UNIVERSITY COLLEGE OF ENGINEERING, DINDIGUL - 624622

AUTOMATIC FAULT DETECTION IN STREET LIGHTS

BE. ELECTRONICS AND COMMUNICATIONS ENGINEERING

PROJECT GUIDE
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WELCOME TO OUR PRESENTATION

ABSTRACT

The project "Automatic Fault Detection in street lights" is all about making a system that can easily spot when there's something wrong with street lights. This helps make public places safer and ensures that the lights work reliably.

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- Solar energy is the energy that comes from the sun in the form of light and heat. It can be converted into electricity or other useful forms of energy.
- It reduces the energy consumption and costs of the street lighting system.
- The project "**Automatic Fault Detection in Street Light**", focuses on creating a system to quickly find problems with street lights and making public spaces safer and more reliable.
- Old methods of checking street lights are slow and need a lot of manual work. The solution aims to make this process faster and easier.
- Used components like an Arduino UNO board, LCD display, LED lights, LDR sensor, Ultrasonic sensor, Solar panel, and Battery are used.
- The Arduino UNO board acts as the main brain of our system.
- An LDR sensor is a device that used to detect the intensity of the light whether the solar light is working or not working.
- Ultrasonic sensor is a device that used to sense the movement of vehicles, pedestrians, or animals on the road, if there is any object comes near the ultrasonic Sensor, the light will ON. Otherwise, the light will OFF.
- If any fault is detected in the system, it will shows the error message on the LCD screen.

OVERALL DESIGN

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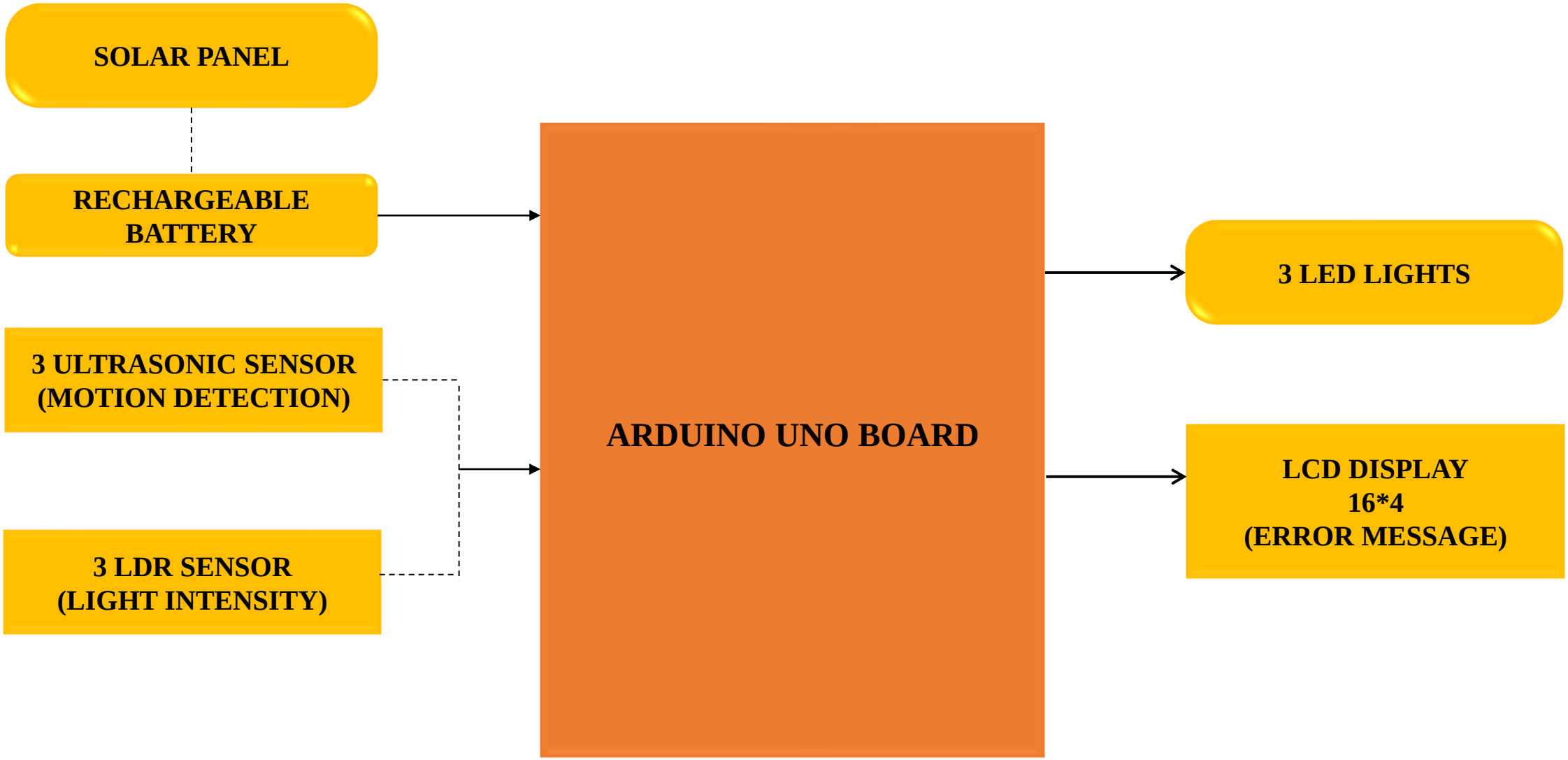


HARDWARE SETUP

- Connect three LDR sensors to the Arduino Uno board. These sensors will detect ambient light levels, serving to monitor the functionality of solar lights.

- Connect three ultrasonic sensors to the Arduino Uno. These sensors will detect the movement of an object, if an object comes within range of an ultrasonic sensor, the corresponding LED light switches ON; otherwise, it remains OFF.

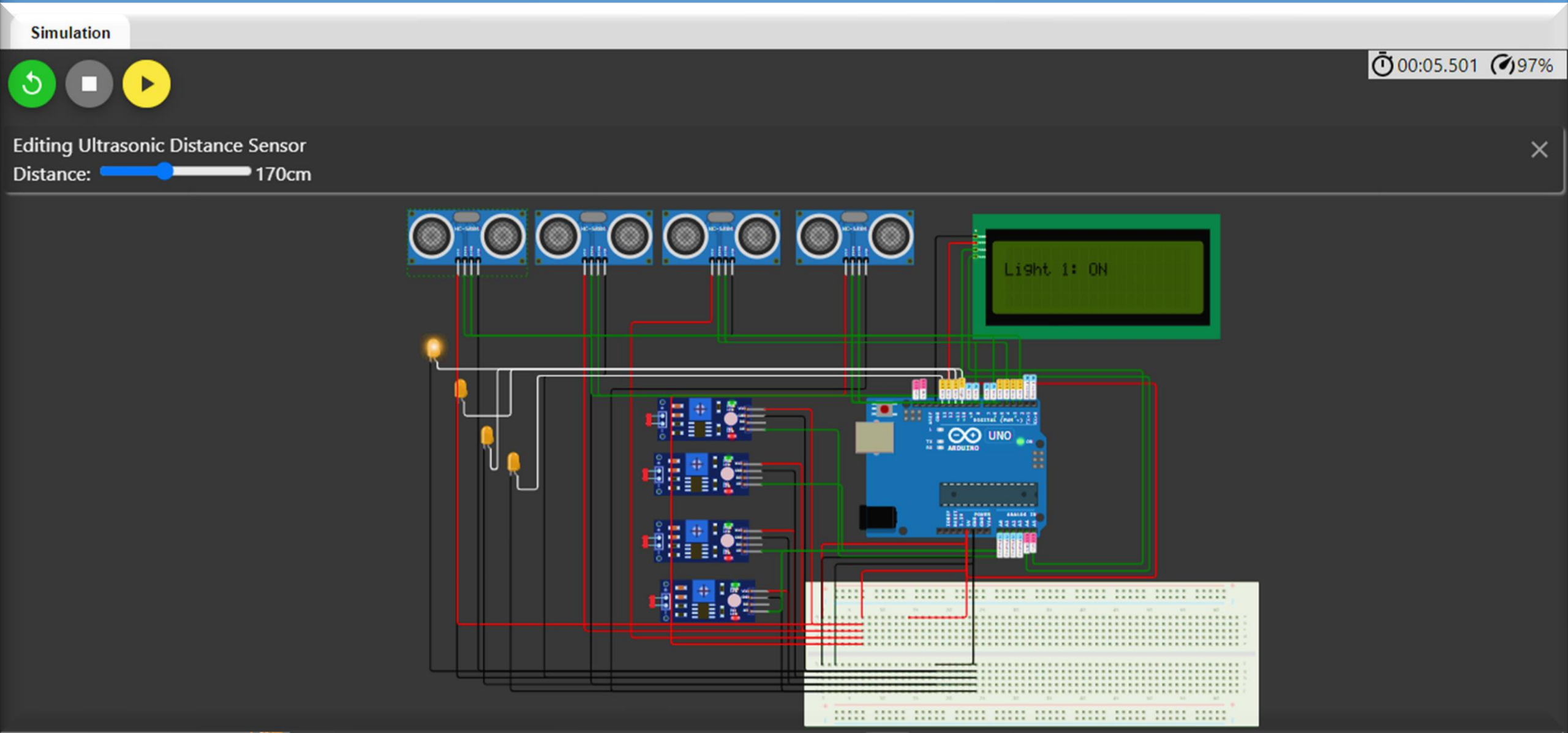
- Connect three LED lights to the Arduino Uno board. These lights represent street lights and will be controlled based on the input from the ultrasonic sensors.

- Integrate an LCD screen into the system to display the output and status. If any faults are detected within the system, an error message will be displayed on the LCD screen for prompt identification and resolution.

