專題演講

Classifying Seyfert galaxies with deep learning

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摘　要/Abstract：

　　Seyfert galaxies have two main characteristics of their optical spectra. Type one has broad Balmer emission lines while type two has narrow Balmer emission lines. However, some Seyfert galaxies are intermediate between type one and type two and have broad Balmer emission line superimposed narrow Balmer emission line in their spectra. Traditional classification for intermediate Seyfert galaxies is usually visual check or using a quantity which is defined as the ratio of the Balmer line to forbidden line. However, the visual check usually takes a lot of time and a quantity does not reflect the physics information about the shape of the emission line. The shape of the emission line is the original classification features and usually contains physic information of the cloud of emission line. We use a method called convolution neural network (CNN) to classify different spectra of the Seyfert galaxies. CNN is an algorithm of deep learning and is widely used for classification. This algorithm can extract features though a specified filter dotting to input data to discern the difference between input sources. In this work, we build a 1D Convolution Neural Network as our classification model to distinguish the spectra of Seyfert 1.9 galaxies from Seyfert 2 galaxies. Our model can discern up to 80% accuracy of the Seyfert 1.9 galaxies from the Seyfert 2 galaxies. We also derive the broad and narrow components of the Hα emission line and provide emission line properties of the Seyfert 1.9 galaxies.

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