



NON INVASIVE ESTIMATION OF BLOOD UREA CONCENTRATION USING NEAR INFRARED SPECTROSCOPY

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Abstract- This paper details about the noninvasive estimation of Urea concentration in blood using near infrared spectroscopy (NIRS) and Artificial neural network based prediction model. The absorption spectrum of the urea has been studied experimentally in order to choose the wavelengths of peak absorption. For this purpose, IR absorption spectrum of 0.1M aqueous urea solution has been collected and analyzed in second overtone region of the near-infra red spectra using the Bruker tensor 27 FTIR spectrometer. Based on the theoretical analysis the optimal wavelength of sensor is found to be 995nm for obtaining proper Photo plethysmograph (PPG). The regression analysis has been carried out on PPG signal with the artificial neural networks for obtaining a prediction model for estimating the blood urea concentration. The mean square error of prediction is found to be $\pm 2.23\text{mg/dL}$.

Index terms: Noninvasive, blood urea, photo plethysmograph, artificial neural network.