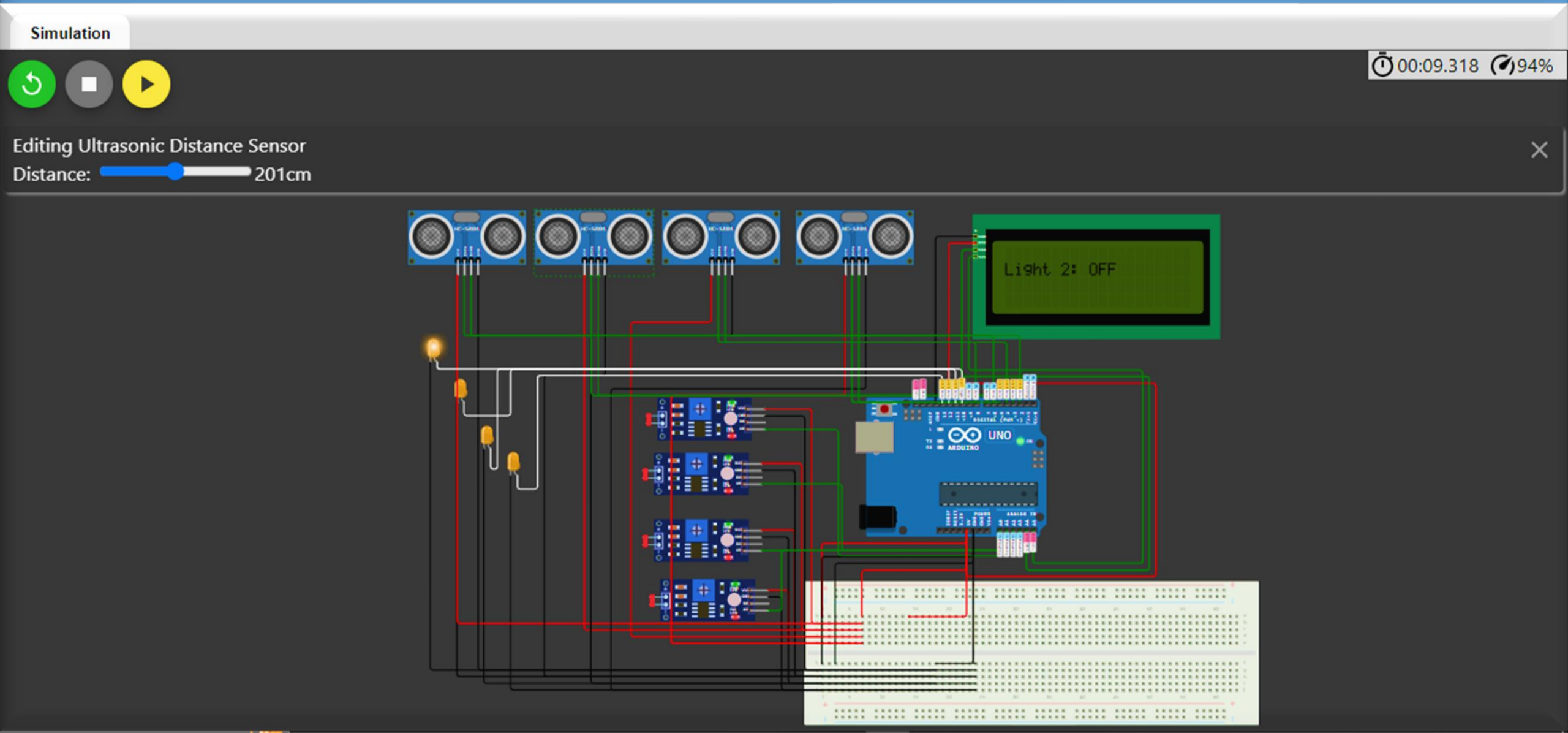
EXPERIMENTAL RESULT

SOFTWARE RESULT

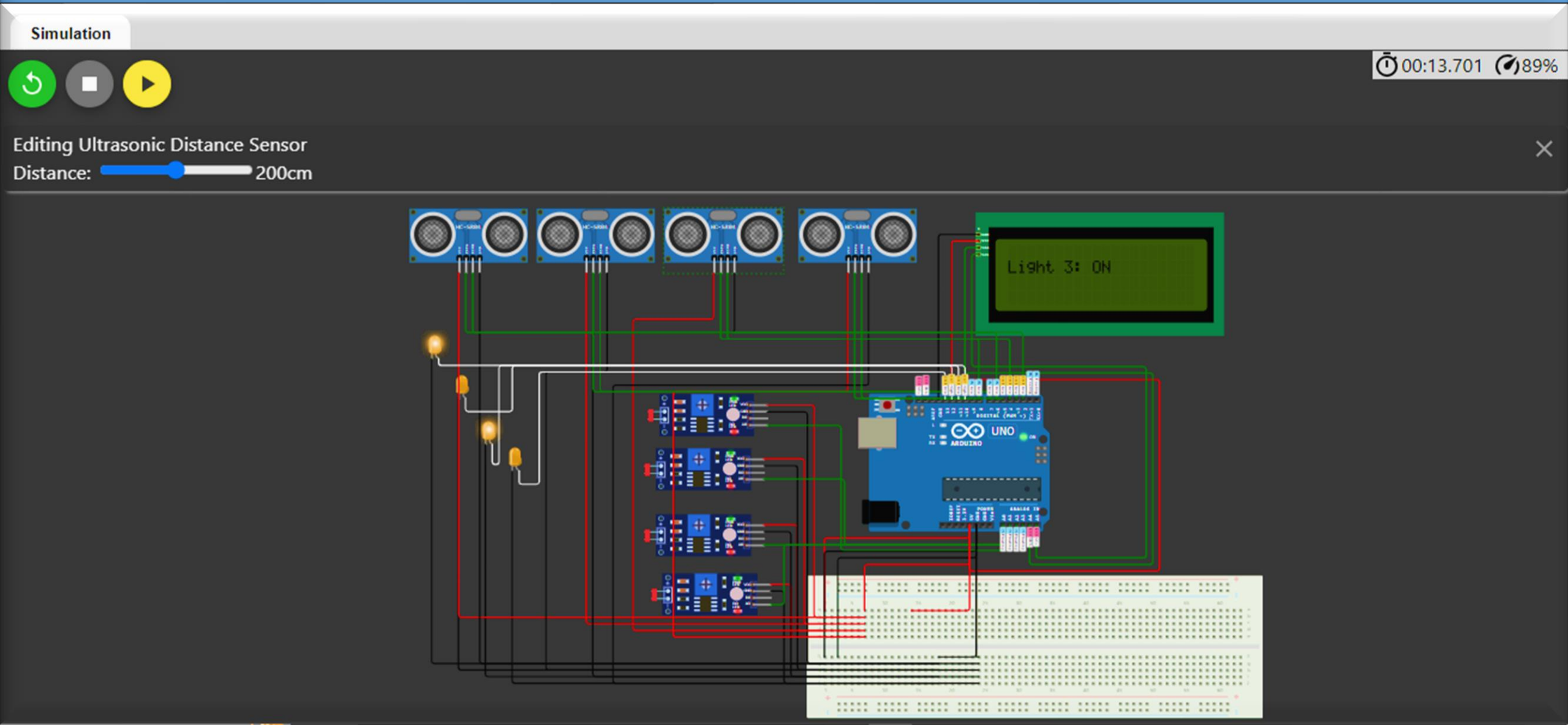
- If the ultrasonic sensor detects a distance of 170cm, it triggers the condition for activating "light 1." This means that when the sensor measures an object or obstruction at this distance, the programmed response is to turn **ON** "light 1."



