

Supplementary Information

Smartphone-Based Colorimetric Analysis of pH Strips Using Machine Learning

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Table S1. Computational performance comparison of the original 33-feature model and the SHAP-optimized 6-feature model deployed on the smartphone application.

Model	Features	TFLite Size	Memory Usage	Inference Time	Performance (R^2)
33-feature model	33	16 KB	0.18 MB	0.10 ± 0.02 ms	0.988
SHAP-optimized model	6	6 KB	0.18 MB	0.06 ± 0.02 ms	0.969

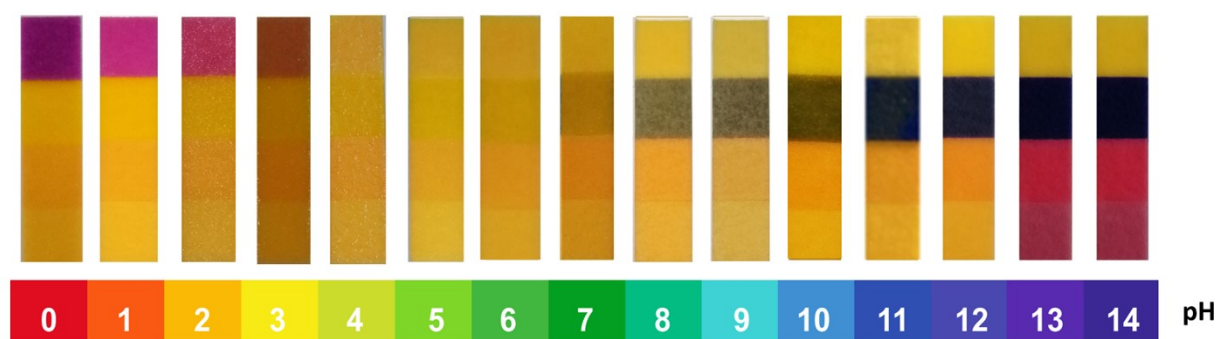


Figure S1. Representative regions of interest (ROIs) obtained from images captured using a different smartphone (Huawei Mate 10 Lite) for external validation.

Predicted vs True pH

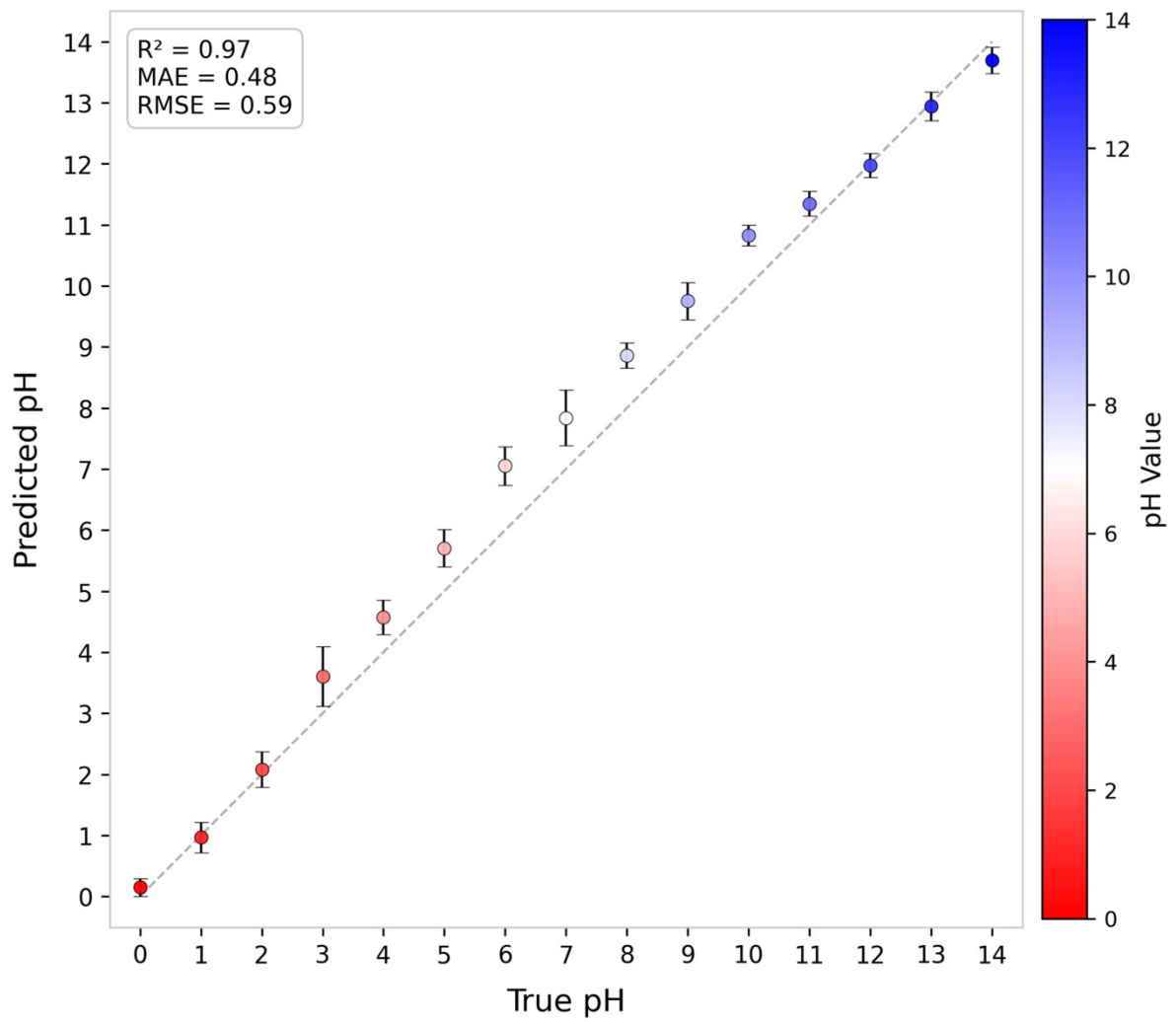


Figure S2. Predicted versus true pH regression plot for images acquired using a different smartphone (Huawei Mate 10 Lite) to evaluate cross-device model generalizability.