

A Comprehensive Python Library for Deep Learning-Based Event Detection in Multivariate Time Series Data

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Universal Event Detection in Time Series



Versatile Use Cases

- Frauds Detection
- Anomaly Detection
- Change Points Detection
- Physical Occurrences Detection
- Information Retrieval in NLP

Inputs

Time Series	Events																																																																																																												
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```
import pandas as pd
from typing import Union

# Time Series
dataset: pd.DataFrame
# Reference Events
events: Union[list, pd.DataFrame]
```

Arguments

Argument	Type
output_dir	str
dataset	pd.DataFrame
events	Union[list, pd.DataFrame]
width	int
step	int

Simple

```
from eventdetector_ts.metamodel.meta_model import MetaModel

meta_model = MetaModel(dataset=, events=, width=, step=,
    ↪ output_dir=)

meta_model.fit()
```

Papers

Theory



Implementation

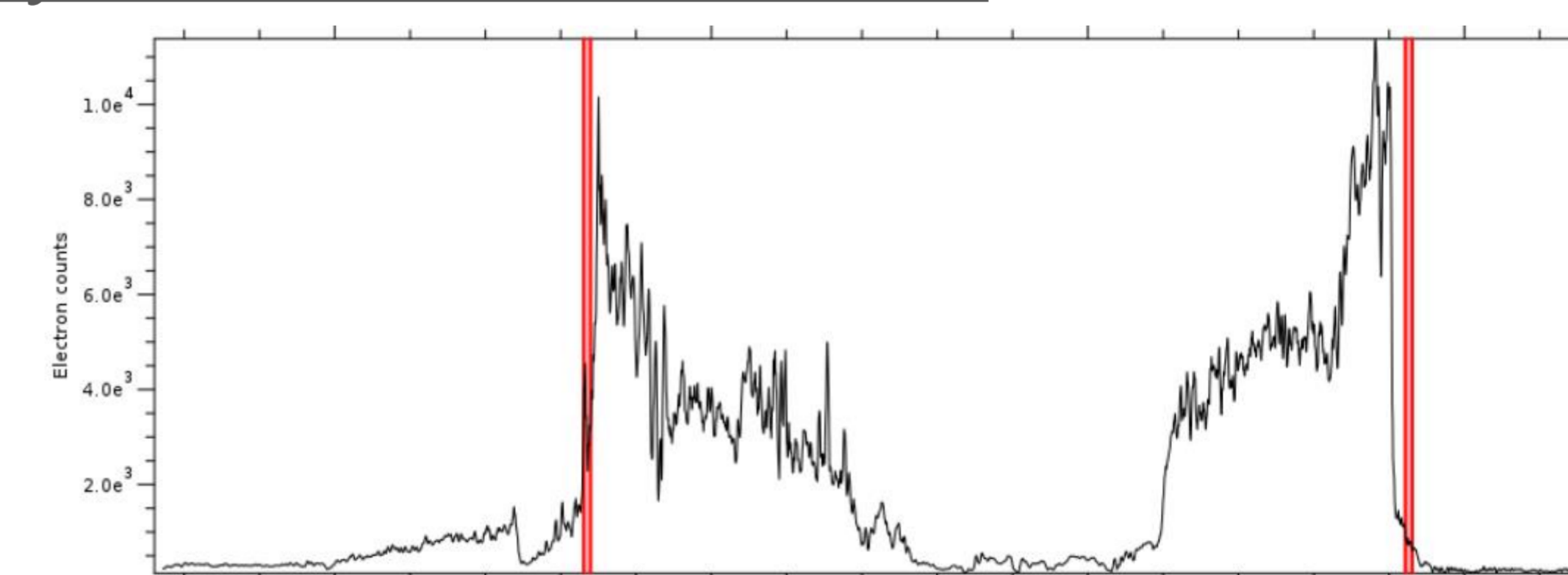
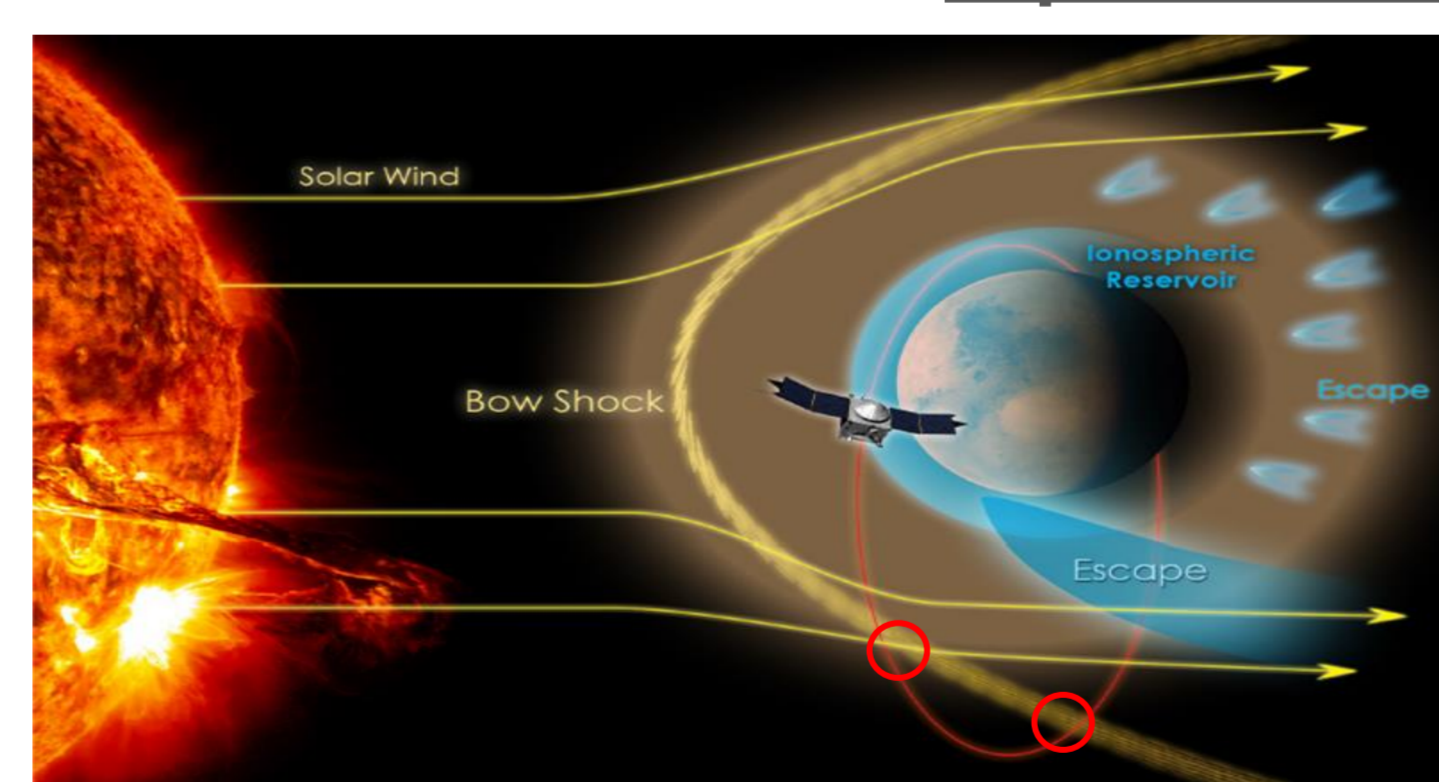


Efficient & Accurate

Frauds Detection



Space Physics Events Detection



Method	Number of Parameters	Precision	Recall	F1-Score
CNN [1]	119,457	0.89	0.68	0.77
