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Development of a radon detector module using CMOS image sensor and a selective real time monitoring system: CMOS image sensor and its application in a radon detector with selective real time monitoring system

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Radon detector is a device that measures radon gas concentration using CMOS image sensor in camera at very low cost. Alpha particles emitted by alpha decay of radon are collected by an electrostatic concentrator and strike one or more pixels of CMOS image sensor and they are counted. The concentrator which is applied by high voltage generates sufficient charge to saturate pixels. The radon detector transmits this data that includes concentration, time, and day data to the central control unit that could watch radon con-centration of entire region in one place or give a notice that concentration of the region is higher than considered safe. World Health Organization (WHO) states that radon is the best cause of the lung cancer next to smoking. International Agency for Research on Cancer (IARC) classified the radon as group 1 of carcinogenic substance. Because radon is heavier than elements of the air and colorless & odorless, it is easy to be stuck in indoor. So, it is worthwhile to notice danger of radon by making it detectable at low cost. When it is necessary to know about radon concentration of entire region, it is waste to use radon detector without communication function in terms of time and money. Unlike the other way, using CMOS image sensor and concentrator can detect alpha particles at the same time and increase detector sensitivity. Because there are regions that can't use internet network, using optional communication module of one of CDMA, WI-FI or HSPA is more flexible. Radon progeny concentration has been achieved using an electrostatic concentrator, and alpha particles were detected using a CMOS image sensor. Alpha parti-cles were counted at a rate 5.2 counts/hour at radon concentration of 159 Bq/m^3

Biography

Jae-Hak Kim is a Senior Student in Undergraduate Course of the University of Seoul and studying in Non-Linear Control Laboratory supervised by Professor Gyu-Sik Kim.

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