

Visualizing the Decision Tree of a Stellar Evolutionary Path

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Abstract

Decision Trees (DTs) are commonly utilized machine learning algorithms for analyzing large datasets and simplifying complex decision-making, particularly in fields characterized by uncertainty. We explore the application of DTs in astronomy to classify the evolutionary paths of stars into one of four categories: Protostar, White dwarf, Neutron star, and Black hole. The study was conducted in five structured phases. Phase I focused on extracting the mass of 250 stars and classifying them into three preliminary categories. In Phase II, we divide the dataset into a training and test set, followed by employing DTs to construct the prediction algorithms in Phase III. We trained the algorithm in Phase IV and utilized the trained model to predict the final evolutionary stages of the stars in Phase V. The result was implemented in Graphviz for visualization, and demonstrated that DTs effectively classified the evolutionary paths of stars based on their mass.

