

BORDER SECURITY SYSTEM

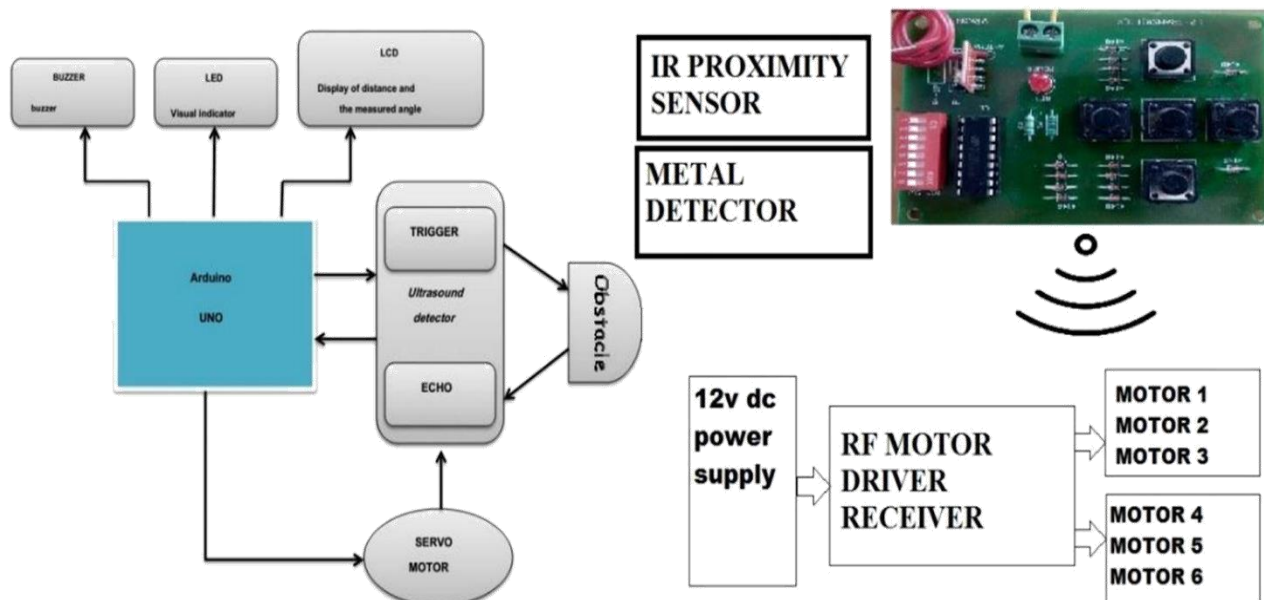
Abstract:

In this project we are designed Arduino based “BORDER SECURITY SYSTEM” using Ultrasonic Sensor for Detection & Ranging. Ultrasonic an object detection system that uses radio waves to identify the range, altitude, direction and speed of the objects. The ultrasonic antenna transmits radio wave pulses that bounce off any object in their path. The object returns a portion of the wave received by the receiver which is in line of sight with the transmitter. We are implement a DIY vehicle to move system from one place to another. Different sensor like proximity sensor, metal detector and ultrasonic sensor with LCD is placed on vehicle to detect the object and show the distance and angel of a object. Mechanical buzzer and different LED’s connected to give the response of a system. This project aims to find enemy or object present in the surrounding based on Arduino board, capable of detecting stationary and moving objects.

Working:

Ultrasonic sensor is placed on servo motor and it's rotate with the help of servo motor by 180 degree and it is connected to Arduino. Servo motor is rotating continuously by 180 degree. If object detected the wave transmitted by ultrasonic sensor touch the object and reflects back on the receiver of ultrasonic sensor. Arduino board sends a signal of +5V to trig pin of Ultrasonic Sensor HC-SR04 which triggers the sensor. Then it provides rotational action at the servo motor mechanically fitted along with ultrasonic Sensor HC-SR04 so that it can detect the moving objects and locate within 180 degrees.

Working Of Project



The Arduino sends a HIGH pulse width of (10 S) on the TRIGGER pin of the sensor to regenerate a series of ultrasonic waves which propagate through the air, until it touches an obstacle and returns in the opposite direction towards the sensor pin ECHO. The sensor detects the width of the pulse to calculate the distance.

