**APPLYING DEEP NEURAL NETWORKS FOR MEASURING PHOTOMETRIC REDSHIFTS FROM GALAXY IMAGES: PRELIMINARY STUDY**

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ABSTRACT

In the cosmological and extragalactic study, distance to a galaxy is an important parameter, by knowing the distance, we can find any other physical parameter such as mass, luminosity, star formation rate, and metallicity. By applying the specific cosmological model, a distance can be measured from the redshift. The accurate redshift can only be measured by using the spectroscopic technique (Doppler effect). However, spectroscopic observation limited to brighter objects and number of objects in a single field of view (FoV). While photometric observation can capture fainter objects and more objects in a single FoV. In this work, we use datasets from SDSS DR10 [1]. In the SDSS DR10 numbers of images from photometric observation are about 250 times more than the number of spectrums from spectroscopic observation.

Measurements of photometric redshift can be done by comparing the SED curves of the elliptical galaxy with known spectroscopic redshifts from other elliptical galaxy which we want to find the photometric redshift [2]. Another method is to do linear or non-linear regression, by assuming the redshift is a function of magnitude in each bandpass filter [3].

Therefore, we propose a technique that using full galaxy images in each measured bands and machine learning method for measuring photometric redshift [4]. We pass entire multi-band galaxy images into the machine learning architecture to obtain an estimated redshift. We use DenseNet, which is one of Deep Neural Networks (DNN) architecture, to recognize unique features from the flux of a galaxy per pixel in the single image which represents the redshift. We note that DNN requires more computing resources and better accuracy than standard machine learning architecture.

*Keywords: Photometric-redshifts; Galaxies; Machine Learning; and Deep Neural Networks*

References

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