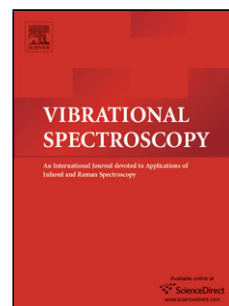


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Application of deep learning and near infrared spectroscopy in cereal analysis

Ba Tuan Le (Conceptualization)
(Methodology) (Data analysis) (Writing - original draft)



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Application of deep learning and near infrared spectroscopy in cereal analysis

Ba Tuan Le^{1,*}

¹ *Institute of Research and Development, Duy Tan University, Da Nang, 550000, Vietnam*

*Corresponding author: Ba Tuan Le (e-mail: lebatuan1@duytan.edu.vn; batuanle@hotmail.com)

Highlights

1. A method for quickly analyzing cereal characteristics.
2. The method is based on deep learning and near infrared spectroscopy.
3. Uses stacked sparse autoencoder to extract features of near infrared spectral data.
4. A near infrared spectroscopy analysis model was proposed.
5. Compared with other methods, the method proposed has better predictive ability.

Abstract

Deep learning is an important research achievement of artificial intelligence in recent years and has received special attention from scientists around the world. This study applies deep learning to spectral analysis techniques and proposes a rapid analysis method for cereals. First, the advanced features of the near infrared spectroscopy (NIR) were extracted by the deep learning-stacked sparse autoencoder (SSAE) method, and then the prediction model is built using the affine transformation (AT) and the extreme learning machine (ELM). Experiments were conducted on corn and rice data sets to verify the effectiveness of the method. The results show that the proposed method achieves good prediction results and is superior to other typical NIR analysis methods.

Keywords: deep learning; cereal analysis; near-infrared spectroscopy; stacked sparse autoencoder; extreme learning machine.

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