SMART ANTENNA POSITIONING SYSTEM FOR BETTER SIGNAL STRENGTH

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MOTIVATION

- Manual antenna alignment is inefficient and inaccurate.
- Poor signal reception leads to disrupted communication.
- Need for automated systems in remote or rural areas.
- Desire to reduce human effort and technical dependency.

OBJECTIVE

- To design and develop a smart dish antenna positioning system.
- To automatically align the antenna toward the strongest signal source.
- To reduce human effort in manual antenna alignment.
- To improve signal reception and communication reliability.
- To build a low-cost, efficient, and scalable prototype using microcontroller-based control.

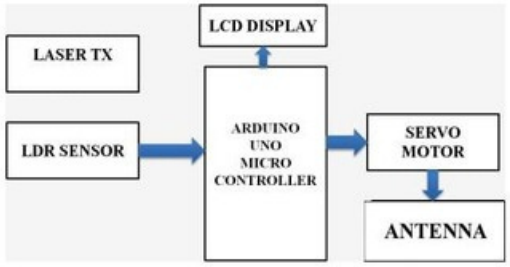
APPLICATIONS

- Satellite TV signal tracking and alignment.
- Wireless communication in rural or remote areas.
- Disaster recovery and emergency communication systems.
- Military surveillance and defence communication.
- Mobile broadcasting and news vans.
- IoT-based smart antenna systems for future networks.

EXPERIMENTAL SETUP

- Components used:Arduino Uno, Servo Motor, Prototype Dish Antenna, Light Dependent Resistors (LDRs), Resistors, Connecting Wires, Breadboard, Power Supply (5V), LED/Light Source (for signal simulation)
- Prototype dish antenna mounted on a servo motor.
- Arduino Uno used as the central controller.
- LDR sensors detect light intensity (simulated signal).
- Servo motor rotates to align with maximum light source.
- System powered by 5V supply and tested under varied light conditions.

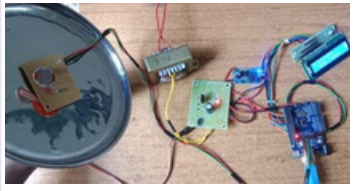
BLOCK DIAGRAM/ALGORITHM

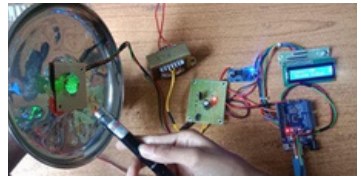


WORKING PRINCIPLE

- LDR sensors detect light intensity from different directions (simulating signal strength).
- Arduino Uno reads the sensor data to compare intensity values.
- The servo motor rotates the prototype dish antenna toward the direction of maximum light.
- Once the highest intensity is detected, the system locks the antenna in that position.
- The system continuously monitors for signal changes and readjusts if needed.

EXPERIMENTAL / SIMULATION RESULTS





- The prototype accurately detected and aligned to the strongest light source (simulated signal).
- Servo motor responded correctly to varying light directions based on LDR input.
- System achieved consistent alignment in different ambient light conditions.
- Real-time response and automatic locking improved signal stability in the demo.

CONCLUSION

- A smart dish antenna positioning system was successfully developed.
- The system automatically aligns to the strongest signal source using LDR sensors.
- Arduino-based control ensures accurate and efficient positioning signal quality.
- The model provides a low-cost and scalable solution for real-world communication needs.

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