Applicant information:

Name of Applicant
- Trilce Procyon Estrada Piedra

Postition Title
- BSc. In Computer Systems

Institution
- Instituto Nacional De Astrofísica Óptica y Electrónica (INAOE)

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- Orquídea 634
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Citizenship
- Mexican

Academic Level
- Undergraduate

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Education

Undergraduate	M.Sc. in Computer Science Instituto Nacional De Astrofísica Óptica y Electrónica, Puebla, México
1997	BSc. In Computer Systems Universidad de Guadalajara, Jalisco, México

Awards

1997	Excellent student of the "Sistema de Enseñanza Media Superior U de G" Generation 1994-1997
2001	Excellent student of the "Sistema de Enseñanza Superior U de G" Computer systems degree Generation 1997-2001

Others

1997	Conferences: "Excelencia Académica 97, Calidad Total"
1999	Participation in the "1ª Muestra de Material Didáctico de Ciencias Experimentales" U de G
2001	Participation in the "XI Verano de la Investigación Científica 2001" Ensenada BCN
2001	Participation as exponent in the "VI Congreso del Verano de la Investigación Científica del Pacífico 'Delfín'" Acapulco. Gro.
2001	Partcipation as dictaminer of the National Contest: "Leamos la ciencia para Todos 2001" Fondo de Cultura Económica.

Research interests

Machine learnig, Processing of natural language, Automatic Speech Recognition, and General Pattern Classification.

Presentation Information:

Requested Presentation:
- Oral

Presentation title:
- Age determination for the nuclear stellar population of Active Galactic Nuclei (AGN) using Locally Weighted Regression (LWR).

PresentationAbstract:

Recent spectroscopic surveys of nearby AGN have proven that a large fraction show high-order hydrogen Balmer absorption lines in the near-UV. These features are characteristic of young stars and therefore represent a strong evidence of the presence of recent star formation in these galaxies. From a theoretical point of view, it is very important to determine the age of these starbursts, in order to understand the nature of the starburst-AGN connection and its relation with galaxy formation and evolution. The characterization of the nuclear star forming region (its age and mass) is very difficult to achieve in AGN, due to the contamination of the nuclear stellar absorption lines by the AGN component itself.

We present a new technique to determine the age of nuclear starbursts in galaxies with AGN using an ensemble of classifiers. The classifiers are specialized in the profile shape of high-order Balmer and Calcium K absorption lines and therefore very insensitive to the AGN contamination effect.

An ensemble of classifiers is a group of classifiers whose outputs are combined in some way, usually by voting. Ensembles of classifiers normally have better accuracy than the individual classifiers that make them up. For this work, each member of the ensemble was created using a randomly selected attribute set, and each applied the locally weighted regression algorithm, an instance based learning method that explicitly retains the training data and uses them to build a local linear model, valid only in the neighborhood of the point of interest, each time a prediction needs to be made. Our training data consist of 23 high spectral resolution synthetic models of starbursts of different ages. Each classifier was trained with randomly generated subsets of features, and the ensemble was tested using ten-fold cross-validation and an analytically classified test set. An accuracy of about 0.3dex in logarithmic age was achieved.

The method was then applied to the optical/near UV spectra of nuclear regions of nearby Seyfert galaxies covering the wavelength region 3600-5300 Angstroms and it was found to be very insensitive to the AGN dilution. The results obtained by means of machine learning are compared with those produced by exhaustive search in terms of time and precision. We conclude that the automatic learning method greatly surpasses the performance of the traditional method.

Requested financial aid:

- Hotel

Letter of recomendation:

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