

Temperature Sensor Measurement

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Project abstract

To investigate the temperature variances realized within a temperature-controlled environment. The experimental design of the study is using a methodology such that sixteen to twenty-five (16-25) sensors inherent to temperature measurement configured equidistant from each other in a square pattern will quantify actual data points as voltages in real-time specific to predetermined measured positions

Results Serial Plotter Temperature Output

```
/dev/tty.usbserial-Bee-000C  
Send  
ROM = 28 94 AA 62 2 0 0 25  
Chip = DS18B20  
Data = 1 41 1 4B 46 7F FF F 10 AA CRC=AA  
Temperature = 20.06 Celsius, 68.11 Fahrenheit  
No more addresses.  
ROM = 28 94 AA 62 2 0 0 25  
Chip = DS18B20  
Data = 1 42 1 4B 46 7F FF E 10 AB CRC=AB  
Temperature = 20.12 Celsius, 68.22 Fahrenheit  
No more addresses.  
ROM = 28 94 AA 62 2 0 0 25  
Chip = DS18B20  
Data = 1 43 1 4B 46 7F FF D 10 AC CRC=AC  
Temperature = 20.18 Celsius, 68.32 Fahrenheit  
No more addresses.  
Autoscroll No line ending 9600 baud
```

Results:

- Multiple DS18B20 digital sensors recorded temperature values in lab as noted from -55°C to $+125^{\circ}\text{C}$ (-67°F to $+257^{\circ}\text{F}$) $\pm 0.5^{\circ}\text{C}$ accuracy from -10°C to $+85^{\circ}\text{C}$
- The multi-drop capability simplifies distributed temperature sensing applications
- Serial Plotter supports multi sensor data plotting
- Application employed sustains use of multiple sensors for temperature measurement

Impact

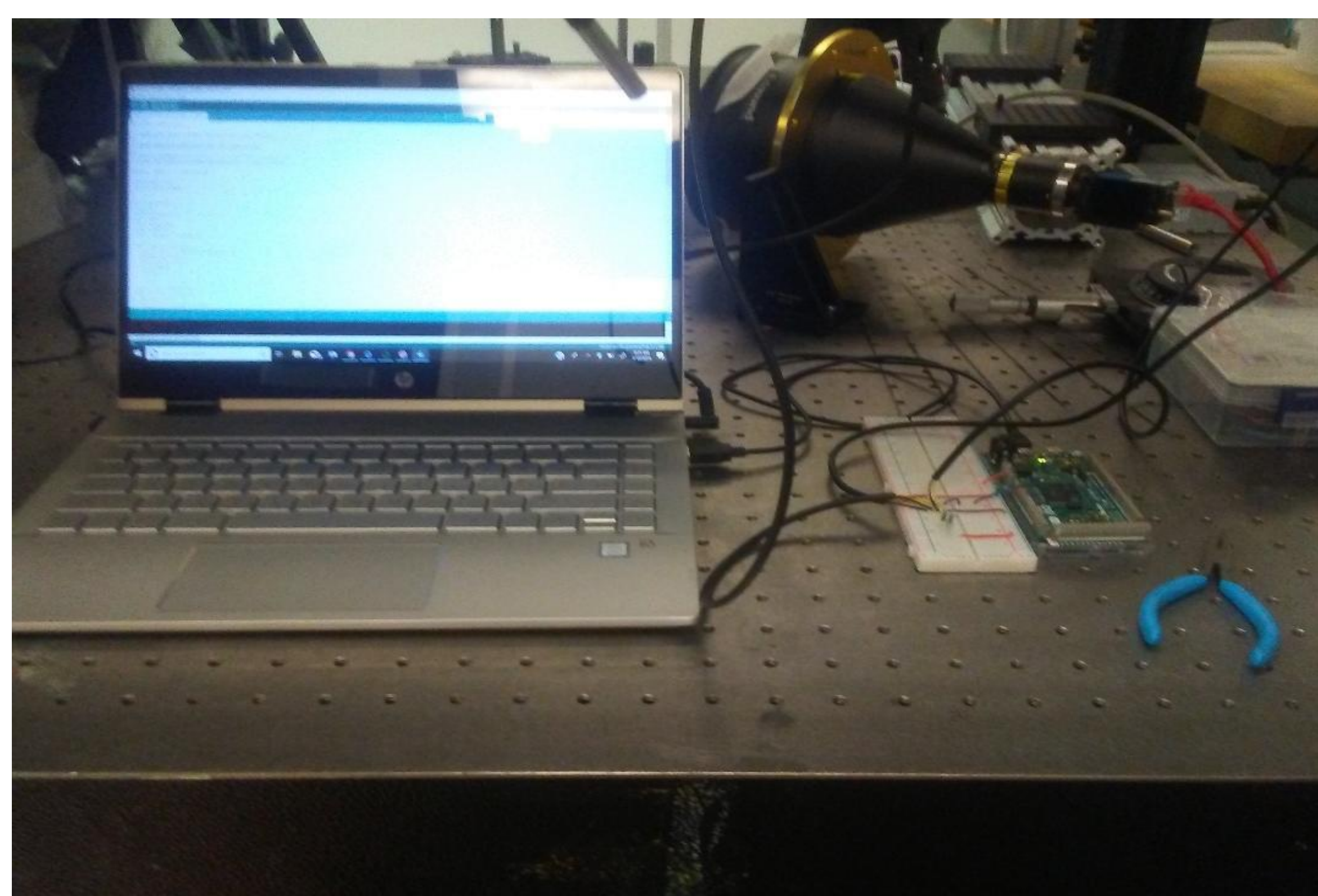
Engineering applications with hands on learning is essential for students in the engineering disciplines. This research study emphasizes tangible associations between teaching and problem-based learning. It reinforces a necessity for the practiced learning structure, being made parallel within the classroom for transportable learning. The research impacts students' perceptions of engineering fundamentals and how their understanding of the relationship with engineering, science and, mathematical principles are essential to the study of materials, sources, and intellectual development. While acquiring insights contributing to their career planning, education, or training.

References/ Acknowledgments

- <https://www.arduino.cc/>
- <https://datasheets.maximintegrated.com/en/ds/DS18B20.pdf>

Overall Technical Approach

- Three (3) sensors instinctive to temperature measurement configured equidistant from each other in a square pattern
- Actual data points as voltages in real-time explicit to prearranged measured positions



Interfacing DS18B20 temperature sensor to Arduino Uno

