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Analysis and Classification of Hot Subdwarfs Using Artificial Intelligence Techniques and Gaia DR3 data (poster pitch, online)

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In this study, we present an analysis of hot subdwarf stars (hot sds) based on the catalogue provided by Solano et al. (2022). Our analysis includes the utilization of the newly available Gaia DR3 data including the treatment of BP/RP spectra using artificial intelligence (AI) techniques. The AI techniques employed in this study involve Self Organized Maps (SOM) and software tools accessible to our collaboration group. This collaboration involves researchers of the Galician Group for the Gaia satellite (GGG), from the University of A Coruña (UDC) and the University of Vigo (UVIGO), in association with the Gaia DPAC consortium, of the Spanish Virtual Observatory (SVO) and of the University of Vilnius (Lithuania).

Our current work focuses on the development of a novel classification method for hot subdwarfs in binary systems, employing supervised machine learning (ML) techniques. Subsequently, we calculate the distribution of binary probabilities. For training purposes, we selected samples from Solano et al. (2022) and Drilling et al. (2013), and we applied our methodes to a larger catalogue of over 39,000 blue candidates as presented in Geier et al. (2019). We plan to compare our results with the outcomes derived from SOM techniques and also in the context of Virtual Observatory (VO) techniques as explored in Solano et al. (2022). These analyses aim to contribute to a better understanding of hot subdwarfs evolution and to enhance our knowledge of binary systems within this class, using advanced AI and data mining methodologies.

This abstract is framed within a Short-Term Scientific Mission (STSM), as part of a research exchange between members of the GGG consortium, the SVO and a visitor (presenting author) from the University of Vilnius, aiming to strengthen scientific collaboration and to advance the field of hot subdwarf classification using artificial intelligence techniques.

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Primary authors: VISCASILLAS VÁZQUEZ, Carlos (Vilnius University); SOLANO, Enrique (Centro de Astrobiología); ULLA-MIGUEL, Ana (Universidade de Vigo); ÁLVAREZ GONZÁLEZ, Marco Antonio (University of A Coruña); SANTOVEÑA GÓMEZ, Raúl (University of A Coruña); MANTEIGA OUTEIRO, Minia (University of A Coruña); DAFONTE VÁZQUEZ, José Carlos (University of A Coruña); PEREZ-FERNÁNDEZ, Esther (Universidade de Vigo); RODRIGO, Carlos (Centro de Astrobiología); ALLER, Alba (Centro de Astrobiología); OREIRO, Raquel (Universidade de Vigo)

Presenter: VISCASILLAS VÁZQUEZ, Carlos (Vilnius University)

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