

STAR- GALAXY USING CLASSIFICATION USING DEEP LEARNING

Abstract

The challenge of accurately classifying astronomical objects as stars or galaxies has been a fundamental task in astrophysics for centuries. Traditional methods relied heavily on visual inspection and morphological analysis, which were labour-intensive and limited by human subjectivity and the capacity to process large data volumes. With the advent of modern sky surveys like the Sloan Digital Sky Survey (SDSS), the volume of astronomical data has grown exponentially, rendering manual classification impractical.

The literature survey across the reviewed papers highlights three algorithms Convolution Neural Network (CNN), deep convolutional neural networks (ConvNets), ContextNet where taken into consideration.

The performance of deep learning architecture Convolution Neural Network (CNN) is used to classify stars and galaxies. Steps include rejecting data with errors, correcting for extinction, aligning images, and centring objects using nMontage and SExtractor.

The Dataset is taken from the Kaggle repository, the dataset contains 3986 data which 942 galaxy 3044 Star data.

Among the three Architecture, the Convolution Neural Network (CNN) is found to be best in terms of model building and computation. Thus, Star-Galaxy Classification Using Deep learning offers significant benefits for star-galaxy classification, including reduced human error, increased scalability, and efficient handling of vast data quantities.

References :

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- Kennamer N, Kirkby D, Ihler A, Sanchez-Lopez FJ. ContextNet: Deep learning for star galaxy classification. In International conference on machine learning 2018 Jul 3 (pp. 2582-2590). PMLR.

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