The signal on pin ECHO the sensor remains at the HIGH position during transmission, thereby measuring the duration of the round trip of ultrasound and thus determine the distance. The LCD display displays the calculated distance and the angle of rotation. The buzzer is an additional component, it rings when there is a detection (Tone1 and Tone2) along with LEDs. These both LEDs along with buzzer determine the field where the object is located (near or distant).

Ultrasonic sensor is placed on servo motor and LCD display is connected to the sensor via Arduino. It is placed on wireless robotic vehicle controlled with RF module. IR proximity sensor and metal detector are also placed on vehicle. Proximity sensor detect the movement and metal detector detect the metal.

Components and devices used:

1. Arduino UNO R3
2. Servo Motor
3. Ultrasonic Sensor & Metal Detector
4. LCD display & IR proximity sensor
5. Motor Driver (TX & RX)
6. PVC Pipes for Vehicle (including all sizes and bolts)
7. 12v DC Gear Motor 6
8. Vehicle Wheels 6
9. 24V Battery
10. Wireless spycamera(optional)
11. Jumpers, Connecting Wires

Material for making vehicle:

1. PVC pipe
Length: 6 feet, size: 1" (25mm)
2. 90-degree PVC Elbow
Quantity: 6 pieces, Size: 1" (25mm)
3. 45-degree PVC Elbow
Quantity: 6 pieces, Size: 1" (25mm)
4. PVC cap
Quantity: 2 pieces, size: 1" (25mm)
5. Metal or Hard plastic plate
Quantity: 4 pieces, size: 10 cm long
6. Hose Clip PVC Pipe Clamp
Quantity: 6 pieces, size: 1" (25mm)

7. Robot wheel with Hex Brass Coupling
Quantity: 6 pieces, Dimeter: 125mm
8. 12V DC Metal Gear Motor
Quantity: 6 pieces, speed: 30 RPM
9. 24V DC Battery (Green thing in video)
Quantity: 1 pieces, type: Lead Acid
10. RF 433mhz Multi Channel Remote
wireless remote control for DC
Motor

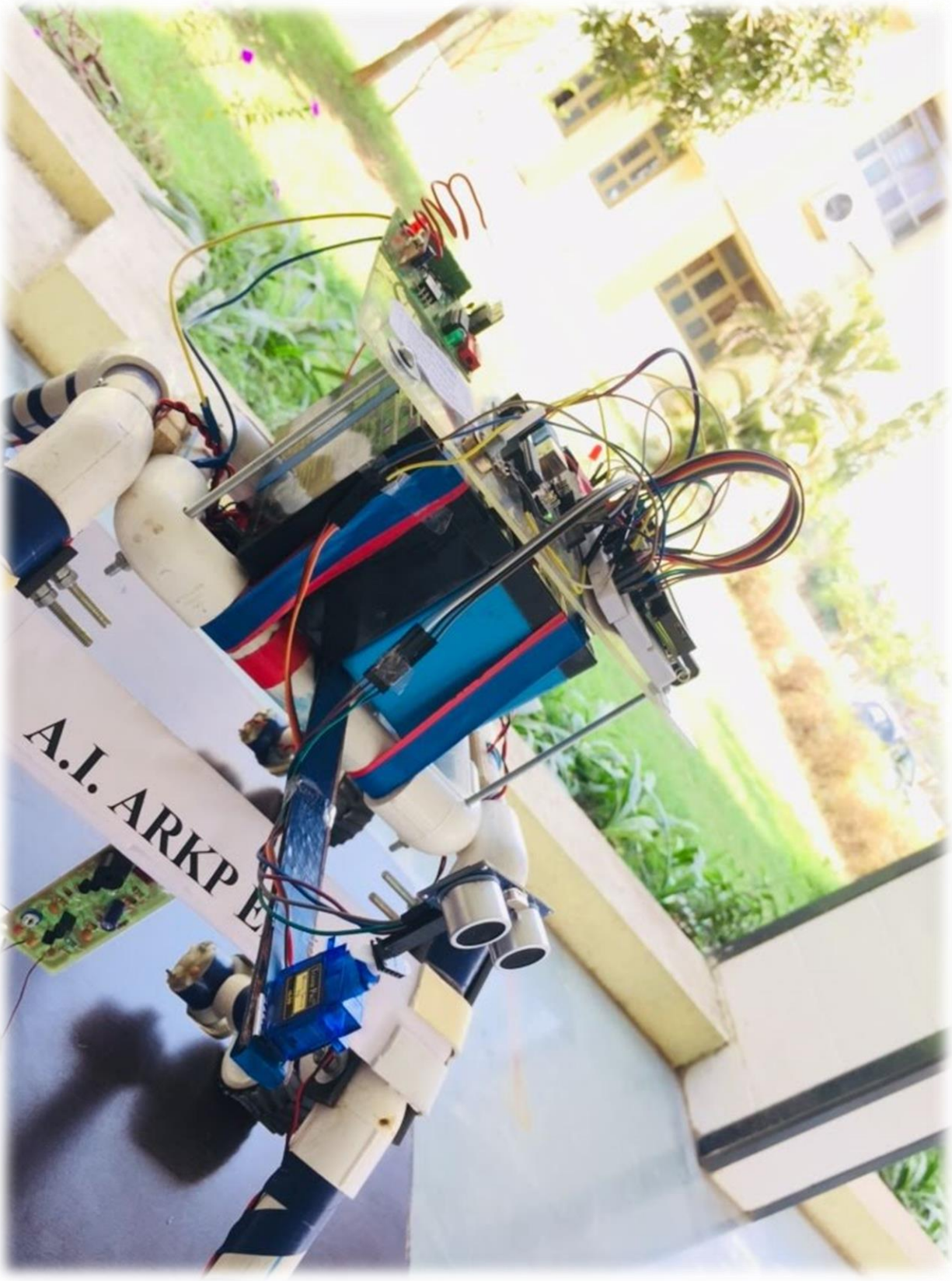
Reference:

<https://navinkhambhala.com/rocker-bogie-robot>

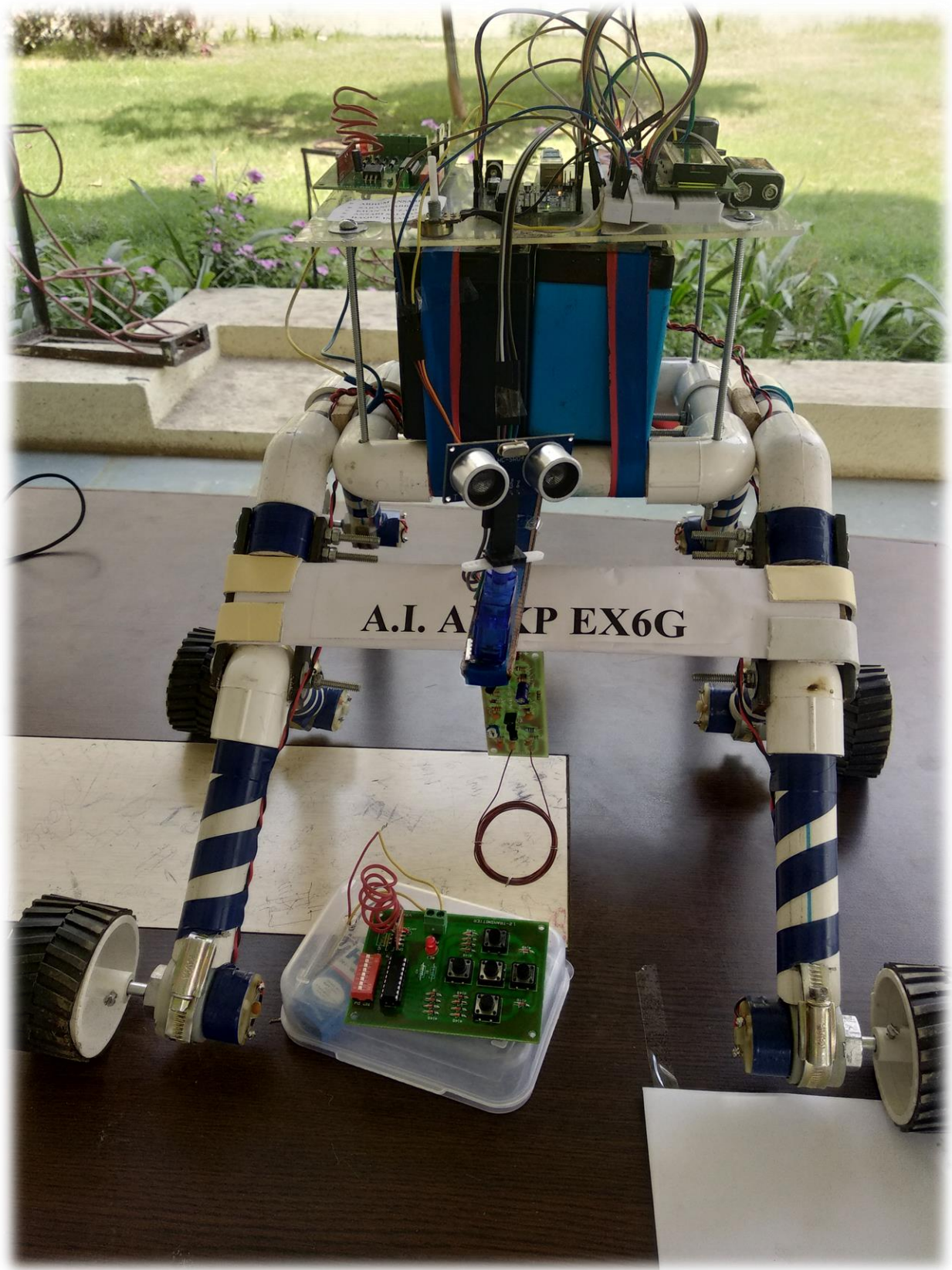
