

IidSpikeEstimator Class

Reference

Definition

Namespace: [Microsoft.ML.Transforms.TimeSeries](#)

Assembly: Microsoft.ML.TimeSeries.dll

Package: Microsoft.ML.TimeSeries v2.0.0

Detect a signal spike on an [independent identically distributed \(i.i.d.\)](#) time series based on adaptive kernel density estimation.

C#

```
public sealed class IidSpikeEstimator :  
Microsoft.ML.Data.TrivialEstimator<Microsoft.ML.Transforms.TimeSeries.IidSpikeDetector  
>
```

Inheritance [Object](#) → [TrivialEstimator<IidSpikeDetector>](#) → [IidSpikeEstimator](#)

Remarks

To create this estimator, use [DetectIidSpike](#).

Input and Output Columns

There is only one input column. The input column must be [Single](#) where a [Single](#) value indicates a value at a timestamp in the time series.

It produces a column that is a vector with 3 elements. The output vector sequentially contains alert level (non-zero value means a change point), score, and p-value.

Estimator Characteristics

Does this estimator need to look at the data to train its parameters?	No
Input column data type	Single
Output column data type	3-element vector of Double
Exportable to ONNX	No

Estimator Characteristics

Machine learning task	Anomaly detection
Is normalization required?	No
Is caching required?	No
Required NuGet in addition to Microsoft.ML	Microsoft.ML.TimeSeries

Training Algorithm Details

This trainer assumes that data points collected in the time series are independently sampled from the same distribution (independent identically distributed). Thus, the value at the current timestamp can be viewed as the value at the next timestamp in expectation. If the observed value at timestamp $t - 1$ is p , the predicted value at t timestamp would be p as well.

Anomaly Scorer

Once the raw score at a timestamp is computed, it is fed to the anomaly scorer component to calculate the final anomaly score at that timestamp.

Spike detection based on p-value

The p-value score indicates whether the current point is an outlier (also known as a spike). The lower its value, the more likely it is a spike. The p-value score is always in $[0, 1]$.

This score is the p-value of the current computed raw score according to a distribution of raw scores. Here, the distribution is estimated based on the most recent raw score values up to certain depth back in the history. More specifically, this distribution is estimated using [kernel density estimation](#) with the Gaussian [kernels](#) of adaptive bandwidth.

If the p-value score exceeds $1 - \frac{\text{confidence}}{100}$, the associated timestamp may get a non-zero alert value in spike detection, which means a spike point is detected. Note that `confidence` is defined in the signatures of [DetectIidSpike](#) and [DetectSpikeBySsa](#).

Check the See Also section for links to usage examples.

Methods

Fit(IDataView)	(Inherited from TrivialEstimator<TTransformer>)
GetOutputSchema(Shape)	Schema propagation for transformers. Returns the output schema of the data, if the input schema is like the one provided.

Extension Methods

[AppendCacheCheckpoint<TTrans>](#)
([IEstimator<TTrans>](#), [IHostEnvironment](#))

Append a 'caching checkpoint' to the estimator chain. This will ensure that the downstream estimators will be trained against cached data. It is helpful to have a caching checkpoint before trainers that take multiple data passes.

[WithOnFitDelegate<TTransformer>](#)
([IEstimator<TTransformer>](#), [Action<TTransformer>](#))

Given an estimator, return a wrapping object that will call a delegate once [Fit\(IDataView\)](#) is called. It is often important for an estimator to return information about what was fit, which is why the [Fit\(IDataView\)](#) method returns a specifically typed object, rather than just a general [ITransformer](#). However, at the same time, [IEstimator<TTransformer>](#) are often formed into pipelines with many objects, so we may need to build a chain of estimators via [EstimatorChain<TLastTransformer>](#) where the estimator for which we want to get the transformer is buried somewhere in this chain. For that scenario, we can through this method attach a delegate that will be called once fit is called.

Applies to

Product	Versions
ML.NET	1.2.0, 1.3.1, 1.4.0, 1.5.0, 1.6.0, 1.7.0, 2.0.0

See also

- [DetectIidSpike\(TransformsCatalog, String, String, Double, Int32, AnomalySide\)](#)