Contribution ID: **69** Type: **Poster**

AutoSourceID-FeatureExtractor. Optical images analysis using a Two-Step Network for accurate feature estimation and uncertainty characterization.

Wednesday, 17 May 2023 13:15 (1 minute)

In astronomy, machine learning has succeeded in various tasks, such as source localization, classification, anomaly detection, and segmentation. However, feature regression remains an area with room for improvement.
We aim to design a network that can accurately estimate sources'features and their uncertainties from single-band image cutouts. The algorithm presented here, AutoSourceID-FeatureExtractor (ASID-FE), uses single-band cutouts of 32x32 pixels around the localized sources to estimate flux, more accurate centre coordinates and their uncertainties. The method uses two convolutional neural networks (CNN) in a two-step approach to first estimate the features and then their uncertainties without the need for any additional information.
We show that ASID-FE, trained on synthetic images from the MeerLICHT telescope, can predict more accurate features with respect to similar codes like SExtractor and that the two-step method can estimate well-calibrated uncertainties that are better behaved compared to similar methods that use deep ensemble regression techniques. Finally, we evaluate the model on real images from the MeerLICHT telescope to test its transfer learning abilities.

Primary author: STOPPA, Fiorenzo (Radboud University)

Co-authors: Dr RUIZ DE AUSTRI, Roberto (nstituto de Física Corpuscular, Valencia); Dr VREESWIJK, Paul (Radboud University); Dr BHATTACHARYYA, Saptashwa (Center for Astrophysics and Cosmology, University of Nova Gorica); Prof. CARON, Sasha (Radboud University); Dr BLOEMEN, Steven (Radboud University); Prof. ZAHARIJAS, Gabrijela (Center for Astrophysics and Cosmology, University of Nova Gorica); Prof. CATOR, Eric (Radboud University); Prof. NELEMANS, Gijs (Radboud University)

Presenter: STOPPA, Fiorenzo (Radboud University)

Session Classification: Poster Prizes & closing