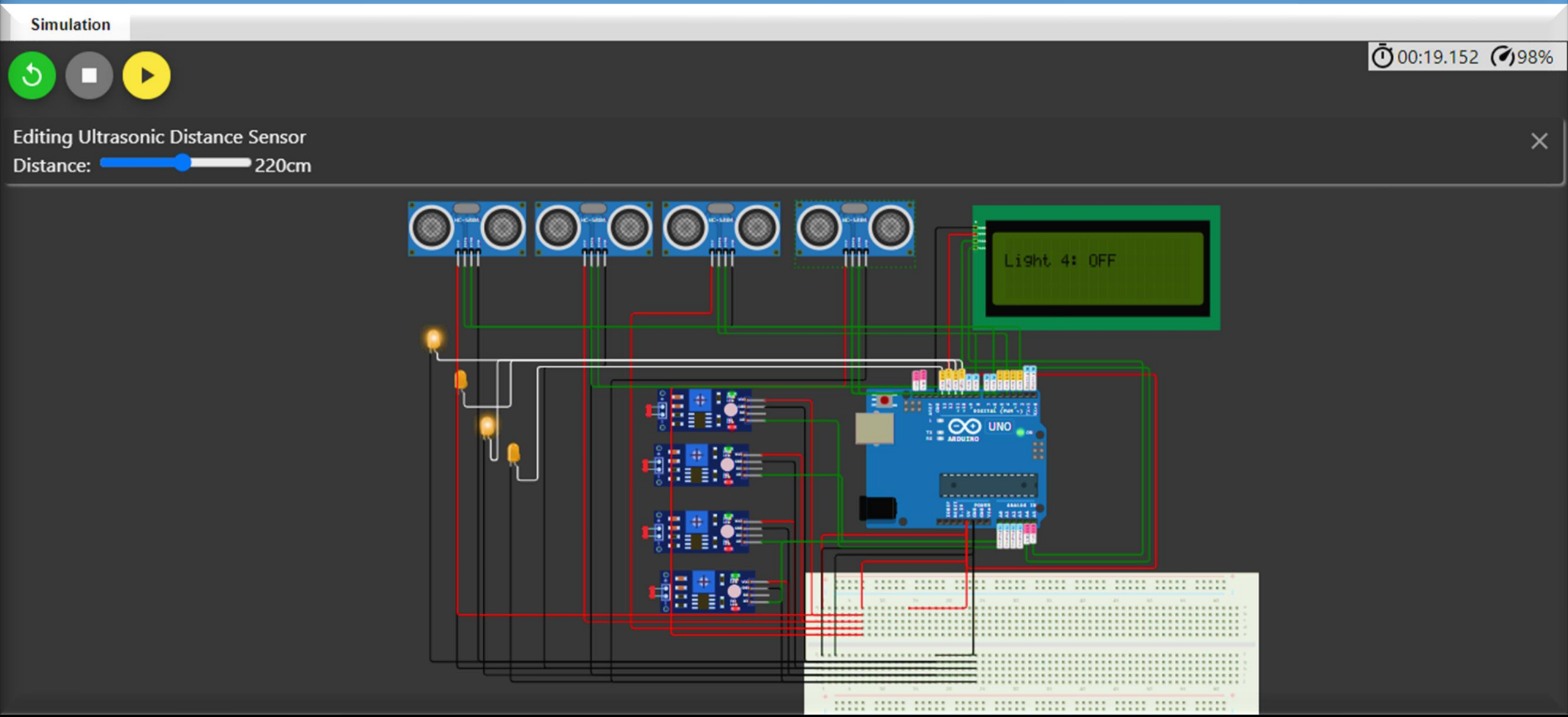
- If the ultrasonic sensor measures a distance of 201 cm, then "light 2" will be turned **OFF** "light 2" should be turned **OFF** according to the programmed conditions or logic.



