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TensorFlow 2.4 on Apple Silicon M1: installation under Conda environment

Install arm64 TensorFlow alpha and other ML packages

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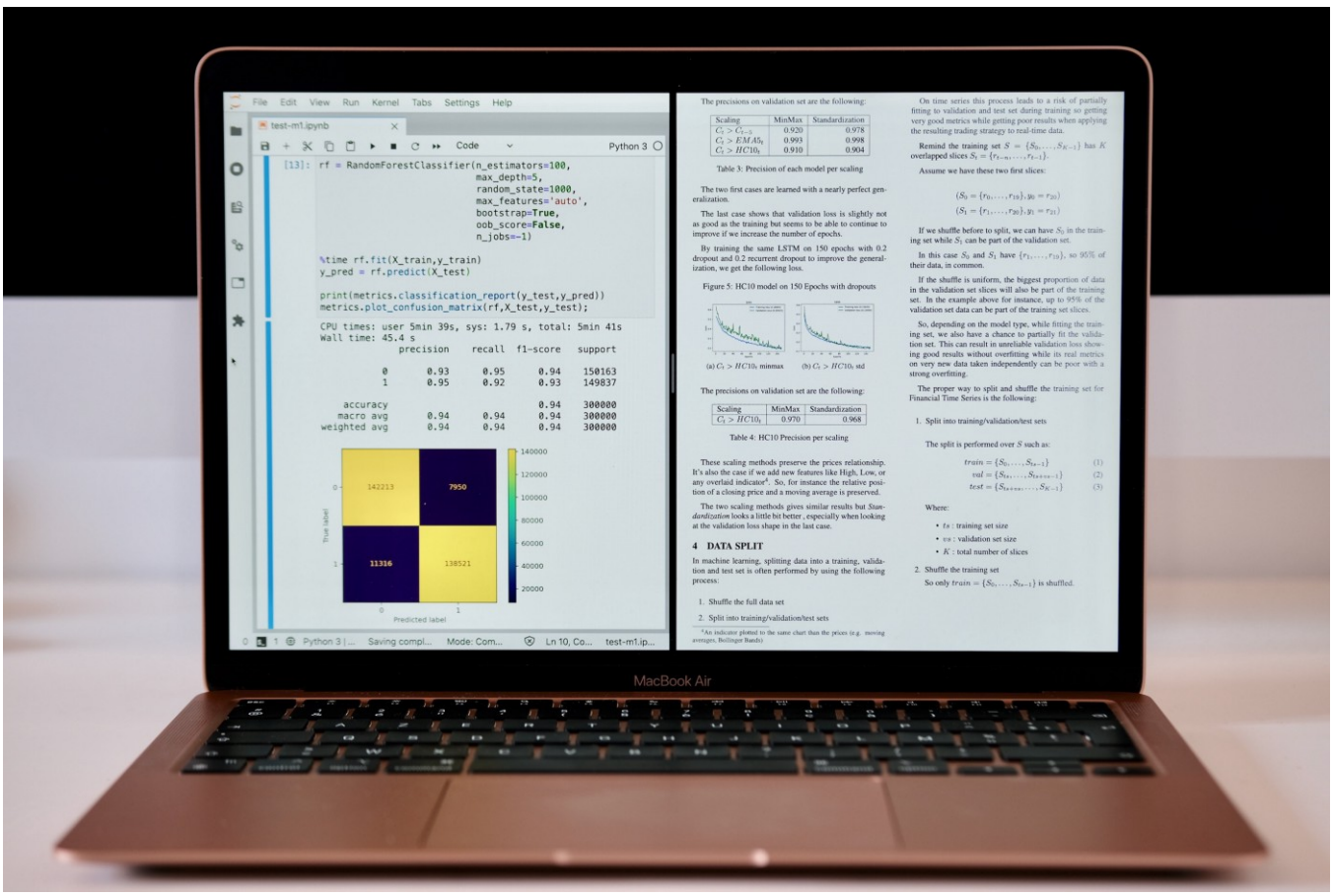

Photo by the author

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Mac **M1**.

*In this article **ATF 2.4** stand for TensorFlow 2.4 for Apple Silicon currently available from github in release 0.1 alpha 1.*

With **ATF 2.4**, standard installation requires creating a python environment while nearly no other package like scikit-learn can be installed from pip. This is making this environment quite useless for machine learning engineers except for small testing.

At the time of writing this article **ATF 2.4** is not free of bugs. It cannot yet be used in a professional context. But it's already possible to start working on personal Machine Learning projects with a Mac M1. Here I describe step by step how to install a full environment under Conda with every packages natively compiled for Apple Silicon:

- **ATF 2.4** *(TensorFlow 2.4 for Apple Silicon)*
- numpy
- scikit-learn
- pandas
- matplotlib
- JupyterLab

Step 1: Xcode Command Line Tools

Install Xcode Command Line Tools by downloading it from Apple Developer or by typing:

```
xcode-select --install
```

Step 2: miniforge

Install *miniforge for arm64 (Apple Silicon)* from miniforge github.

Miniforge enables installing python packages natively compiled for Apple Silicon including scikit-learn.

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provided script. Go under the `arm64` directory:

```
cd tensorflow_macos/arm64
```

Step 4: create Conda environment

Don't forget to open a new session or to source your .zshrc after miniforge install and before going through this step.

Create an empty Conda environment, then activate it and install python 3.8 (as required for ATF 2.4) and all the needed packages. Please note `numpy` is unnecessary here as `pandas` already install it, but it will be overwritten in the last step with the version provided by Apple.

```
conda create --name tf24
conda activate tf24
conda install -y python==3.8.6
conda install -y pandas matplotlib scikit-learn jupyterlab
```

Step 5: install all the ATF 2.4 packages

Now manually install **ATF 2.4** packages exactly like `install_venv.sh` does but under your Conda environment.

Please note the following instruction corresponds to the second **ATF 2.4** release, namely **0.1 alpha 1**. Any new release can require a different process, you will be able to adapt it by checking `install_venv.sh` content.

```
# Install specific pip version and some other base packages
pip install --force pip==20.2.4 wheel setuptools cached-property six

# Install all the packages provided by Apple but TensorFlow
pip install --upgrade --no-dependencies --force numpy-1.18.5-cp38-
cp38-macosx_11_0_arm64.whl grpcio-1.33.2-cp38-cp38-
macosx_11_0_arm64.whl h5py-2.10.0-cp38-cp38-macosx_11_0_arm64.whl
tensorflow_addons-0.11.2+mlcompute-cp38-cp38-macosx_11_0_arm64.whl

# Install additional packages
pip install absl-py astunparse flatbuffers gast google_pasta
```

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```
# install TensorFlow
pip install --upgrade --force --no-dependencies tensorflow_macos-
0.1a1-cp38-cp38-macosx_11_0_arm64.whl
```

Now you can run JupyterLab and start working.

Note that as pip installation can lead to inconsistencies with Conda packages previously installed, and especially because `numpy` is replaced by the **1.18.5** version shipped with **ATF 2.4**, there is no guarantee that it will work in every situation.

For now, I've successfully trained several MLP and Convnet models while LSTM still have an issue with the evaluation on test set. I also trained RandomForest models and plot confusion matrix everything from JupyterLab **without any issue**.

In the next article I will go through **TensorFlow 2.4 benchmark on Mac M1**.

Thank you for reading.

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