NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY
NAAC ACCREDITED 'A+' GRADE

WATER LEVEL INDICATOR

NAME OF THE STUDENT : RAHUL KUMAR AGARWAL

ROLL NO. : 23BEC153

FPGA-Based 9-Level Water Level Indicator

This presentation details the design and implementation of a 9-level water level indicator. It uses an FPGA DE2 board and Verilog HDL. The system accurately monitors and displays water levels.

System Architecture and Design

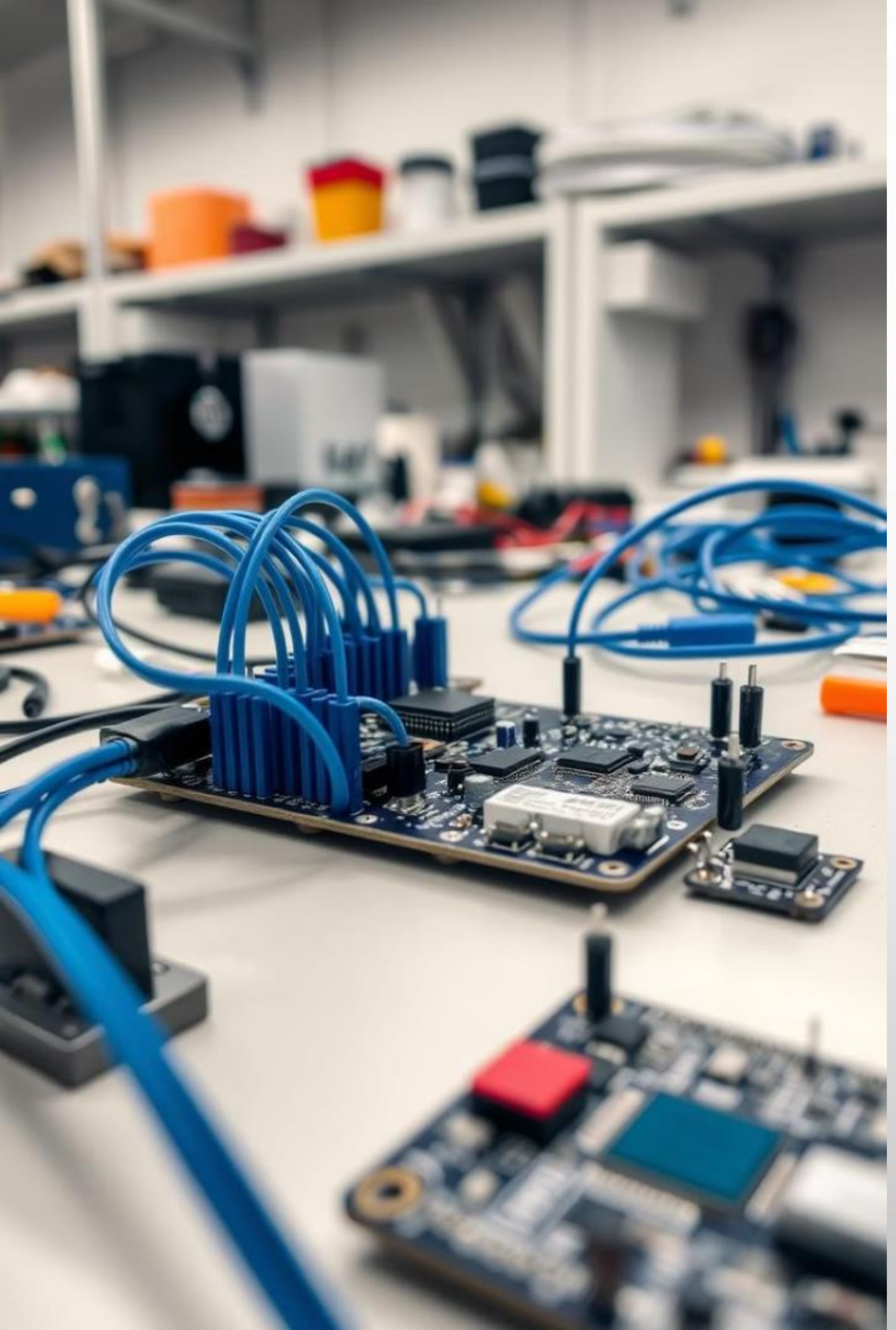
Core Components

- Water level sensors
- FPGA DE2 board
- GPIO pins
- 7-segment display

Functional Modules

- Binary conversion
- Display driver

The system converts sensor input to numerical levels. The FPGA processes data and drives the display.



