Hazardous Gas Detector

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The monitoring of hazardous gases, such as carbon dioxide (CO_2), is critical for ensuring the safety of workers in enclosed environments such as spacecraft. This research project focuses on the design, development, and coding of a compact CO_2 detector.

My design utilizes a Raspberry Pi Pico microcontroller connected to an RTD60 thermopile gas detector. The microcontroller was then programmed to analyze the input from the sensor and determine the CO_2 levels in its environment.

The RTD60 gas detector was soldered to four wire leads and connected to the microcontroller. Three LED lights are incorporated into the design to provide visual alerts based on the CO_2 levels: green for safe, yellow for caution, and red for danger.

MicroPython, a high-level programming language, was used to code the microcontroller. The code is written to continuously read the input from the sensor and to calculate the results. Based on those results the controller would then activate the appropriate LED indicator. The code also includes an output to the user, giving them live readings from the detector.

An enclosed area was constructed for testing. A valve and CO_2 cartridges were used to administer the gas. The detector proved to be accurate and reliable. The compact size, low power consumption, real-time readings, and alerts make this CO_2 detector a valuable tool to ensure the safety of workers in any enclosed environment. My insights gained from this project have given me valuable experience in the design, construction, and coding of instruments and detectors such as my hazardous gas detector.