MFA and Pretrained Acoustic Models

The *Montreal Forced Aligner* (MFA) is a third-party tool developed by Michael McAuliffe and others for time aligning orthographic and phonological forms from a pronunciation dictionary to orthographically transcribed audio files. It is open source software based on the Kaldi ASR toolkit.

LaBB-CAT includes a layer manager module called "MFA Manager" which integrates with MFA in order to facilitate forced alignment of LaBB-CAT corpus data.

The layer manager can work in two modes:

- *Train and Align* - acoustic models are trained on the data you want to align, which can be in any language as long as you have a pronunciation dictionary for it.
- *Pre-trained Models/Dictionaries* - pre-trained models and pronunciation dictionaries are supplied by the Montreal Forced Aligner and used for forced alignment. Languages for which dictionaries are available listed on the MFA website and include:
  - English
  - French
  - German
  - Brazilian Portuguese
  - Spanish
  - Catalan

These instructions assume that your corpus is in one of these languages, and uses the *Pre-trained Models/Dictionaries* approach...

MFA Installation

MFA is a 3rd-party tool that LaBB-CAT integrates with via a Layer Manager module. MFA is *not included* as part of LaBB-CAT, and so it must be installed on the server you have installed LaBB-CAT on before you can integrate LaBB-CAT with it.

If MFA has not been installed already, please follow the following steps, depending on the operatings system of your LaBB-CAT server. This is a one-time process.

Linux

To install the Montreal Forced Aligner on Linux systems for *all users*, so that your web server can access it if required:

1. Download Miniconda:
   `wget https://repo.anaconda.com/miniconda/Miniconda3-py38\_4.10.3-Linux-x86\_64.sh`

2. Start the installer:
   `sudo bash Miniconda3-py38_4.10.3-Linux-x86_64.sh`
3. When asked the location to install Miniconda, use:
   `/opt/conda`
4. When asked whether the installer should initialize Miniconda, this is unnecessary so you can respond `no`
5. Change ownership of the conda files:
   `sudo chown -R $USERNAME:$USERNAME /opt/conda`
6. Make conda accessible to all users (so you web server can access MFA):
   `chmod -R go-w /opt/conda`
   `chmod -R go+rX /opt/conda`

7. Install the Montreal Forced Aligner. `sudo /opt/conda/bin/conda create -n aligner -c conda-forge montreal-forced-aligner`

Windows

To install the Montreal Forced Aligner on Windows systems for all users, so that your web server can access it if required:

1. Download the Miniconda installer:
   https://repo.anaconda.com/miniconda/Miniconda3-latest-Windows-x86_64.exe
2. Start the installer by double-clicking it.
3. When asked, select the "Install for all users" option. This will install conda somewhere like. `C:\ProgramData\Miniconda3`
4. When asked, tick the "add to PATH" option.
5. Install the Montreal Forced Aligner by specifying a path to the environment. `conda create -c conda-forge -p C:\ProgramData\Miniconda3\envs\aligner montreal-forced-aligner`

Forced Alignment

Once MFA has been installed, you have to install the MFA Manager, which is the LaBB-CAT module that provides MFA with all the data it needs, and then saves to alignments MFA produces back to your database.

1. Select the *layer managers* menu option.
2. Follow the *List of layer managers that are not yet installed* link.
3. Find *MFA Manager* in the list, and press its *Install* button and then press *Install* again.
4. As long as MFA has been installed for all users, you should see a box that's already filled in with the location that MFA was installed to.
5. Click *Configure* to continue the layer manager installation.

6. You will see a window open with some information about integrating with MFA, including the information you've already read above.
7. Now you need to add a phrase layer for the HTK configuration:

    - *Layer ID*: `mfa`
    - *Type*: *Text*
    - *Alignment*: *Intervals*
    - *Manager*: *MFA Manager*
    - *Generate*: *always*
    - *Description*: *MFA alignment time*

8. When you configure the layer, set the following options:

    - *Dictionary Name*: the dictionary language, e.g. *english_uk_mfa*
    - *Pretrained Acoustic Models*: the models language, e.g. *english_mfa*
    - The rest of the options can be left as their default values.
    - If you're curious about what the configuration options do, hover your mouse over each option to see a 'tool tip' that describes what the option is for.

9. Press *Set Parameters*
10. Press *Regenerate*
    You will see a progress bar while LaBB-CAT force-aligns all the transcripts in the corpus, which may take a few minutes.
11. When the layer manager has finished, you'll see a message saying:
    Complete - words and phones from selected utterances are now aligned.