FUTURE GENERATION INFORMATION SYSTEMS

Convergence of Deep Learning and Artificial Intelligence in Internet of Things

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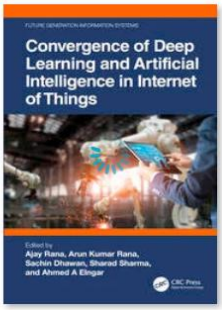

Chapter

Prediction of Alanine Using Neural Network Model

By M. Sequeira, Jivan Parab, G.M. Naik

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ABSTRACT

The near-infrared region is increasingly been used for rapid clinical testing in the medical field. A medical doctor caring for patients suffering from liver diseases often relies upon the levels of blood alanine to assess the condition of the patient. This manuscript discusses the neural network approach to estimate the alanine content using the near-infrared (NIR) absorption spectra in the range of 2,050–2,350 nm. NIR spectra were obtained from 64 laboratory samples on a spectrophotometer. The recorded dataset was divided into training and validation sets containing 57 and 7 samples, respectively. The former was used to train the model and the latter was used to test the prediction of the created model. Before applying the training using a neural network, principal component analysis (PCA) transformation is done on the dataset. The inputs to the neural network were the PCA scores. The network was trained using the Levenberg–Marquardt algorithm. Bland–Altman analysis of the model gave a bias of 0.04 mg/dL and the limits of agreement from -0.88 to 0.95 mg/dL. The model gave a root mean square error for prediction of 0.43 mg/dL and an accuracy of 97.68% on the validation dataset.