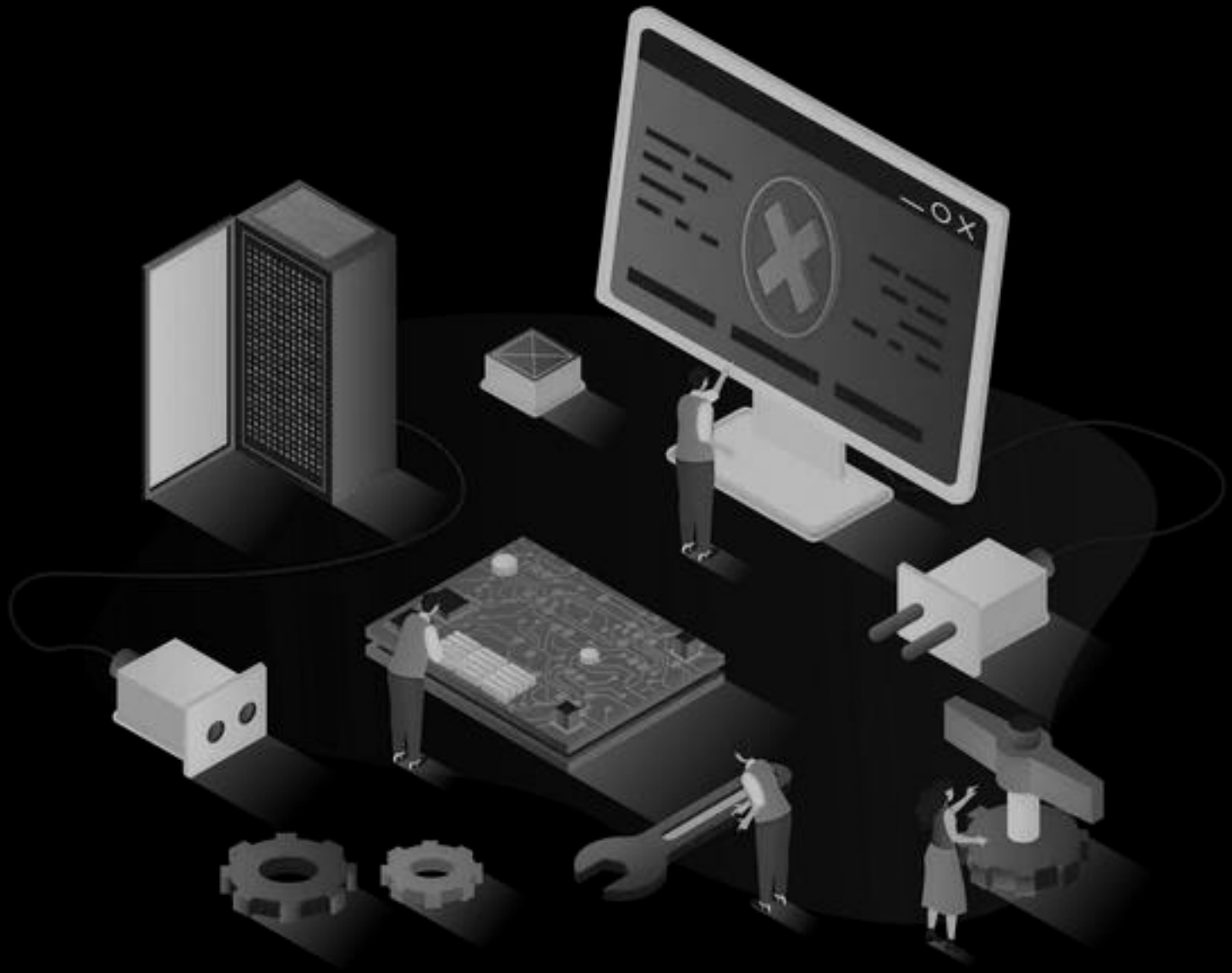
- If the ultrasonic sensor measures a distance of 200 cm, then the condition for turning **ON** "light 3" is met



