

Lecture Notes in Computational Vision and Biomechanics 32

João Manuel R. S. Tavares  
Nilanjan Dey  
Amit Joshi *Editors*

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## Author information

### Authors and Affiliations

Goa University, Goa, India

Jivan Parab, M. Sequeira, R. S. Gad & G. M. Naik

### Corresponding author

Correspondence to [Jivan Parab](#).

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# Effect of Reduced Point NIR Spectroscopy on Glucose Prediction Error in Human Blood Tissue

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Jivan Parab , [M. Sequeira](#), [R. S. Gad](#) & [G. M. Naik](#)

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## Abstract

Measuring blood glucose noninvasively is a major objective for many research groups. They have discussed various techniques for better efficiency in the prediction of glucose. This paper discusses a novel technique to measure the blood glucose noninvasively in the NIR range, i.e., 4000–5000  $\text{cm}^{-1}$ . Here, a multivariate model of human blood tissue is developed by considering five major confounders in their normal ranges in human blood, i.e., Glucose, Alanine, Ascorbate, Lactate, and Urea. All 12 templates were made and scanned using Shimadzu FTIR 8400S in the range 4000–5000  $\text{cm}^{-1}$  which gives total 512 points for calibrating the PLSR multivariate model. The model is best suited for glucose prediction when instrumentation has to be developed with less number of probe points for portable and low-power application. A comparison between the results of glucose prediction between 512 points and 2387 points is given to explain the usefulness of model. Also, a study of only 128 points has been carried out to show that the error is within the accepted limit. This model with 512 points is validated using percentage error in prediction, and results were compared with 2387 points. We have also plotted how the prediction error is dependent on the PCA factors.