efficiency of rescue missions. In the realm of crime detection, UAVs serve as valuable tools for aerial surveillance, capturing the crime areas, capturing criminal activities, and assisting in decision management. They aid in locating suspects or missing persons, collect crucial evidence at crime scenes, and can even be deployed for crowd control during large events.

**Features:**

Novel Autonomous flight capabilities with GPS

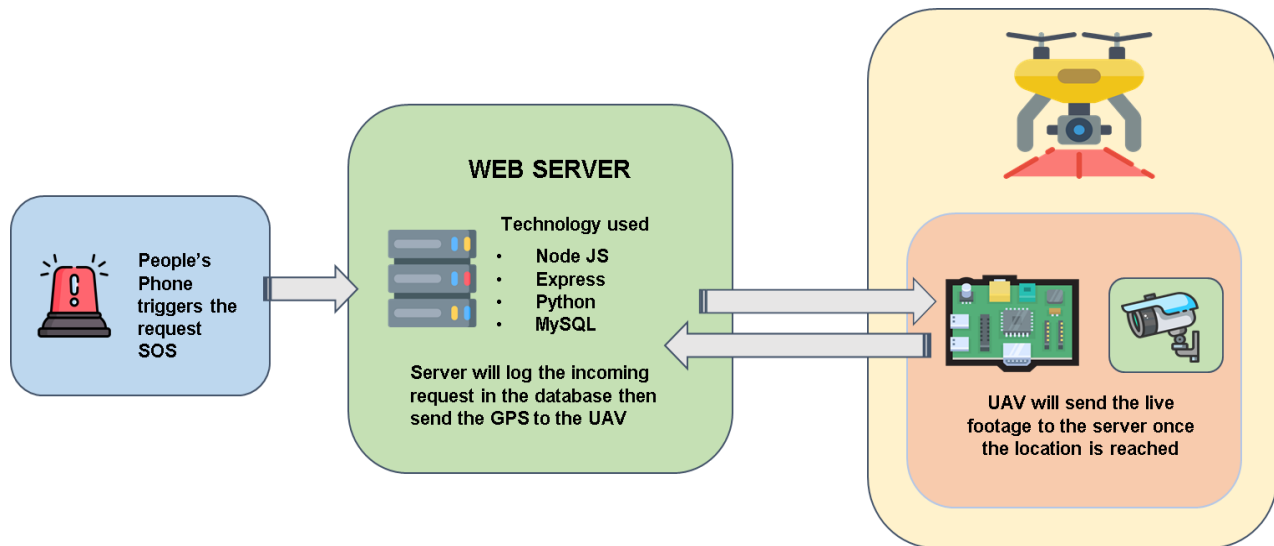
Rescue operations

Rapid deployment capabilities

Novel Assist in tracking missing persons

Operate in challenging terrains

## BLOCK DIAGRAM



## WORKPLAN (01.08.2023 - 30.04.2024)

<b>AUGUST 2023- SEPTEMBER 2023</b>	Back end Web server creation
<b>OCTOBER 2023- NOVEMBER 2023</b>	Data communication –UAV –Server checking-Image processing
<b>DECEMBER 2023-JANUARY 2024</b>	UAV Building- Autonomous flight testing
<b>FEBRUARY 2024- MARCH 2024</b>	Path detection to GPS, Flying mode verification
<b>APRIL 2024</b>	Testing of crime surveillance application

## BUDGET PLAN

Flight Controller	1000
BLDC motors	1000
Electronic Speed Controllers	450
Propeller Blades	350
Raspberry Pi 3	4000
Camera Module	1400
LIDAR sensors	450
14.8-volt Rechargeable LiPo Battery	500
UAV Frame	200
Battery Management System	150
GSM & GPS module	500
<b>Total</b>	<b>10,000</b>