



HAMLET August 19 - 21, 2024
Copenhagen, Denmark
How to Apply Machine Learning to
Experimental & Theoretical
PHYSICS

Contribution ID: 46

Type: **Parallel or poster**

Geomagnetic Forecasting with Neural Networks

Monday 19 August 2024 16:30 (1h 30m)

Geomagnetic storms, resulting from solar activity, pose significant risks to satellite operations, communication systems, and power grids. Accurate forecasting of these storms is crucial for mitigating their impacts. As the final project in the course “Applied Machine Learning” at the University of Copenhagen, we explore the application of convolutional neural networks (CNNs) and recurrent neural networks (RNNs) to forecast geomagnetic storms using satellite image data from the Solar Dynamics Observatory (SDO). By leveraging solar images capturing phenomena such as solar flares and coronal mass ejections (CMEs) in the 171Å band, our neural network models are trained to identify patterns and temporal sequences indicative of the geomagnetic activity. Preliminary results demonstrate that the neural networks work well for geomagnetic forecasting on short timescales. Future work should focus on extending the models for predictions further into the future and perhaps also more specifically optimizing the models for geomagnetic storm prediction, if this is desired.

Authors: AHMAD, Ali; MUSTAFAJ, Florent Imishti (University of Copenhagen)

Co-author: PETERSEN, Troels (Niels Bohr Institute)

Presenters: AHMAD, Ali; MUSTAFAJ, Florent Imishti (University of Copenhagen)

Session Classification: Poster Session