

SKATR – A Self-Supervised Summary Transformer for the Square Kilometre Array

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The upcoming Square Kilometre Array (SKA) will bring about a new era of radio astronomy by allowing 3D imaging of the Universe during the periods of Cosmic Dawn and Reionisation. Machine learning promises to be a powerful tool to analyse the highly structured and complex signal, however accurate training datasets are expensive to simulate and supervised learning may not generalise. We introduce SKATR, a self-supervised vision transformer whose learned encoding can be cheaply adapted for downstream tasks on SKA maps. Focusing on regression and posterior inference of simulation parameters, we demonstrate that SKATR representations are near lossless. We also study how SKATR generalises to differently-simulated datasets and compare to fully-supervised baselines.

Track

Astrophysics

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