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# About this paper


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# Testing the Efficacy of Various Artificial Neural Network for Total Haemoglobin Estimation

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## Abstract

In today's world, haemoglobin is detected using the traditional invasive method which leads to delayed diagnosis and painful experiences for patients. This paper presents a non-invasive method for estimating haemoglobin with different Machine Learning (ML) algorithms in neural networks using extracted features from PPG signals. The PPG signals were acquired for five different LED wavelengths (670 nm, 770 nm, 810 nm, 850 nm, and 950 nm) for fifty subjects. The raw PPG signal was preprocessed and the PPG features were extracted and given to the neural network. The model was implemented using MATLAB with Arduino board. To compare the performance of the different ML algorithms, different measures of performances such as Root Mean Square Error (RMSE), $R^2$ (Coefficient of determination), r (Correlation coefficient), and Accuracy were evaluated. Finally, it was shown that, when compared to the other two training algorithms, Bayesian regularisation produces more accurate results, with RMSE of 0.45 g/dL, r = 0.98, $R^2$ = 0.959, and the prediction accuracy of 97.25%. Also, Bland-Altman's study showed that the two measurements were in strong agreement.