

Third Technical Meeting Spoke 3

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ESPAI

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The ESPAI project (Enhancing Signal Purity with Artificial Intelligence in X-band telescopes) aims to develop innovative Deep Learning and Artificial Intelligence (AI) techniques to mitigate contamination from solar flares in X-band astronomical observations conducted by the XMM-Newton telescope. By leveraging state-of-the-art anomaly detection algorithms tailored to our dataset, we seek to build a model capable of distinguishing genuine astrophysical signals from solar flare artefacts. In parallel, we are implementing a Generative AI framework to augment the training data by synthesising realistic solar flare events, thereby enhancing the performance and robustness of the anomaly detection model.

To date, we have completed a comprehensive exploratory data analysis, established the architecture for the generative model, and developed an initial benchmark classifier capable of identifying solar flare photons in a test dataset. Ongoing work focuses on developing a more robust anomaly detection model and generating a synthetic dataset. These methods have the potential to significantly improve signal retention in X-band astronomical observations by enabling the recovery of valuable data that would otherwise be discarded due to solar flare contamination.

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Session Classification: Bandi a Cascata