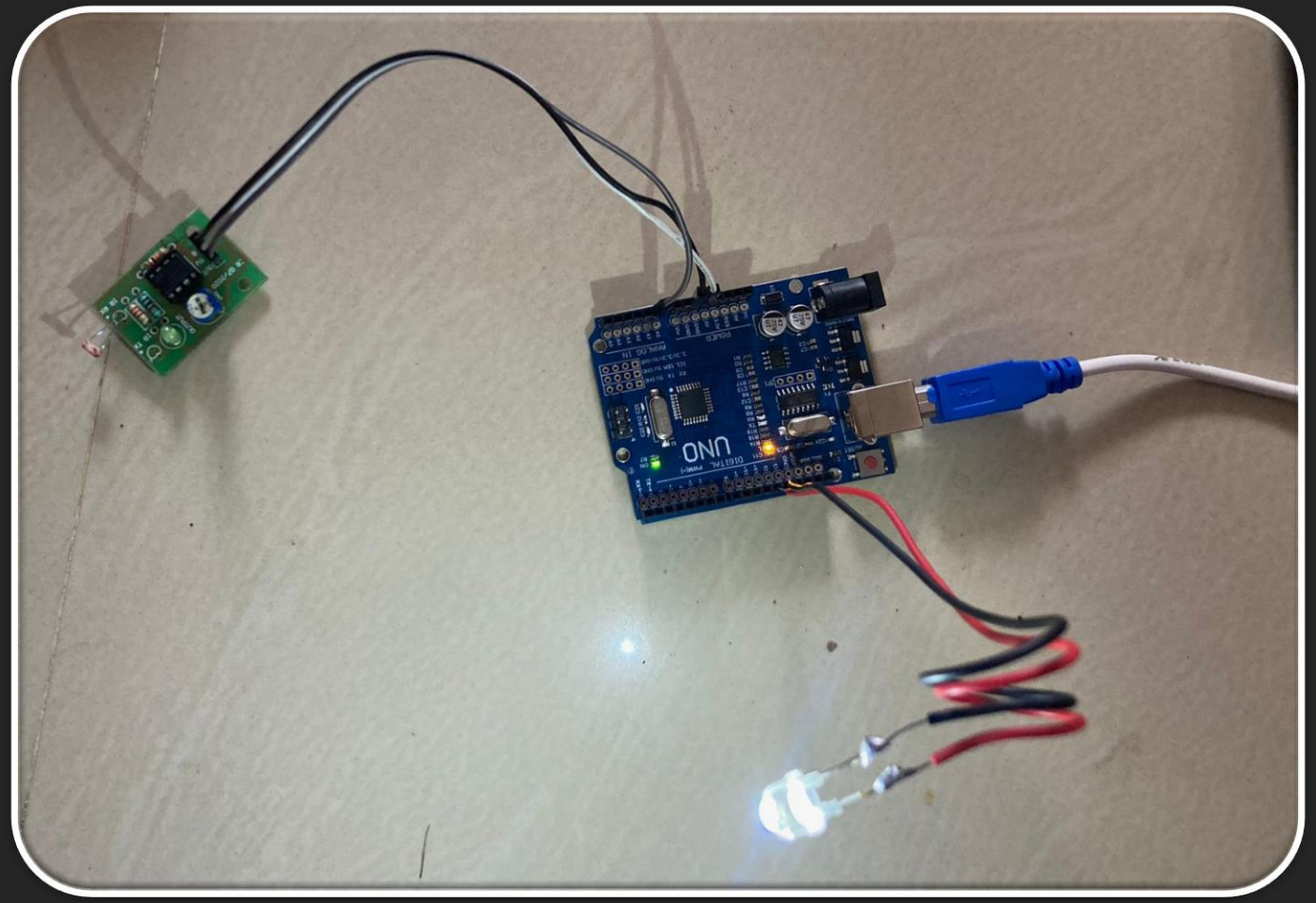
- If the ultrasonic sensor measures a distance of 220 cm, then the condition for turning **OFF** "light 4" is met. So, under this specific circumstance, "light 4" should be turned **OFF** according to the programmed conditions or logic.



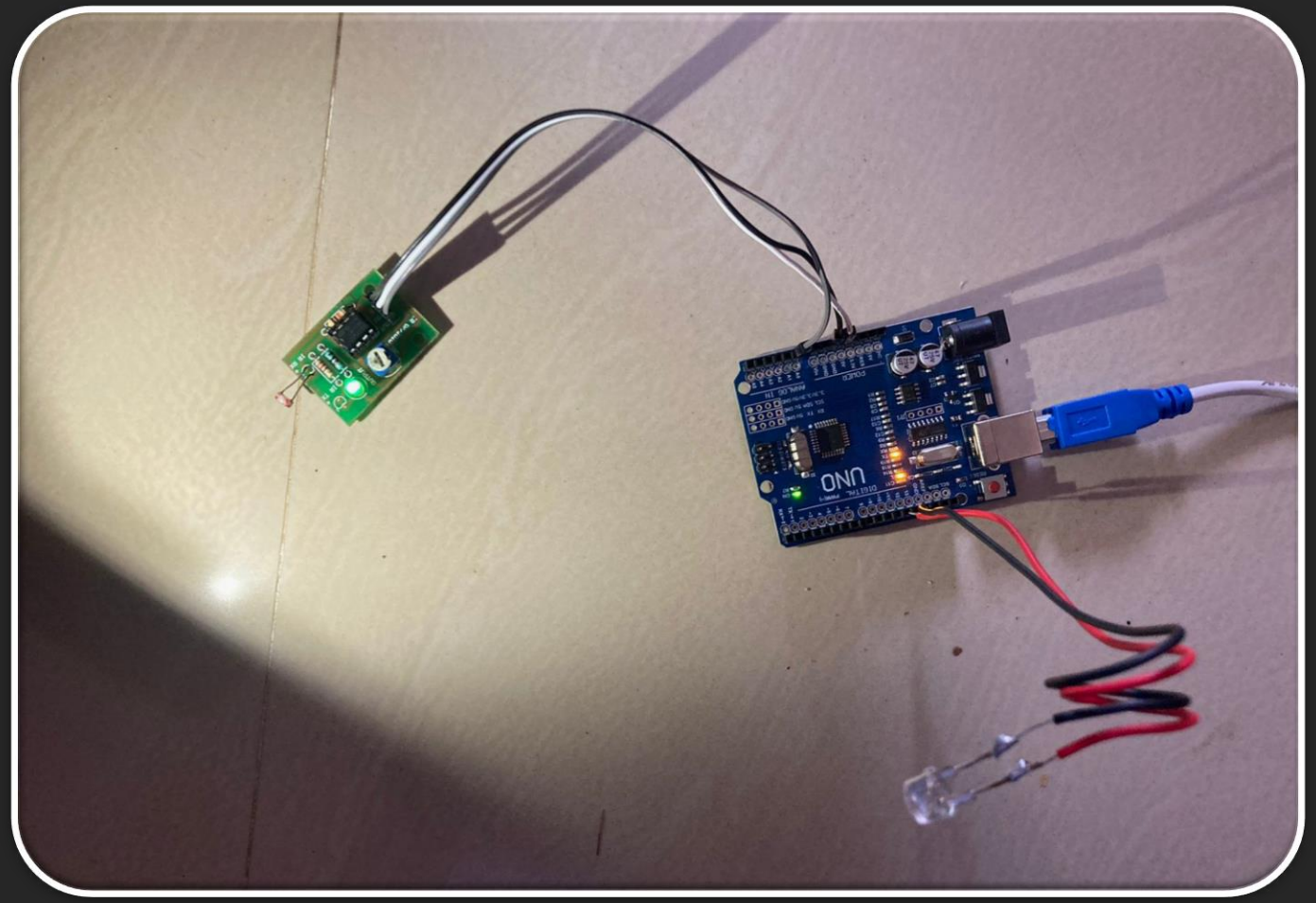
HARDWARE RESULT



When there is no light intensity, meaning it is dark, the Light Dependent Resistor (LDR) sensor becomes active, the LDR sensor detects this lack of light and triggers a response, causing the LED light to turn **ON**.

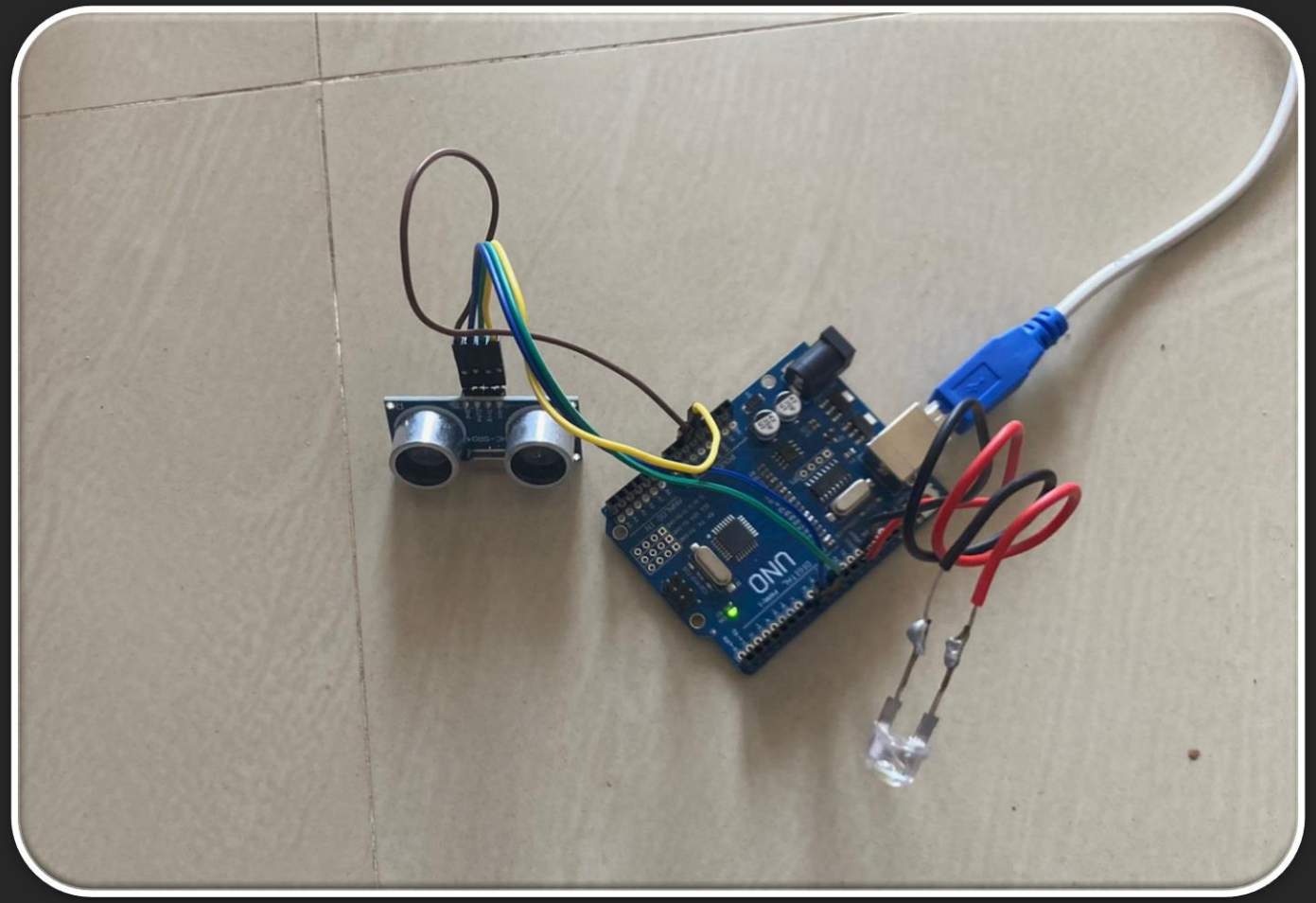


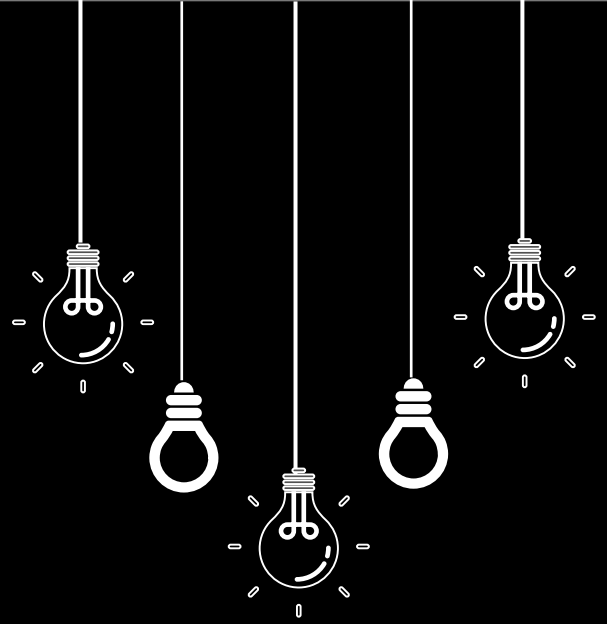
When there is light intensity, near the Light Dependent Resistor (LDR) sensor registers it, prompting a response that leads to the LED lights turning **OFF** condition.



