SPACE WEATHER PREDICTION: PRELIMINARY RESULTS USING MACHINE LEARNING TECHNIQUES

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Space weather refers to the changing solar wind conditions in the heliosphere causing disruptions and damages to the technological infrastructure and threat to humans in space. It is necessary to forecast these changing conditions to mitigate the adverse effects in a timely manner. Since the solar-terrestrial system is profoundly dynamic and intricately coupled, space weather forecast comprises of predictions of magnetospheric perturbations driven by the solar wind. The Space Wether Prediction Center (NOAA/SWPC) provides space weather predictions based on physics-based and empirical models but there exist significant discrepancies between predictions and observations. Data-driven models based on Machine Learning/Artificial Intelligence (ML/AI) are expected to provide better forecasting techniques and, possibly, better insight into the underlying physics.

The *Solar-Terrestrial Interactions Team* of the **NASA FDL 2017** developed a knowledge discovery module based on industry-standard, open source ML software to predict the variability of geomagnetic field in response to solar wind in terms of Kp index, a quantity used to indicate the level of geomagnetic field perturbations. Presented in this talk are the various ML techniques *the Team* tested and the relevant results.