
tensor-fm

Gabriele Modena

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Second Order Factorization Machine implemented with [Tensorflow](#) and [scikit-learn](#).

[Documentation Status](#)

TENSOR-FM

A scikit-learn compatible order 2 Factorization Machine, implemented atop TensorFlow 2. The algorithm is described in <http://www.csie.ntu.edu.tw/~b97053/paper/Rendle2010FM.pdf>. For an higher level overview of the method see <http://nowave.it/factorization-machines-with-tensorflow.html>.

This package is a port to Tensorflow 2 of the code presented in that blog post. The goal of this project is to experiment with different optimization strategies for classical ML models, and scalability of TF2 backends.

1.1 Install

The latest development version of `tensorfm` can be installed from its [github repo](#) with:

```
pip install git+https://github.com/gmodena/tensor-fm
```

1.2 Usage examples

Tensorflow and scikit-learn APIs are provided.

1.2.1 Tensorflow

The tensorflow implementation of Factorization Machines lives under `tensor-fm/tensorfm/base.py`. An example of how to work with this API can be found in `tensor-fm/tests/test_base.py`.

1.2.2 Scikit-learn estimator

`tensorfm.sklearn` exposes two sklearn compatible estimators: `FactorizationMachineRegressor` and `FactorizationMachineClassifier`.

Example

```
from tensorfm.sklearn import FactorizationMachineRegressor
...
fm = FactorizationMachineRegressor()
fm.fit(X, y)
fm.predict(X)
```

See also `examples/movielens.py`

1.3 Performance

All parameters and settings being equal, I noticed a considerable performance degradation of `FactorizationMachineRegressor` (MSE on train/test) on movielens compared to the tensorflow 1 implementation from <http://nowave.it/factorization-machines-with-tensorflow.html>. Possibly related, a test in the `check_regressors_train` suite (sklearn) fails due to a low R^2 . As a workaround `FactorizationMachineRegressor` sets the `poor_score` tag to `True`.

1.4 Limitations and known issues

Operations on sparse matrices are currently not supported. Training continues till `max_iter` is reached, we should stop if performance does not improve for a certain number of iterations.

2.1 sklearn

2.2 Tensorflow

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