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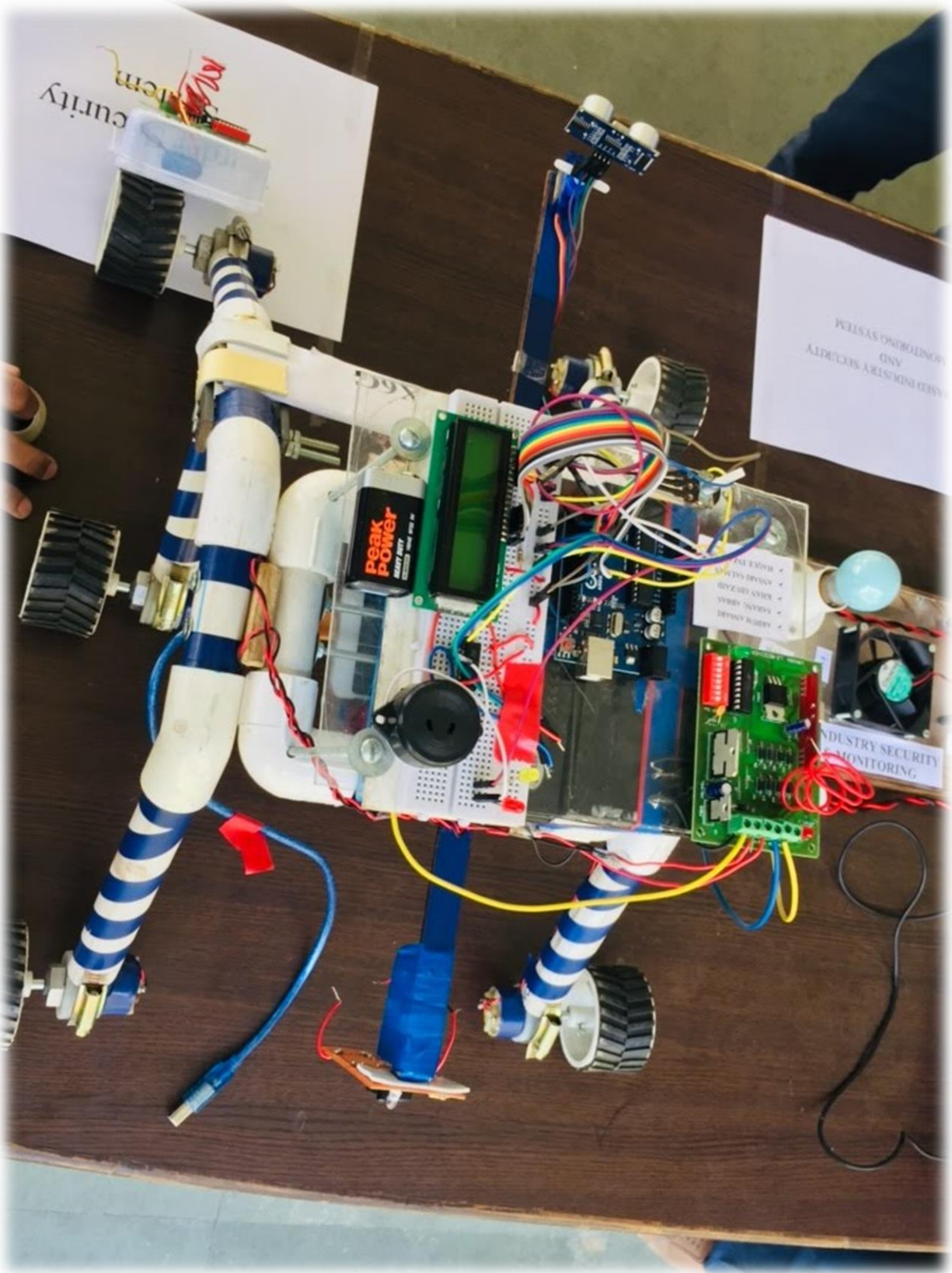
Images related to project:





