

CVPRO COMPETITION KIT

PRODUCT DOCUMENT



Artificial Intelligence (AI) brings the power of human-like decision-making to machines, while robotics adds motion and mechanics to create interactive, intelligent systems. When AI and robotics combine, the result is a new generation of machines capable of **seeing, sensing, analysing, and acting**. This kit is designed to give students and enthusiasts a **real-world introduction** to this powerful combo—where code meets creativity.

What is the CVPro Competition Kit?

The **CVPro Competition Kit** is a **4-wheel robot DIY kit** tailored for high-performance in AI and robotics competitions, especially aligned with the **WRO (World Robot Olympiad) Future Engineers category**. With modular hardware and AI-driven capabilities, this kit allows participants to build, program, and train their robot to tackle real-world tasks using vision and sensor data.

Designed for WRO Future Engineer Competition

This kit is specially designed to meet the **task requirements of WRO Future Engineers Round 1 and Round 2**. It provides:

- **Mechanical flexibility**
- **AI integration readiness**
- **Sensor-rich architecture**
- **Real-world driving system simulation**

Whether it's obstacle avoidance, color-coded decisions, or vision-based challenges, this robot is **built to clear the WRO rounds with confidence**.

Hardware Included:

1. **Servo Motor with Ackermann Steering System**
 - Enables realistic car-like steering, perfect for precision turns and autonomous navigation.
2. **DC Motor with Optical Encoder**
 - Provides accurate control for forward and backward movement with real-time feedback on speed and distance.

3. Color Sensor

- Detects ground color to support line tracking, zone recognition, and trigger-based actions.

4. 6 Ultrasonic Sensors

- Equipped with 6 ultrasonic sensors—3 in front, 1 at the back, 1 on the left, and 1 on the right—for comprehensive obstacle detection and avoidance in all directions.

5. Push Button

- Simple and efficient way to start the robot or initiate specific tasks.

6. Programmable RGB LED

- Indicates states like color detection, task status, or error signalling using visual cues.

7. Mobile Phone Holder

- A detachable mobile phone holder will be included for added convenience and flexibility.

8. CVPro Controller Board

- Based on the ESP32, it provides powerful processing with WIFI and Bluetooth.
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Software Requirements:

- **Arduino IDE**
 - For programming the ESP32 microcontroller.
 - **Android App Support**
 - An Android mobile application designed specifically for WRO Round 2. It features an object detection model capable of identifying red and green boxes.
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Ideal For:

- WRO Participants (Future Engineer Category)
 - AI and Robotics Workshops
 - STEM Competitions
 - School Robotics Clubs
 - Hobbyists & Developers
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This DIY kit isn't just a build—it's a **gateway to innovation**. Empower your team with a robot that doesn't just move—but **thinks, sees, and learns**.

Let the future engineers rise with AI-powered robotics!