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Odor Recognition System Using Embedded Leaning Vector Quantization Circuit

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In this paper, we propose a system that can recognize odors in real time even in a highly fluctuating environment. We used quartz crystal microbalance (QCM) sensors to detect odors. We adopted the learning vector quantization (LVQ) algorithm because it is possible to identify complicated data using a small amount of computation resources. Moreover, we extracted the time constant of the QCM sensor with a short-time Fourier transform (STFT) unit to improve the identification rate. Then, we performed identification experiments using pseudo QCM sensor signals that faithfully reproduced the previous data. When we performed experiments on identifying the smells of apple, muscat, banana, and pineapple, we obtained an identification rate of about 90% despite the high fluctuation of odor concentration.

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