

# RASPBERRY-PI ULTRASONIC DISTANCE MEASUREMENT & ALARM SYSTEM

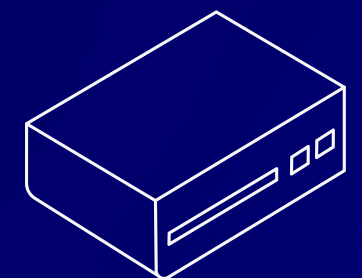
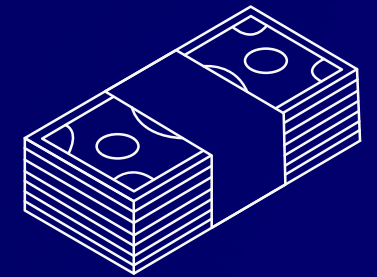
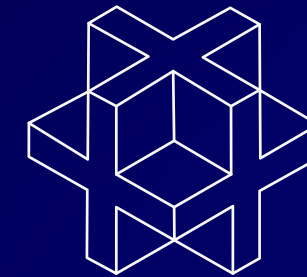
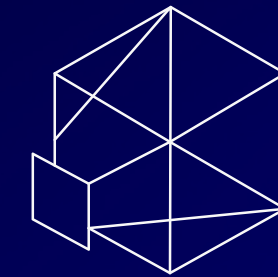
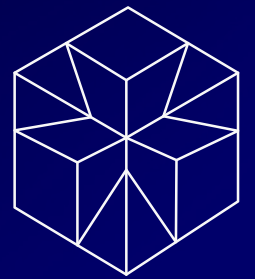
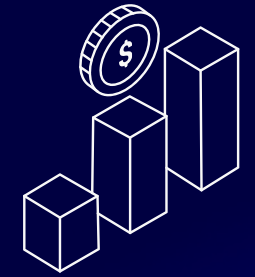
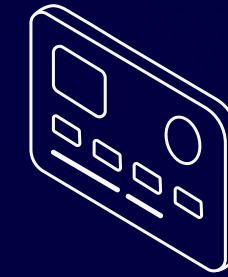
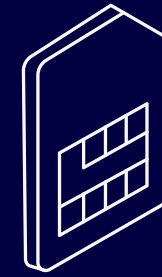
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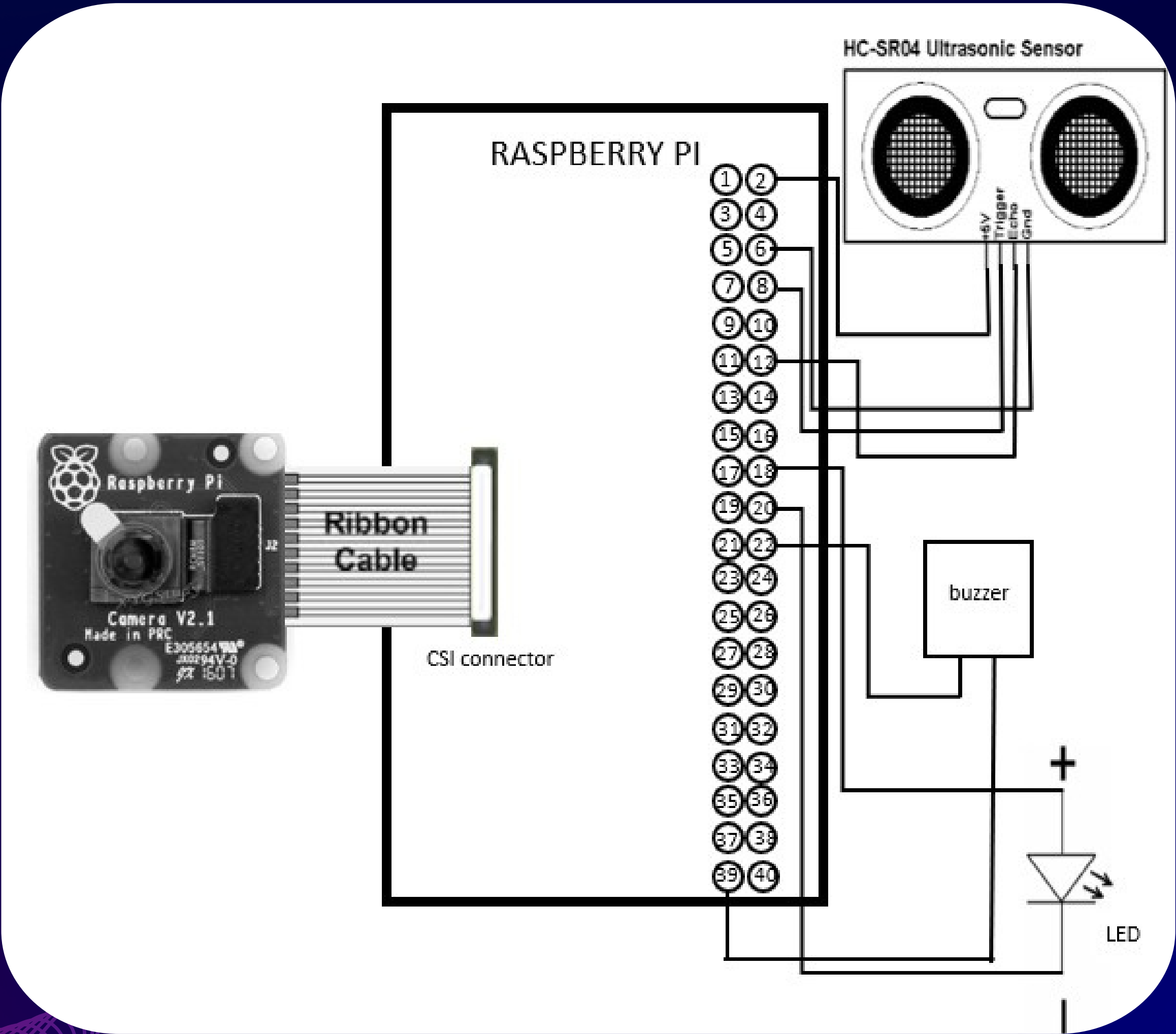
# ABSTRACT

This study presents the implementation of a Raspberry Pi-based ultrasonic distance measurement and alarming system designed to generate timely alerts upon detecting objects in close proximity to the device. The prototype seamlessly integrates four key components: an ultrasonic sensor for precise distance measurement, LED and buzzer modules as integral parts of the alarming system, and the Raspberry Pi Camera for real-time object visualization. The primary focus of this system is akin to modern-day car reverse alert systems.



# CIRCUIT DIAGRAM

COMPONENT	PIN SPECS
HC - SR04 ULTRASONIC SENSOR	TRIGGER PIN = 8 ECHO PIN = 12
LED	ACTIVE PIN [ANODE] = 18
BUZZER	ACTIVE PIN = 22





# WORKING PRINCIPLE

1

In Ultrasonic sensor, GPIO\_TRIG (pin 8) is responsible for triggering the ultrasonic signal, while GPIO\_ECHO (pin 12) is employed to receive the reflected signal. The system utilizes the time-of-flight measurement technique to calculate the distance between the sensor and the object accurately.

2

The LED is connected to GPIO pin 18 and is dynamically controlled using Pulse Width Modulation (PWM). When an object is detected within a 20 cm range, the LED is activated, creating a dynamic blinking effect.

3

A buzzer is linked to GPIO pin 22 and serves as an audible alert component. Upon detecting an object in close proximity, the buzzer emits an alarming sound. This feature contributes to the real-time alarming system.

