

Arduino Ultrasonic Distance Measurement System with LED Indicators

Innovative proximity sensing solution for robotics and manufacturing.

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Problem & Solution

Current Issues

Costly, slow proximity sensing with limited scalability.

Our Solution

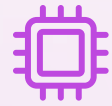
Low-cost Arduino system with real-time feedback.

Key Features

Ultrasonic sensor, LED indicators, cloud-based analysis.



System Components



Arduino Uno

Brain of the system, processes sensor data.



HC-SR04 Sensor

Ultrasonic sensor for distance measurement.



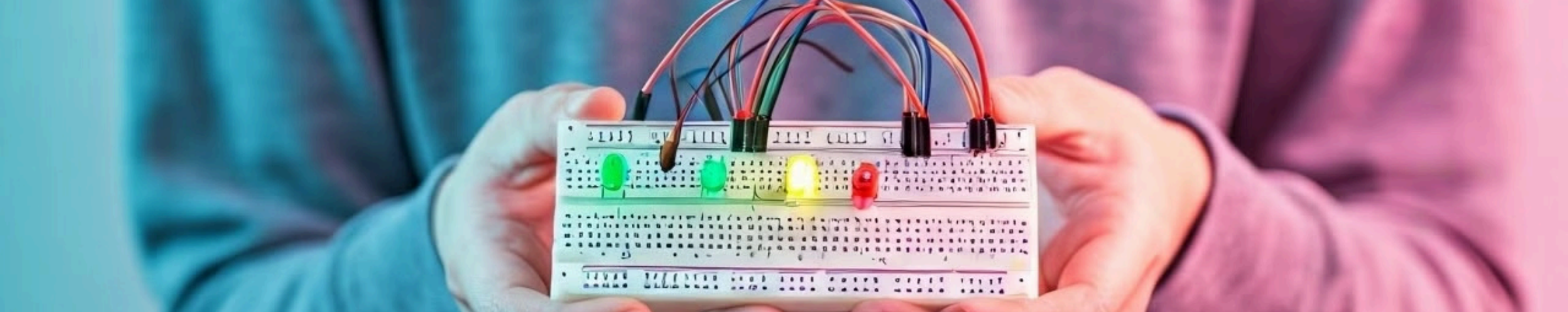
LED Indicators

Visual feedback for distance ranges.



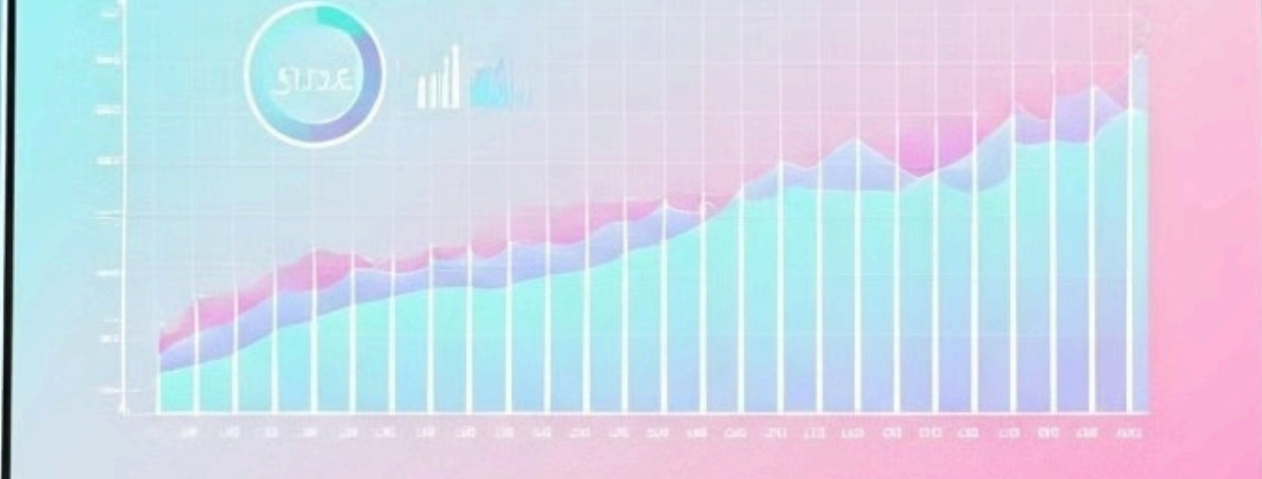
Arduino Cloud

Real-time data transmission and storage.



LED Indicator System

LED Color	Distance Range
Green (LED1)	>40 cm
Green (LED2)	30-40 cm
Yellow (LED3)	20-30 cm
Red (LED4)	10-20 cm
Red (LED5)	<10 cm



Data Analysis & Visualization

1

Custom Dash Plotly Dashboard

Interactive visualization of real-time proximity data.

2

Color-Coded Feedback

Instant visual representation of distance ranges.

3

Time-Series Analysis

Track proximity changes over extended periods.

Results & Discussion

1

Precise Measurements

Accurate distance readings within expected ranges.

