**BLOCK DIAGRAM:**

A computer screen shot of a computer

AI-generated content may be incorrect.

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| **Component** | **Model/Detail** | **Purpose** |
| **Motor** | Rhino 250W 24V BLDC Motor (3000 RPM) | To provide the rotational motion for the project. |
| **Motor Driver** | RMCS 3001 (Brushless DC Motor Driver with Sensor) | To control the motor’s speed and direction. Integrated current sensing eliminates the need for a separate current sensor. |
| **Current Sensor** | ACS712-20A | To measure the current drawn by the motor for motor health monitoring and speed control feedback. |
| **Temperature Sensor** | LM35 | To monitor the motor's temperature for safety, ensuring it doesn't overheat during operation. |
| **Range Detection Sensor** | US-100 Ultrasonic Sensor | To measure distance for obstacle detection or monitoring the surroundings of the motor system. |
| **Tire Pressure Simulation** | P160KN-0QD15B10K Rotary Potentiometer (10k, 200mW) | To simulate tire pressure as part of the motor's feedback system for speed control. |
| **Driver Fatigue Detection** | Raspberry Pi Zero 2W + Pi Camera Module (5MP) | To detect driver fatigue using facial recognition and eye tracking algorithms. |
| **Alerting Sound** | KY-012 Active Buzzer | To provide an alert sound when motor parameters exceed predefined limits (such as current or temperature). |
| **Microcontroller** | STM32F407G-DISC1 | To process sensor data, control motor speed, and interface with other components for the system. |

**COST OF COMPONENTS:**  
(Does not include the cost of basic components like jumper wires, interfacing cables, etc.)

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| **S.No.** | **Component Name** | **Quantity** | **Price (approx. including shipping)** | **Source** |
| 1. | STM32F407G-DISC1 Discovery Kit | 1 | 2437 | <https://robu.in/product/stmicroelectronics-discovery-kit-for-foundation-line-mcu-various-sensors-indicator-leds/> |
| 2. | Raspberry Pi Zero 2 W | 1 | 1700 | <https://robu.in/product/raspberry-pi-zero-2-w/> |
| 3. | 5MP Raspberry Pi Zero W Camera Module | 1 | 330 | <https://robu.in/product/5mp-raspberry-pi-camera-module-w-hbv-ffc-cable/> |
| 4. | US-100 Ultrasonic Sensor Distance Measuring Module | 1 | 250 | <https://robu.in/product/us-100-ultrasonic-sensor-distance-measuring-module-temperature-compensation/> |
| 5. | P160KN-0QD15B10K-Rotary Potentiometer | 1 | 110 | <https://robu.in/product/p160kn-0qd15b10k-rotary-potentiometer/> |
| 6. | 30A range Current Sensor Module ACS712 | 1 | 130 | <https://robu.in/product/acs712-30a-range-current-sensor-module-hall-sensor/> |
| 7. | LM35 TO-92-3 Board Mount Temperature Sensors | 1 | 130 | <https://robu.in/product/lm35-to-92-3-board-mount-temperature-sensors/> |
| 8. | High Current Active Alarm Buzzer Driver Module | 1 | 80 | <https://robu.in/product/high-current-active-alarm-buzzer-driver-module/> |
| 9. | 24V BLDC Motor | 1 | 6726 (incl. GST) | <https://robokits.co.in/motors/rhino-bldc-brushless-dc-motor/rhino-250w-24v-bldc-motors/nema24-brushless-dc-motor-with-hall-low-noise-24v-250w-3000rpm-bldc> |
| 10. | Motor drive (includes inverter) | 1 | 2124 (incl. GST) | <https://robokits.co.in/motor-drives-drivers/dc-motor-driver/rhino-industrial-brushless-dc-motor-driver-bldc-250w-with-rs485-modbus-compatible-15-to-48v-20a> |