4

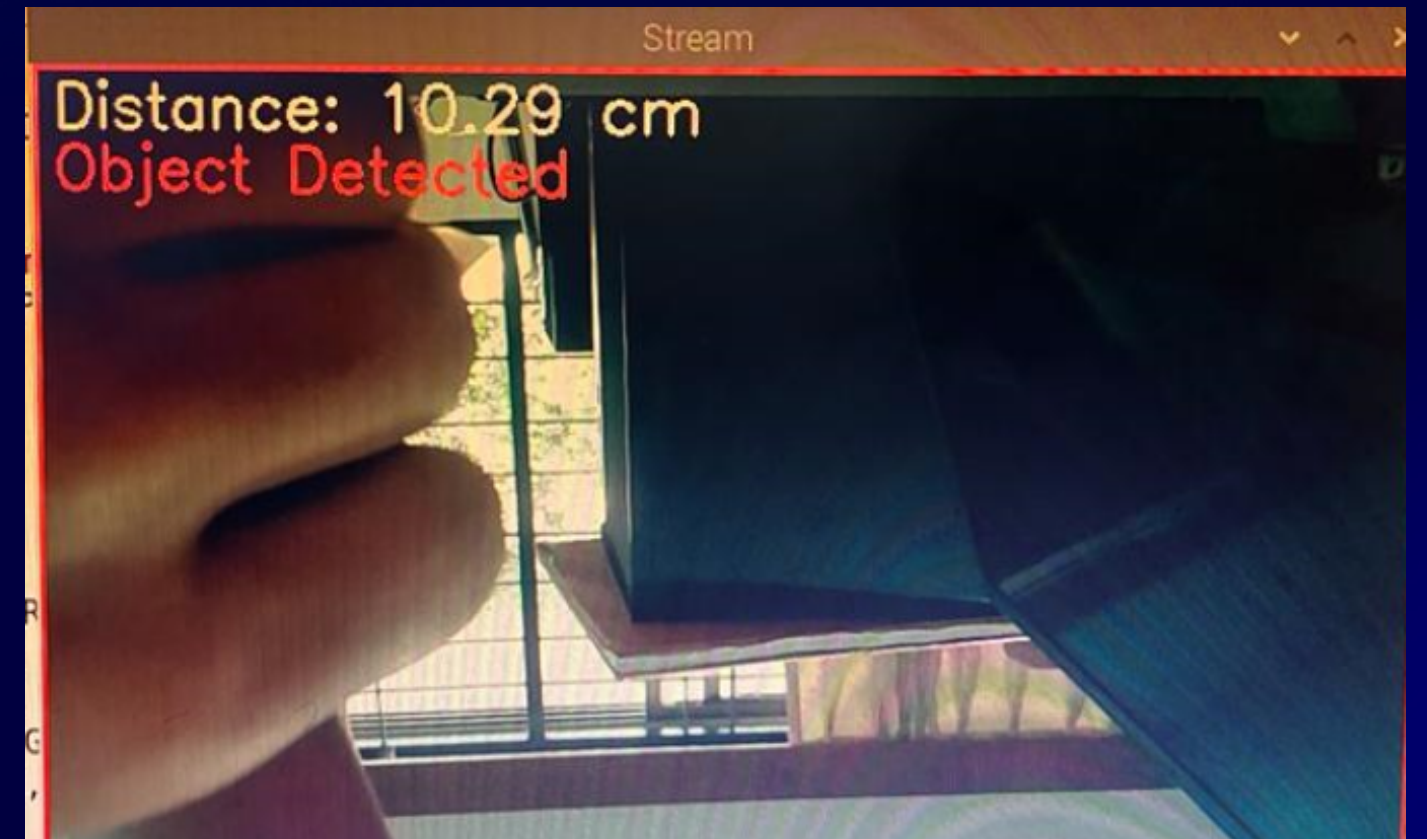
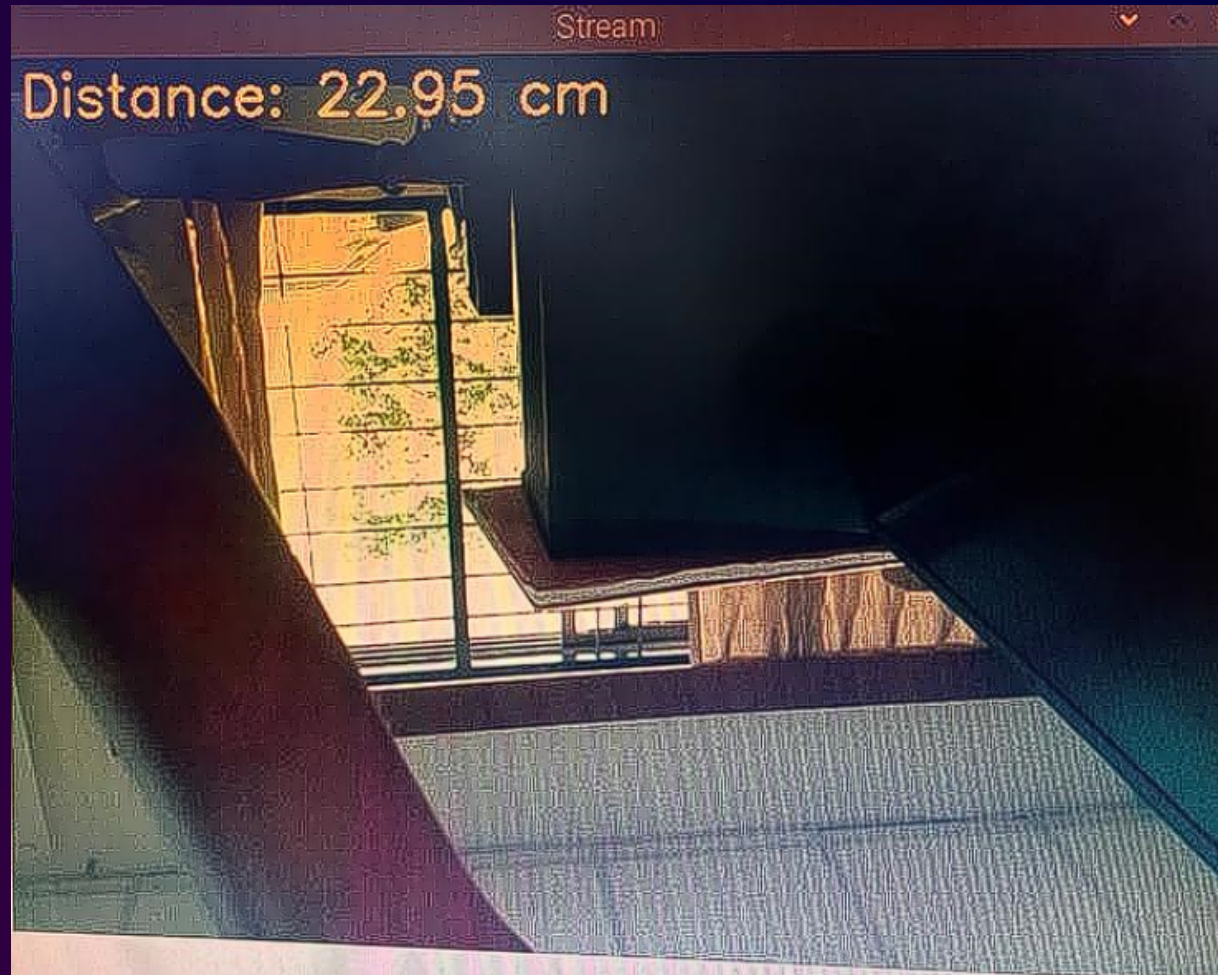
The Picam is seamlessly integrated into the system using a ribbon cable connected to the CSI connector on the Raspberry Pi. It captures real-time visuals of the object, providing users with a comprehensive display of their surroundings. This integration enhances the system's capabilities, especially in scenarios where visual confirmation is crucial.

5

The logical flow of the system is designed to ensure efficient and synchronized operation. Distance measurements trigger the LED blinking, buzzer activation, and Picam feedback. Conditional statements are implemented to determine the specific conditions under which alarms are triggered, creating a responsive and context-aware alarming system.



# OUTPUTS





**THANKYOU**