UNIVERSITY OF PLYMOUTH

Forecasting Solar Winds

Joe Young

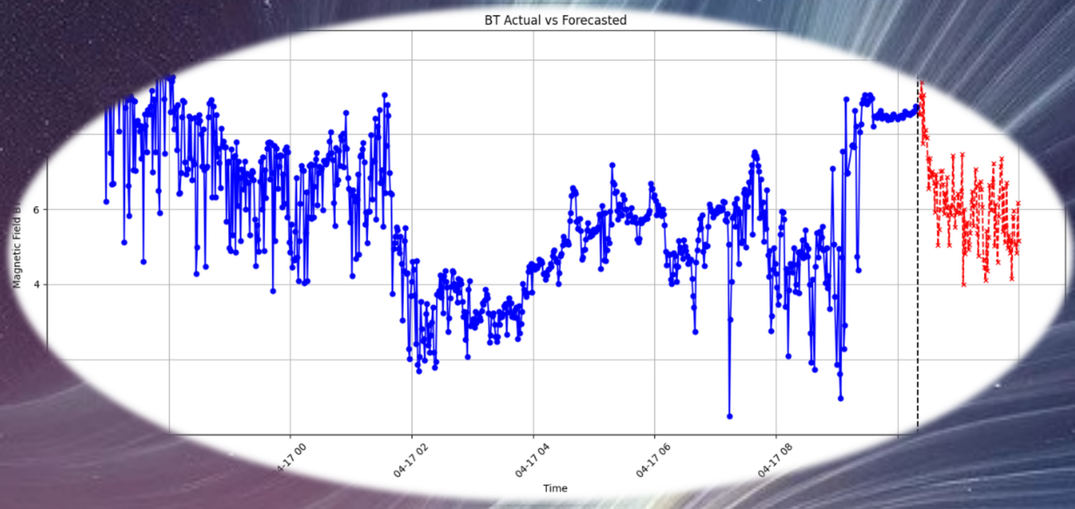
Background

Solar Wind Defined: Solar wind consists of magnetized plasma emitted by the sun, affecting Earth's magnetosphere and technological systems.

Technological Impact: Disruptions from solar wind can lead to severe consequences for satellite communications, GPS navigation, and power grids.

Current Forecasting Challenges: Existing models, primarily linear and based on direct solar observations, struggle with accuracy and real-time data integration.

Need for Improvement: Enhanced forecasting methods are crucial to prepare and mitigate adverse effects efficiently and to support space-weather related decision-making.



Objectives

Enhance Forecast Accuracy: Develop an LSTM model that predicts solar wind parameters more precisely than existing methods.

Validate Performance: Compare LSTM forecasts against traditional models to demonstrate improved reliability and accuracy.

Operational Integration: Adapt the model for real-time use in space weather monitoring and predictive systems.

Features

Advanced Sequence Learning: Utilises Long Short-Term Memory networks to capture complex temporal patterns in solar wind data.

Comprehensive Data Use: Integrates extensive historical and real-time data from NOAA for model training and validation.

Robust Predictive Analytics: Employs cutting-edge preprocessing and machine learning techniques to optimise forecasting performance.

Joe Young

joe.young@students.plymouth.ac.uk