Application of Artificial Intelligence techniques for automatic stellar spectral

PhD Student: Edgar Villavicencio Arcadia

University of Guadalajara (CUCEA)

Department of Information Technology

Guadalajara, México

Abstract:

Due to the rapidly increasing volume of astronomical data obtained from projects like Lamost, the Sloan Digital Sky Survey, the spatial telescopes HST, SPITZER and now GAIA or the multi-object spectrographs as the Gran Telescopio de Canarias, the Keck telescopes etc., has increased the application of intelligence artificial techniques in astronomy in order to develop fast and accurate methods to analyze, classify and extract useful physical information from the spectra. This research focuses on the analysis and automatic classification of large stellar spectra databases using artificial intelligence techniques, we propose the development of an automatic spectral classification system in three dimensions: (temperature, gravity and metallicity), then we compare the classification accuracy by the Artificial Neural Networks (RNA) as well as by other techniques such as Support Vector Machines (MSV) and Genetic Algorithms. The classification obtained by the system is also used for determining distances to stars and other objects such as planetary nebulae and binary systems.