If an object comes near the ultrasonic sensor, it detects the object is presence and turns **ON** the LED lights.

If no object comes near the ultrasonic sensor, it detects this absence and subsequently turns **OFF** the LED lights.





PERFORMANCE EVALUATION

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OBJECTIVE ASSESSMENT

Energy Efficiency: The project uses solar panel to make street lights work.

It reduces the energy consumption and costs of the street lighting system.

System Responsiveness: The integration of an Arduino UNO board and sensors allows for real-time monitoring and control.

Enhancing the system is ability to detect and respond to faults promptly.

Automation Level: The system can automatically turn **ON** and **OFF**, if there is any movement, so it can adjust the lights by itself. this means reducing the need for manual work.

TECHNICAL ASSESSMENT

Component Integration: The use of an Arduino UNO board, LDR sensor, and Ultrasonic sensor shows a thoughtful selection of components.

That work well together to achieve the project goals.

Fault Detection: The system is capability to display the error messages on an LCD display,

when a fault is detected it will shows the error message on the LCD screen, so quickly we can repair the corresponding fault in street light.

PERFORMANCE EVALUATION

USER EXPERIENCE

- **Reliability**: The system automatically finds faults, which helps make street lights more reliable. This is really important for keeping people safe.
- **Ease of Maintenance**: The automatic system can let maintenance workers know about certain problems, making it easier for them to fix things..

AREAS FOR IMPROVEMENT

- **Scalability**: In the future, we can look into making the system work for more street lights at once.
- **Energy Storage**: We can check how well the battery holds energy when there's no sunlight to make sure it works as best as it can.

CONTRIBUTION OF THE PROJECT

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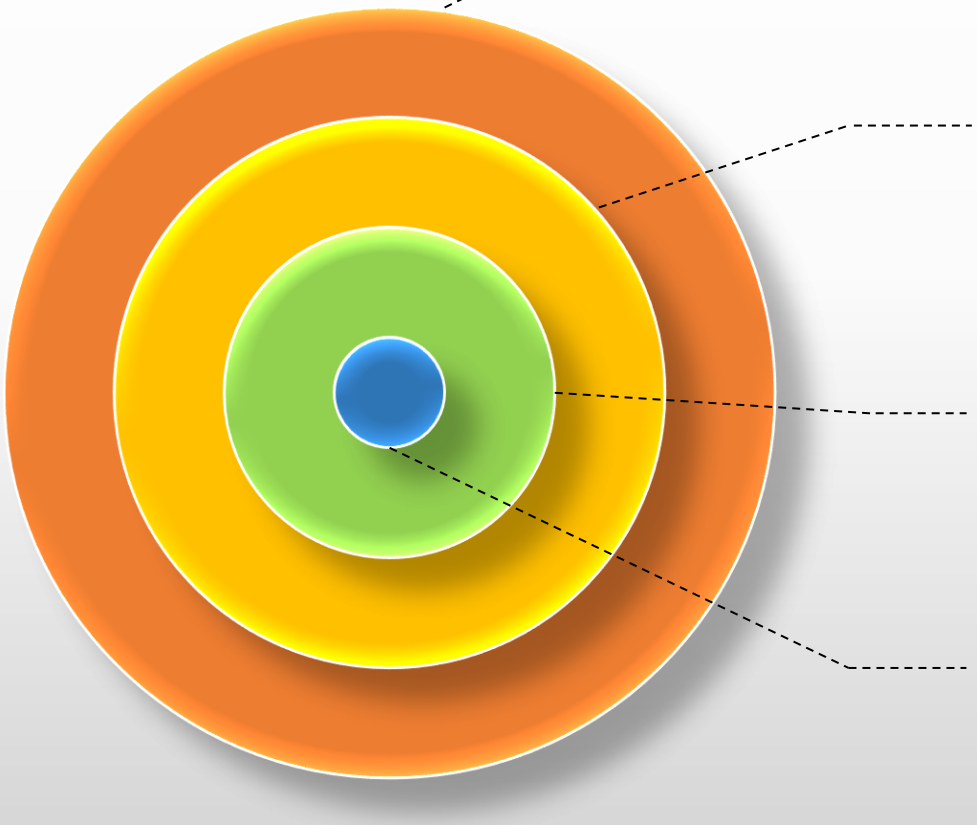
The project contributes to enhancing public safety and reliability by automating the detection of faults in street lights, reducing energy consumption, and optimizing maintenance processes.



Team Member 1: Looked up info about similar projects, made a PowerPoint to explain our project, and learned about all the parts we needed.

Team Member 2: wrote the code (instructions) needed for the project. They ensured that when all the parts were assembled, the project would function correctly according to the programmed instructions.

Team Member 3: Put all the parts together by soldering them onto a circuit board. They checked to make sure everything was connected the right way and wouldn't fall apart.

Team Member 4: Bought all the things we needed for the project and made sure they were good quality. They helped everyone in the team and checked that everything was okay with our project.

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THANK YOU