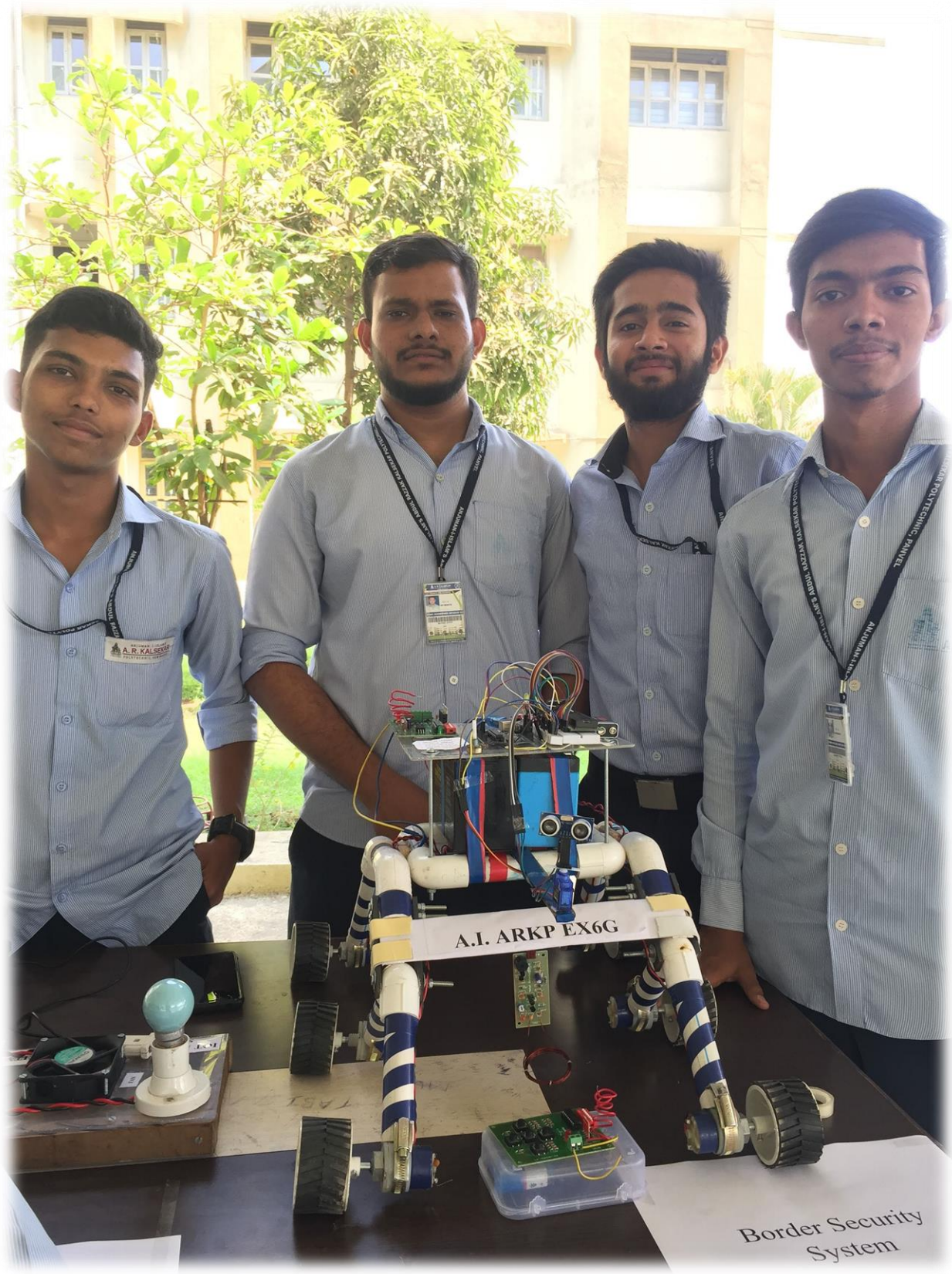


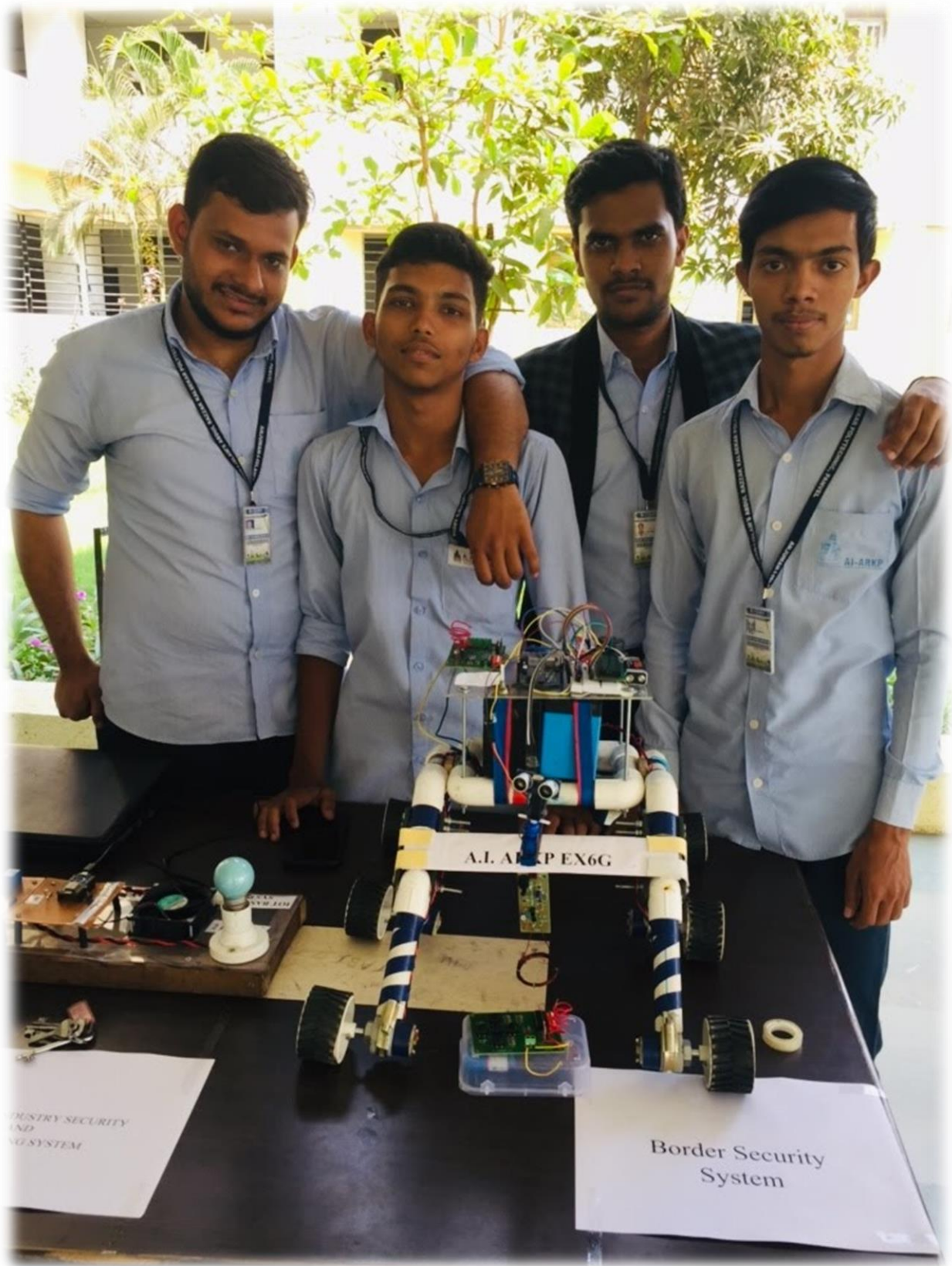












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