Response to Reviewer's Comments on the Study of Non-invasive Anemia Diagnosis: Improvement Directions and Prospects

Yahan Zhang, Jiatuo Xu

Submitted to: JMIR Medical Informatics
on: March 22, 2025

Table of Contents

Response to Reviewer's Comments on the Study of Non-invasive Anemia Diagnosis: Improvement Directions and Prospects

Yahan Zhang[1] MS; Jiatuo Xu[1] PhD

[1] Shanghai University of Traditional Chinese Medicine Shanghai CN

Corresponding Author:
Jiatuo Xu PhD

Shanghai University of Traditional Chinese Medicine
No.1200 Cailun Road, Pudong New Area
Shanghai
CN

Abstract

(JMIR Preprints 22/03/2025:74333)
DOI: https://doi.org/10.2196/preprints.74333

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?
Please make my preprint PDF available to anyone at any time (recommended).
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
✓ **No, I do not wish to publish my submitted manuscript as a preprint.**
2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?
✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http
No. Please do not make my accepted manuscript PDF available to anyone.

Original Manuscript

Author Response to Letter to the Editor

Response to Reviewer's Comments on the Study of Non-invasive Anemia Diagnosis: Improvement Directions and Prospects

Keywords: anemia; hemoglobin; spectroscopy; machine learning; risk warning model

We sincerely appreciate your thoughtful and constructive comments on our recent paper exploring non-invasive anemia diagnosis through facial visible light reflectance spectroscopy and machine learning[1]. Your attention and insightful suggestions greatly guide our efforts to enhance this work. We address your key points below, offering clarifications as needed. You noted that uncontrolled factors like smoking and nutrition might influence anemia severity and spectral data. While our initial focus was validating this approach by controlling core variables (age, gender), we plan to broaden future data collection to include these factors, analyze their effects, and integrate them into our model to improve reliability. You also emphasized how skin types, lighting, and individual variations could affect reflectance. We standardized conditions and preparation to minimize variability, yet acknowledge our sample's limited diversity. Given hemoglobin's specific absorption peaks, we hypothesize that certain wavelength bands may be less skin-tone-dependent. To explore this, we intend to collect data from diverse regions and skin types, aiming to identify such bands and enhance model applicability.

We value your recognition of our SVM model's performance and your concern about overfitting due to sample size. Though it outperformed other algorithms, we are addressing this limitation by gathering more data via multi-center collaboration, applying 10-fold cross-validation, and validating with external datasets to boost accuracy and robustness. Our study focused on establishing facial spectral imaging's potential for anemia detection, but comparative analysis could better assess its clinical utility. We are particularly intrigued by multi-modal integration, such as combining spectroscopy with PPG to improve diagnostic precision. Future work will involve comparative experiments to evaluate metrics like sensitivity and specificity, exploring whether synergy yields superior results. However, PPG indirectly reflects hemoglobin via light intensity changes, suiting routine monitoring, whereas spectroscopy directly measures hemoglobin concentration through reflectance spectra, fitting clinical diagnosis and research. Thus, standalone spectroscopy for non-invasive hemoglobin measurement holds significant promise, which we aim to further investigate.

We are encouraged by your recognition of this technique's potential for community screening and personalized care. Thank you again for your rigorous review and profound insights. We look forward to further discussion and sharing progress or collaboration opportunities as our research advances.

1. Zhang Y, Chun Y, Fu H, Jiao W, Bao J, Jiang T, et al. A Risk Warning Model for Anemia Based on Facial Visible Light Reflectance Spectroscopy: Cross-Sectional Study. JMIR Med Inform. 2025 Feb 14;13:e64204. PMID: 39952235. doi: 10.2196/64204.