

Surveillance Robot using Pan-tilt

I. Goal

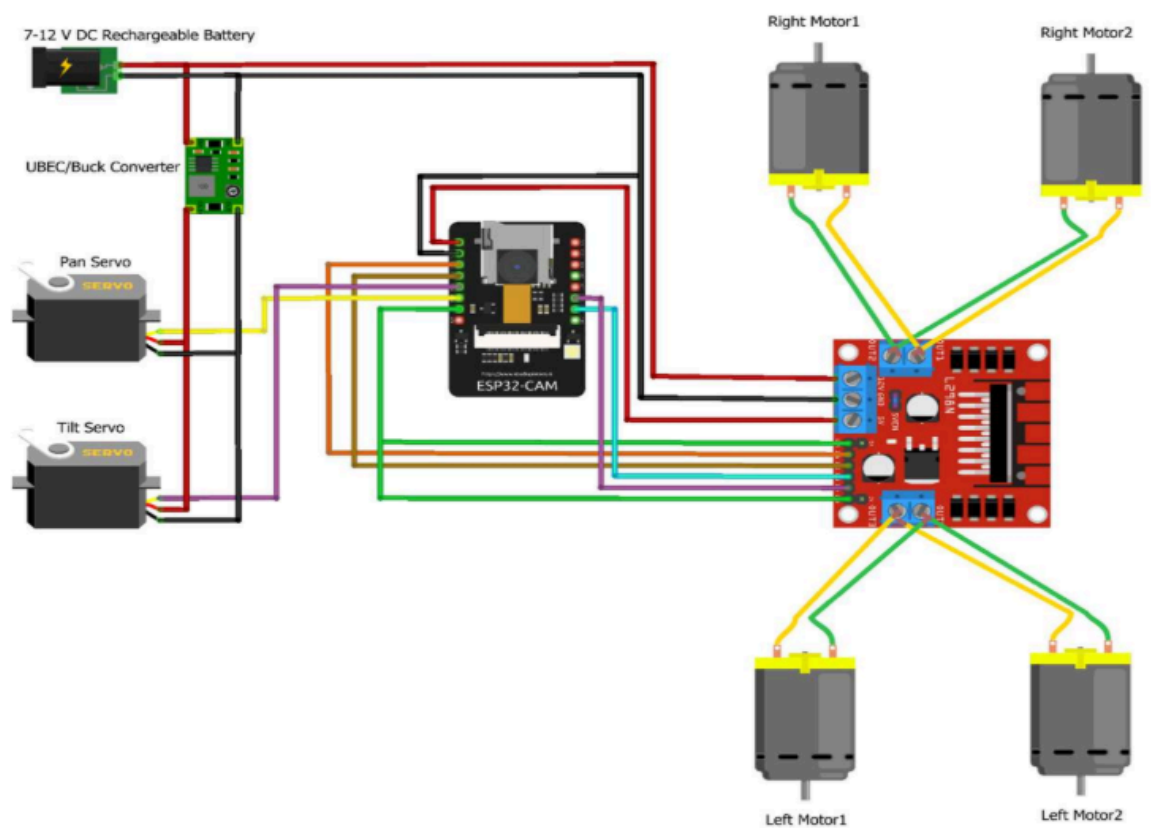
To provide comprehensive and real-time monitoring by dynamically adjusting its camera angles for optimal surveillance coverage.

II. Materials Required:

- | | |
|------------------------|-----------------------------|
| 1. ESP32 Cam Module -1 | 5. Lithium-ion Batteries- 2 |
| 2. FTDI Programmer -1 | 6. Several Jumper Wires |
| 3. L298N Module -1 | 7. 4WD Car Kit-1 |
| 4. USB Cable -1 | 8. Buck Converter-1 |
| 9. Battery Holder-1 | |
| 10. Servo Motor-2 | |
| 11. Pan-tilt -1 | |

III. Circuit Diagram

Wiring Diagram:



Assembling Point

- 1.Connect the wire ENA in L298N to ESP32 cam IO2
- 2.Connect the wire ENB in L298N to ESP32 cam IO2
- 3.Connect the wire IN1 in L298N to ESP32 cam IO12
- 4.Connect the wire IN2 in L298N to ESP32 cam IO13
- 5.Connect the wire IN3 in L298N to ESP32 cam VOT
- 6.Connect the wire IN4 in L298N to ESP32 cam VOR

Servo Motor:

Pan servo

- 1.Connect Orange wire to ESP 32 cam IO14
- 2.Connect Red wire to Buck Converter to +OUT
- 3.Connect Black wire to Buck Converter to -OUT

Tilt Servo

- 1.Connect Orange wire to ESP 32 cam IO15
- 2.Connect Red wire to Buck Converter to +OUT
- 3.Connect Black wire to Buck Converter to -OUT