2

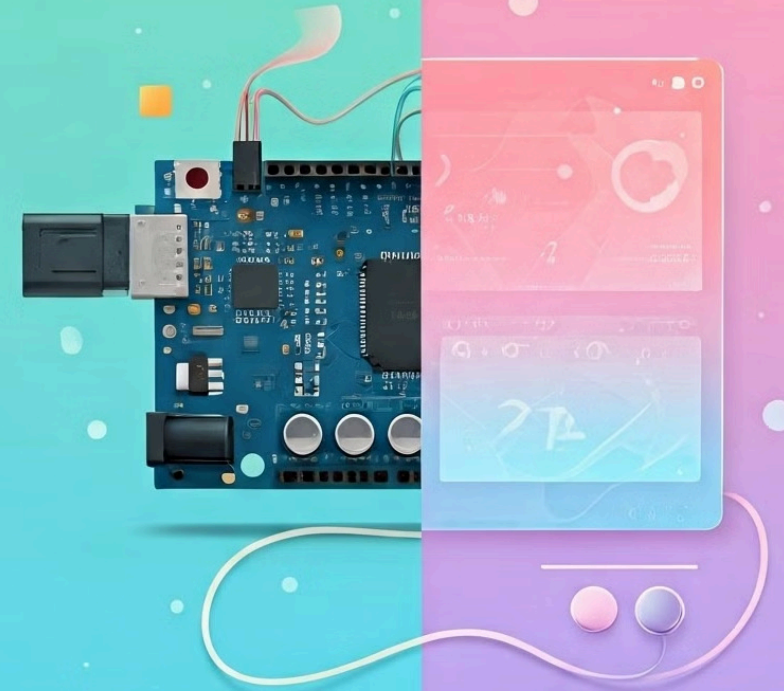
Consistent Feedback

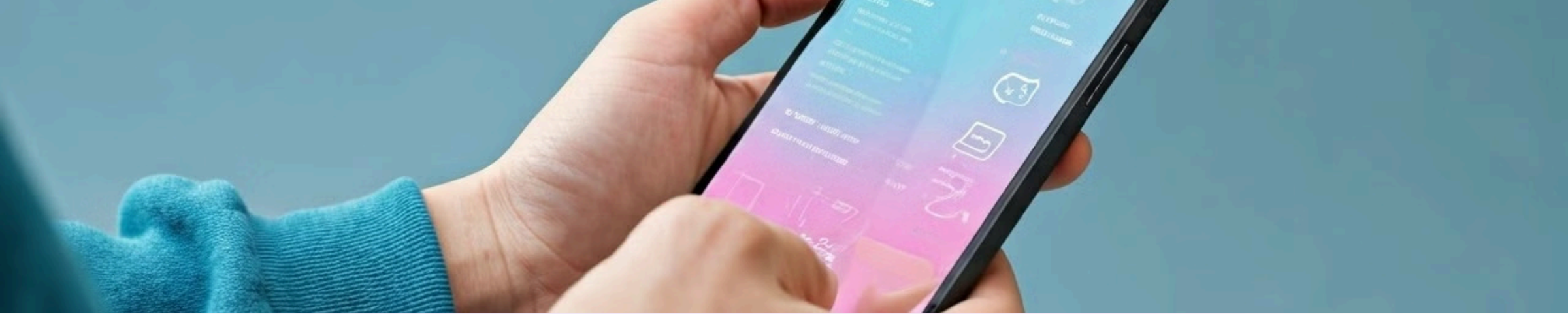
Reliable LED indicators for proximity awareness.

3

Environmental Factors

Impact of conditions on measurement accuracy.





Future Enhancements

1

Mobile Integration

Develop app for remote monitoring and control.

2

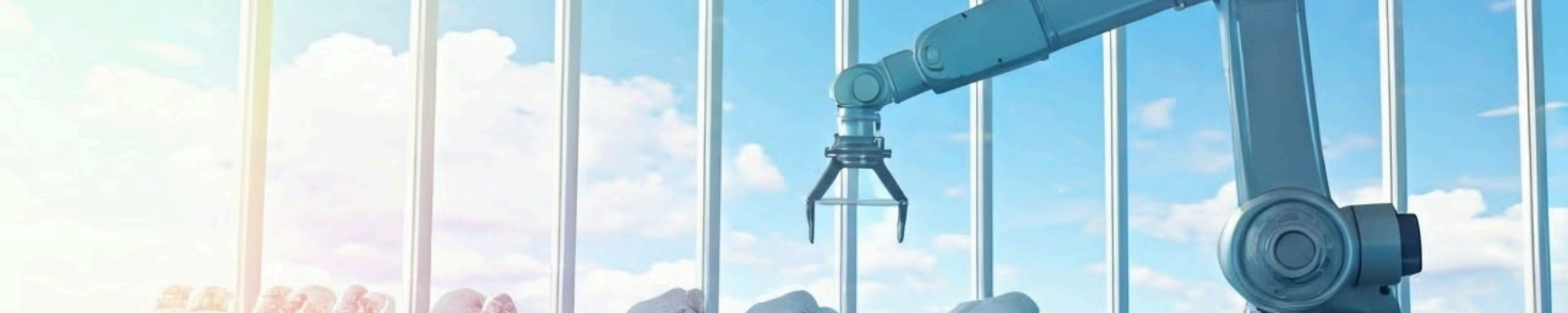
Sensor Fusion

Incorporate additional sensors for comprehensive environmental data.

3

Machine Learning

Implement AI for advanced object classification.



Conclusion

Problem Solved

Accurate, real-time proximity sensing achieved.

Innovative Approach

Low-cost, scalable solution for various applications.

Future-Ready

Platform for IoT-based data analytics advancements.