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A Real-Time Tool for anomaly detection in Advanced Virgo's Auxiliary channels

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The Advanced Virgo interferometer is a complex machine constantly monitored by a vast array of sensors, producing the auxiliary channels datastream. Many analytical tools aid in the task of navigating the information cointained in the $\sim 10^5$ channels, but the limitations of the linear algorithms can hinder their capabilities of correctly assessing the health of the instrument. In this work we propose to exploit the non-linearity and the flexibility of Transformers algorithms to build an unsupervised tool capable of detecting anomalies in the auxiliary channels. The algorithm was able to flag periods of anomalous behaviors, performing real-time inference and give a quantitative measure of the health of each channel. This will help operators in quickly detecting previously hard-to-diagnose problems that arise in the instrument.

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