Hardware and Software Implementation

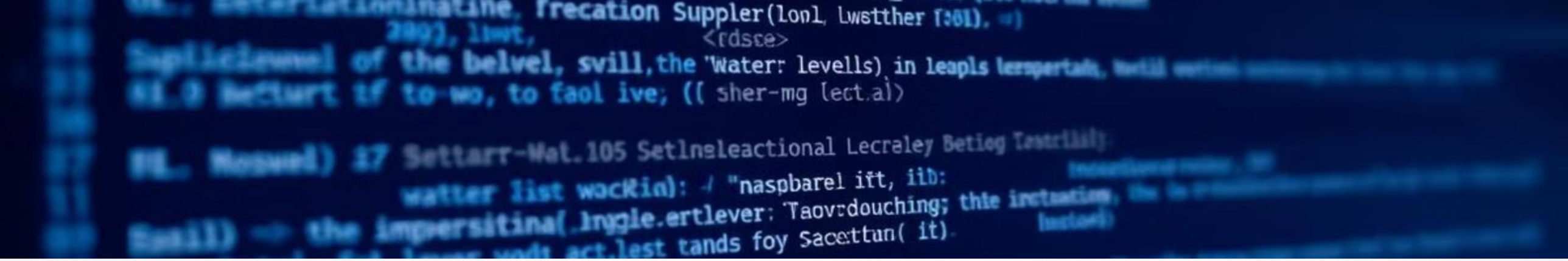
Hardware

- FPGA DE2 board (Cyclone II EP2C35F672C6)
- Resistive or capacitive water sensors
- GPIO pin configurations
- 7-segment display model

Software (Verilog HDL)

- Modules for input, conversion, display
- Sensor input handling
- Level conversion algorithm
- Display logic

The hardware includes the FPGA board and water sensors. Verilog code handles input, conversion, and display functions.



Verilog HDL Design and Simulation

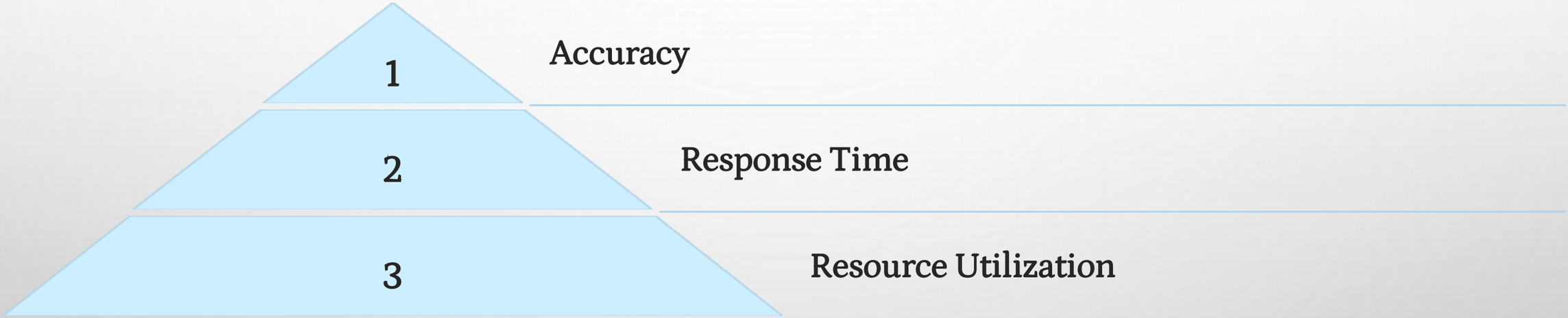
Input Module

Conversion Module

Display Module

The design includes input, conversion, and display modules. Simulation results verify level indication. Code optimization improves resource usage.

Results and Performance Analysis



The system accurately displays water levels with a quick response time. Resource utilization is efficient. Power consumption is minimized.