FFN+SMOTE [2]	5,561	0.79	0.81	0.80
FFN+SMOTE [3]	N/A	0.82	0.79	0.81
Ours	1,201	0.98	0.74	0.85

Method	Number of Parameters	Precision	Recall	F1-Score
ResNet18 [4]	29,886,979	0.99	[0.83, 0.88]	[0.91, 0.94]
Ours	6,121	0.95	0.96	0.95

[1] F. K. Alarfaj, I. Malik, H. U. Khan, N. Almusallam, M. Ramzan and M. Ahmed, "Credit Card Fraud Detection Using State-of-the-Art Machine Learning and Deep Learning Algorithms," in IEEE Access, vol. 10, pp. 39700-39715, 2022, doi: 10.1109/ACCESS.2022.3166891.
 [2] D. Varmedja, M. Karanovic, S. Sladojevic, M. Arsenovic and A. Anderla, "Credit Card Fraud Detection - Machine Learning methods," 2019 18th International Symposium INFOTEH-JAHORINA (INFOTEH), East Sarajevo, Bosnia and Herzegovina, 2019, pp. 1-5, doi: 10.1109/INFOTEH.2019.8717766.
 [3] E. Ileberi, Y. Sun and Z. Wang, "A machine learning based credit card fraud detection using the GA algorithm for feature selection," in J Big Data, vol. 9, no. 24, 2022. [Online]. Available: <https://doi.org/10.1186/s40537-022-00573-8>.
 [4] I. K. Cheng, N. Achilleos and A. Smith, "Automated bow shock and magnetopause boundary detection with Cassini using threshold and deep learning methods," Front. Astron. Space Sci., vol. 9, 2022, doi: 10.3389/fspas.2022.1016453.