Affordable Web-Enabled Continuous Radon Detector

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Radon is a radioactive gas that emerges from Earth's surface. A product of the radioactive decay of Uranium, radon and its daughters present a serious health hazard that is often neglected. More than 20,000 Americans die from radon-related lung cancer every year, and, yet, there are no inexpensive devices capable of continuously monitoring radon radiation levels that are available to the average homeowner. This work focuses on the development of an inexpensive web-enabled radioactivity monitor capable of recording and analyzing radon radiation levels. Two prototypes were developed. The developed devices are based on Russian military Geiger-Muller counters which are inexpensive, sensitive, and accurate. The data registration circuitry is implemented using an Arduino micro-processor. The device uploads the registered radiation levels to a website developed for this project. Besides data storage and analysis, the website provides homeowners with information about radon, exposure health risks, mitigation techniques, etc. Based on the collected data, the web-site's users are able to make an educated decision on whether the installation of a radon mitigation system is beneficial and how effective a mitigation system is if one has already been installed. The system was beta-tested in three households and set to work continuously in one household for three months. Collected data showed radon fluctuations with levels exceeding 4pCi/l and convinced a homeowner to install a mitigation system. In conclusion, the system was cheaper than existing models, allowed for continuous monitoring, and had the capability to record historical data.

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