IR Thermometers: Optimizing the Degree of Accuracy Through the Inspection of Energy Transfer

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Inspection of a myriad number of thermometers for commercial sale reveals many discrepancies with the reading. More specifically, things like tympanic and temporal readings are greater than or less than the actual reading by around 0.3 degrees C - 0.6 degrees C, respectively. Although many studies claim the aforementioned temperature error, a wider higher range of error exists because of the user, algorithm in the thermometer, or the quality of the thermometer itself. An accurate temperature is crucial because mesophiles, bacteria that live optimally in human body temperatures, dramatically decrease in growth potential as the temperature increases slightly above normal human temperature. Knowing the accurate temperature of a human is vital and can be used to fight bacterial infections and pathogens that are susceptible to temperature change. In order to combat the issue present, we analyzed the algorithm present in the IR thermometer used and used an oral thermometer as a base while taking the appropriate measures to ensure accuracy. By analyzing dozens of temperature data points along various distances, a strong trend that closely resembles the Stefan-Boltzmann Law (among other ideas) emerged. Using this data, we sought to develop a universal algorithm that can be used in other thermometers, given the correct parameters. Understanding the potential errors that can occur in measuring temperature can allow possibly sick individuals to take better measures, leading to a safer society.