Supplementary Information

A Regression-Based Machine Learning Approach for pH and Glucose Detection with Redox-Sensitive Colorimetric Paper Sensors

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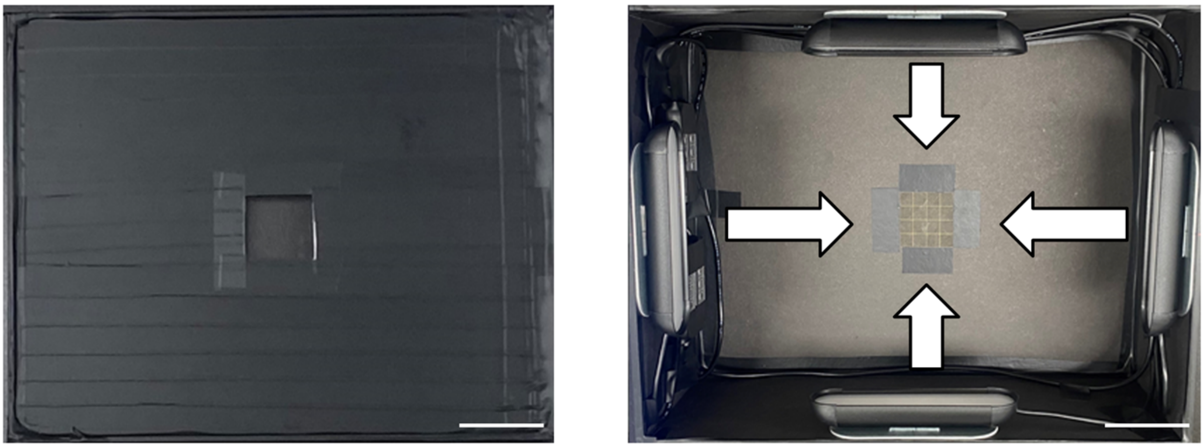

Figure S1. Exterior (left) and interior (right) photos of the homemade darkroom. Scale bar, 5 cm.

Table S1. Percentages of recovery and RSD of pH (*n*=110) and glucose (*n*=79)

pH	Recovery (%)	RSD (*n*=110) (%)	Glucose (mg/mL)	Recovery (%)	RSD (*n*=79) (%)
2	102.5	8.8	0	N/A	176.5
4	99.8	6.3	0.1	270	85.2
6	99.8	3.5	1	120	85
8	107.8	7.0	5	92.2	36.4
10	92.8	6.3	10	94.7	12.4

Through this study, we know that wide range detection of glucose is difficult with a colorimetric paper sensor. In order to accurately detect a low concentration of glucose, it is necessary to optimize the performance of the paper sensor accordingly. If machine learning (ML) is applied to the optimized paper sensor, better recovery and RSD values can be obtained. In this regard, further study is needed.

Year	Materials	Target analytes	Detection range	Best model	Extracted value	Self-manufactured sensor?	Accuracy (%)	Ref.
2017	pH indicator strip	pH	pH: 4–9	LS-SVM	RGB	No	97.2	[1]
2018	Quantofix Peroxide 100	H_2O_2	H_2O_2: 0–100 ppm	LS-SVM	LAB	No	90	[2]
2021	μPAD	Glucose	Glucose: 0–10 mM	LDA	RGB	Yes	98.2	[3]
2022	PPS[1)] and GPPS[2)]	pH and glucose	pH: 2–10 Glucose: 0–56 mM	RFR	RGB	Yes	95.7 for pH 92.2 for glucose	This work

Table S2. Comparison of various methods with our work regarding the ML-based colorimetric detection

[1)] PPS: PAni paper sensor; [2)] GPPS: GOx-embedded PPS

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References