Time-series Forecasting of Space Weather using Ensemble Machine Learning

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Space Weather (SW):
- Varying conditions between the Sun and Earth (limited understanding)
- Impacts the technologies (satellites, navigation, communications, power grids).

Objectives:
- ML for the SW in the Earth’s ionosphere.
- Corrections for navigation applications and early-warning.
- Discovering of knowledge and functions to describe SW processes.

Data:
- Inputs: Solar activity, solar wind, geomagnetic field, time (hour and day of the year) …
- Output: Vertical total electron content (VTEC) in the ionosphere at high-, mid- and low- latitudes
- Training & cross-validation: 2015-2016. Test: 2017

Algorithms: Decision Tree (DT), Random Forest (RF), AdaBoost (AB), XGBoost (XGB), Voting regressor (VR): RF, AB & XGB

Test: 24-hour forecast

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