

The usage of perception, feed and deep feed forward artificial neural networks on the spectroscopy data

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The usage of machine learning algorithms is a growing field of research. Since the computer power is constantly growing its application is often found in a wide variety of applications from determination of objects on a photograph all the way to expert systems capable to determine adequate states and predicted outcomes of complex systems, from difficult to maintain machines up to the assistance in human health monitoring. Application of the artificial neural networks has fall into focus of our interest because of the flexibility of their applications as well as a variety of complex problems that have been solved with their application. All the mentioned has been a decision factor for the applying of neural networks for the decision process of determining a stellar spectral type as a example of application on astrophysical data.

The usage of systems related to the functions of the neural networks has been in focus of investigation since mid-1940 (McCulloch, et al. 1943), but the real usage has evolved with the application of modern days digital computers, that enabled a construction of networks of enlarged complexity. One of the simplest neural networks, that could be seen more as a test case of validity of operation of artificial intelligence systems is perceptron (Rosenblatt, 1958).

The prediction as well as sensitivity on the training dataset is in favor of more complex networks and is primary goal of our investigation of their application on spectral datasets and measurements.

As a consistent base the set of easily readable, open access data a choice was made on files for the 131 stellar spectra published by A. Pickles (A.J. Pickles, 1998) (available at accompanying reference appended to the bibliographical entry, as seen in May 2022)

The results are promising and the further research on the field is expected. The quality of the trained artificial neural network prediction is related to the dataset as well as its structure, an effort on large scale database for the machine learning as well as finding a promising field of application should be carried out.

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