Advantages of FPGA Implementation

1

Real-time Processing

Immediate response to changes

2

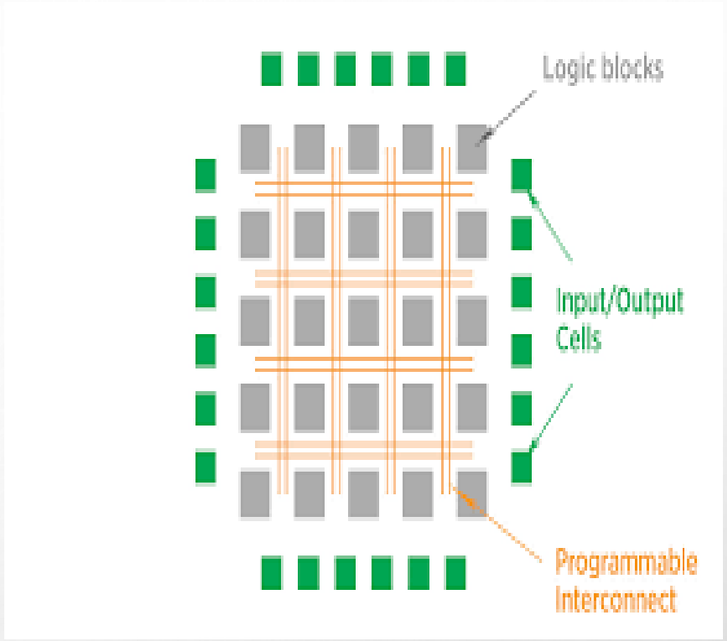
Flexibility

Easy system modification

3

Integration

All logic on a single chip



FPGA provides real-time processing and flexibility. The design can be customized for specific needs. The system is scalable and cost-effective.

Future Enhancements

LCD Display

Clearer level and system status

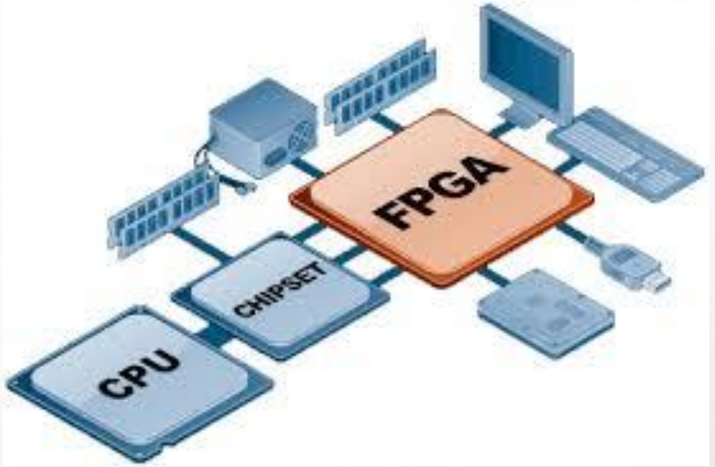
IoT Monitoring

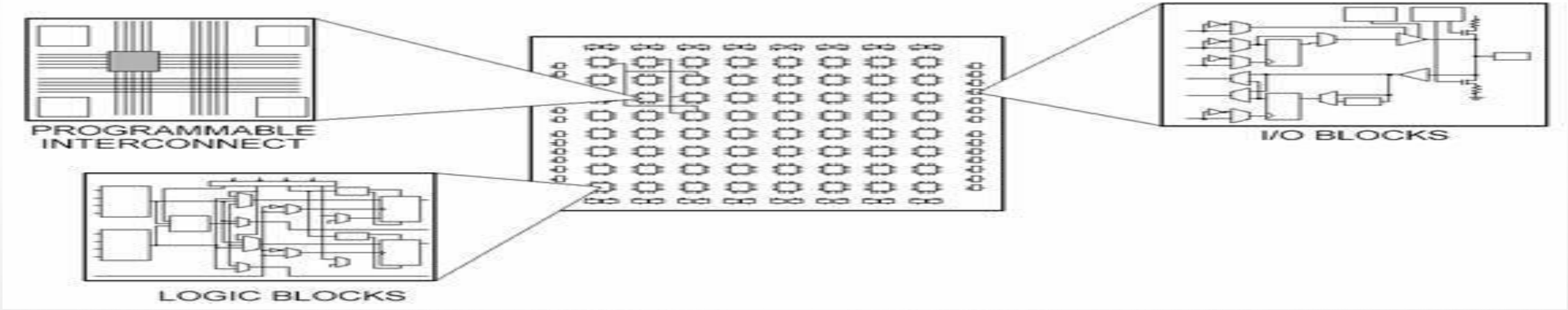
Remote water level monitoring

Alarm Integration

Critical level alerts

Future enhancements include LCD, IoT, and alarms. Data logging and predictive maintenance can be added.





Conclusion

Successful Implementation

Accurate and reliable system

Potential for Growth

Integration with IoT and alarms

FPGA Advantages

Flexibility and performance

The FPGA-based solution is flexible and performs well. The project demonstrates FPGA capabilities for embedded systems.