Servo Motor (RED Colour)	Buck Converter
Pan Servo	+OUT
Tilt Servo	+OUT

Servo Motor (Black Colour)	Buck Converter
Pan Servo	-OUT
Tilt Servo	-OUT

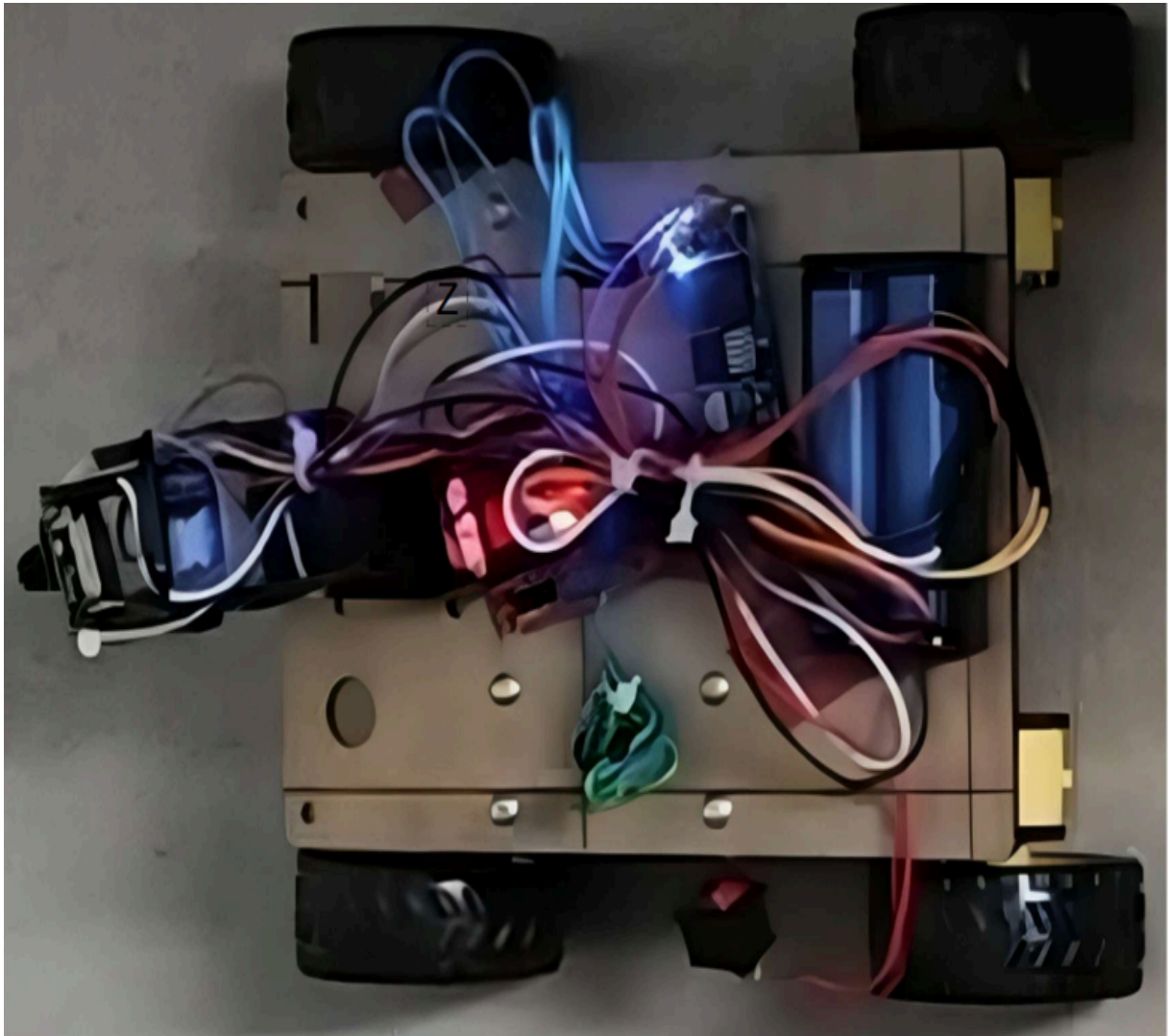
Servo Motor	ESP32 Cam
Pan servo	IO14
Tilt Servo	IO15

L298N	Battery Holder	ESP32 Cam
RED	12V	
Black	GND	GND
RED		VIN

Buck Converter	Battery Holder
+IN	12V
-IN	GND

ESP32 Cam	L298N Module
IO2	ENA
IO2	ENB
IO12	IN1
IO13	IN2
VOT/IO1	IN3
VOR/IO2	IN4
5V	5V
GND	GND

Working Diagram



V. Troubleshooting points:

1. Shaky Image:

If the image is shaking or distorted, it could be due to vibrations or an unstable mount. Ensure the robot is mounted securely and consider using electronic image stabilization (EIS) if available.

2.Position Drift:

If the camera drifts from its set position, it might be due to mechanical issues or vibrations. Recalibrate the pan-tilt mechanism and ensure the mount is stable.

IV. Output:

A surveillance robot with pan-tilt capabilities ensures wide-angle monitoring, tracks moon accurately, provides real-time remote access, and enhances property security through efficient patrol routes.

BY

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