An Algorithm to Determine the Spectral Types of Stars

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The spectral type of a star indicates the star temperature and is associated with other important physical characteristics of a star such as mass, diameter and color. Current methods used to determine a star's spectral type require spectral data spanning from ultraviolet wavelengths to infrared wavelengths. As a result, expensive spectroscopic technology is needed to classify stars. The goal of the algorithm developed in this project is to determine accurately the spectral type of a star using only spectral data from the visible light spectrum, a significantly narrower range of data than what is currently required. To develop the algorithm, algorithm models were formed and tested using stellar spectral data from the ELODIE Archive, a database of stellar spectral data taken by the ELODIE Spectrograph. Based on the results of these models, more algorithms were developed. This process was iterated multiple times, culminating in a final algorithm. The final algorithm has been found to have approximately 93% completeness of spectral type classifications. However, it should be noted that the algorithm cannot determine the subclasses of stars, which current star-classifying methods can do. So, this algorithm will likely be advantageous when a low cost of collecting data from a star's spectrum is needed and when determination of the star's subclass is not required. As such, the next step is to improve this algorithm so that it can also determine a star's subclass.

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