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Poster

MACHINE LEARNING AND THE QUASAR EMISSION LINE PROPERTIES

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Quasars are extremely bright objects with rapidly accreting supermassive black hole at their center. They exhibit a wide range of spectral characteristics and by studying them we can learn about the physical conditions in these extreme environments. Surveys of large number of quasars showed that there is a correlation between some of their spectral parameters. The parameter space with the strongest correlation found between parameters is called Eigenvector 1, where many properties correlate with the strength of optical iron and [OIII] emission. These correlations were found using mathematical tools such as principal component analysis (PCA) which is an unsupervised machine learning algorithm. One of the results obtained by applying PCA was the existence of the quasar "main sequence" which shows a strong correlation between FWHM of Hβ line and equivalent width of FeII emission line. It is thought that the driving force behind this correlation is the accretion rate. PCA and other machine learning algorithms can be applied on the data from widely available databases such as Sloan Digital Sky Survey. In this contribution we will apply different machine learning algorithms on large quasar spectral data sets with a goal to find possible correlations between spectral parameters and potentially describe a physical mechanism behind these correlations.