STag: Supernova Tagging and Classification

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I. Introduction

- Two distinct classes of supernova (Type I & II)
- Upcoming surveys will observe many supernova; classification needs to be robust and logical
- Spectroscopic classification lacks consistency and clarity (especially sub-typing)

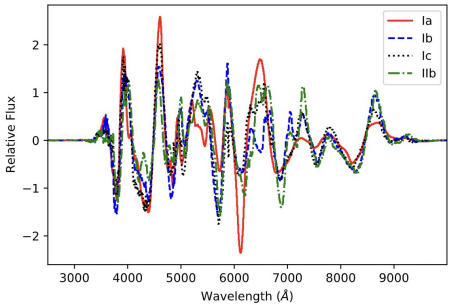

Figure 1. The mean continuum-subtracted flux values of four of the supernova classes.

Follow this QR code to listen to a brief description of *STag*.

II. Tagging and Classifying

- Assign spectra tags based on their features
- Sets of tags can be used to define classes
- ***Not*** template fitting; only concerned with features in a given spectrum
- Tags assigned using logistic regression
- Tags are passed to a neural network which associates certain tags with certain classes
- Neural network trained and tested on template spectra

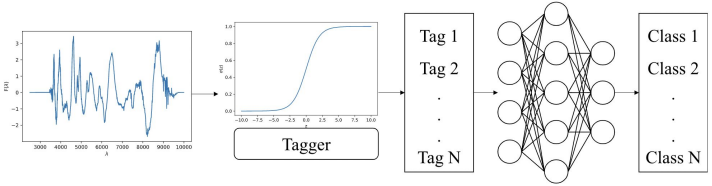

Figure 2. A simplified diagrammatic overview of the general architecture used by *STag*.

III. Results

- First tested against unseen template data
- Fig. 3 shows that *STag* is capable of accurately predicting classes

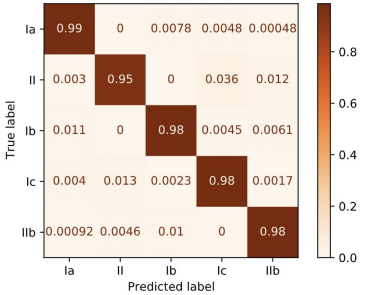

Figure 3. The normalised confusion matrix comparing the predicted class made by *STag* to the 'true' class of the supernova.

- Tested against previously machine classified OzDES spectra, achieving 81% agreement
- Inclusion of more tags, sub-types, and other transients/non-supernova entities

IV. Further Reading

- https://github.com/wdavison909/STag
- https://arxiv.org/abs/2108.10497