Cost-Effective Air Quality Monitoring Using Readily Available Programming Interfaces

Leal, Kevin (School: Brentwood High School)

Over the course of the last forty years concern of the effects caused by indoor air quality on health has been increasing due to the ever-surging indoor based work environments and homes. With constant changes in building design to improve energy efficiency and eco-friendly status, these structures have become more airtight to maintain a controlled environment. Also, improvements have allowed more comfortability and lower costs of construction due to more synthetic building materials, which with the discussed nature of buildings particulates, may build up to abnormal levels compared to outdoor environments. It is important to understand work environments and homes, but schools as well since children are in a school environment for most of their developmental years. This study analyzes air quality in Brentwood High School over a four-week period. It was conducted using devices that were built with cost-effective materials to create a sensor unit that measured CO2 (in ppm), relative humidity (RH%), and temperature (Celsius). Locations were chosen between low-traffic and high-traffic areas. Filters from the SPS30 sensor were imaged under the SEM weekly. The data concluded many common air quality index (AQI) factors to be abnormal. CO2 was found to be above the recommended 1000 ppm limit in both locations and particulates were in abundance in the high traffic location due overcrowding being a prominent factor in air quality control. Data concluded poor air quality was present in the Brentwood High School due to the factors of high body count and poor ventilation.

Awards Won: