DRONE AND UAV DETECTION FOR SECURITY APPLICATIONS USING DEEP LEARNING

AIM:

Design development of Drone and UAV Detection for security applications using Deep Learning.

PURPOSE:

The increasing popularity of unmanned aerial vehicles (UAVs) and drones has brought about significant benefits in various industries. However, it has also raised concerns regarding security and privacy, as malicious actors may exploit these devices for unauthorized surveillance, smuggling, or other illicit activities. This paper proposes an innovative approach to address this issue through drone and UAV detection for security applications using deep learning techniques. The proposed system leverages the power of Convolutional Neural Networks (CNNs) and other deep learning models to automatically detect and identify UAVs and drones from visual data captured by surveillance cameras, security systems, or drones equipped with on board cameras. By analysing the distinct characteristics and patterns of UAVs, such as their unique shapes and flight trajectories, the system can efficiently differentiate them from other objects in the environment. This camera rotates on servo motor, so that it can capture wide area. This proposed project title is Drone and UAV detection for security applications using deep learning.

DESCRIPTION:

ESP32 controller interfaced with ESP32 camera through UART port. Servo motor (MG996R) connected to esp32 controller PWM pins.

WORKING:

ESP32 controller sends PWM pulses to servo motors and servo motor rotates with some certain angle. ESP32 camera placed on servo motor and it will cover wide area. If any drone or UAV detected by

camera, it will send message to ESP32 controller. ESP32 controller enables buzzer or siren. Also it sends notification to IOT server.

TECHNICAL SPECIFICATIONS:

HARDWARE:

Microcontroller	:	ESP32 controller
Crystal	:	16 MHz
LCD	:	16x2 LCD display
Servo Motor	:	MGR996R DC 5V
Camera	:	ESP32 camera
Buzzer	:	5V DC
Power Source	:	12v 1 amp DC adaptor

SOFTWARE:

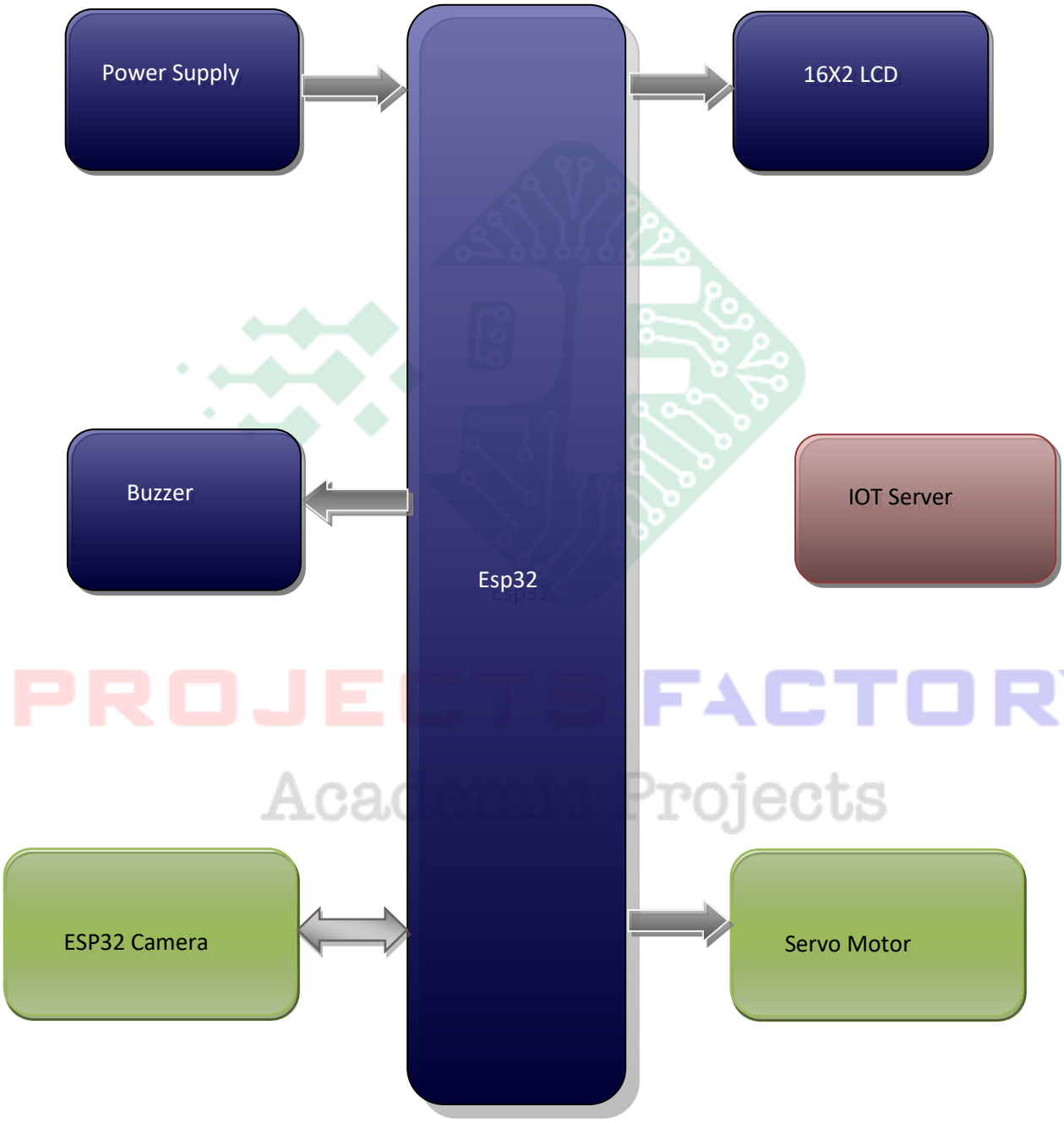
Arduino IDE

Proteus based circuit diagram

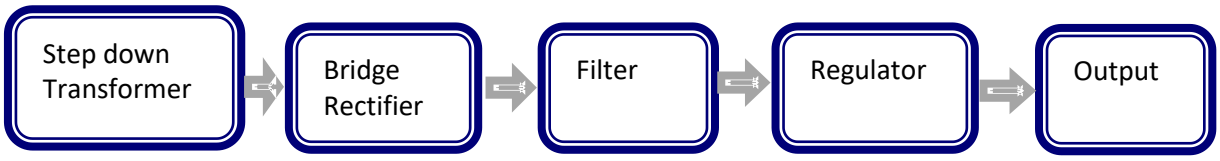
APPLICATIONS:

- Drone detection with computer vision
- UAV detection
- Deep learning based security application
- Artificial Intelligence based military security system

BLOCK DIAGRAM:



POWER SUPPLY BLOCKDIAGRAM:



INTERFACES COVERD:

- We have covered ESP32 controller programming and interface
- ESP32 cam and servo motor interface
- Deep learning models like CNN and RNN implementation