DeepSpeech @ RasPi

Setup Raspi

With Installer Scripting (not used!)

> Beware! This seems to have some problems and needs to be further evaluated! But i want to store the links to have a deeper look at.

Try this out at your own risk: pi boot script

Default Setup

- balenaEtcher and raspian buster
- `touch ssh` on `d:\boot`
- search for raspi IP address via e.g. Angry IP Scanner
- `ssh pi@10.0.0.xx`, password for start: raspberry
- Rest done via raspi-config
  - change pwd
  - set locale (and keyboard layout)
  - change hostname

Preparational Setup for DeepSpeech

> Source: https://www.hackster.io/dmitrywat/offline-speech-recognition-on-raspberry-pi-4-with-respeaker-c537e7

```
sudo apt update
sudo apt upgrade
sudo apt install python3 python3-pip python3-dev
pip3 install deepspeech
sudo apt install libatlas-base-dev
```

> If not done automatically, add `~/.local/bin` to `PATH`.

The following two steps should be performed in a subfolder called `DeepSpeechData`.

Download the model (English):

```
curl -LO
https://github.com/mozilla/DeepSpeech/releases/download/v0.6.1/deepspeech-0.6.1-models.tar.gz

tar -xvf deepspeech-0.6.1-models.tar.gz
```

Download the test data:

```
curl -LO https://github.com/mozilla/DeepSpeech/releases/download/v0.6.1/audio-0.6.1.tar.gz

tar -xvf audio-0.6.1.tar.gz
```

Test DeepSpeech with Prepared Data

Finally perform:

```
deepspeech --model deepspeech-0.6.1-models/output_graph.tflite --lm deepspeech-0.6.1-models/lm.binary --trie deepspeech-0.6.1-models/trie --audio audio/2830-3980-0043.wav
```

> INFO: An error occured with numpy - solution found on snowboy -> `sudo apt install libatlas-base-dev` added to install steps

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Audio Recording (Microphone Usage)

> An error occured with audio package -> additional package needed: pyaudio, for sampling rate "resampling": sox.

Additional dependencies:

```
sudo apt-get install python3-pyaudio
sudo apt-get install sox
```

Plugin an(y?) USB microphone.

Check for hardware: http://wiki.sunfounder.cc/index.php?title=To_use_USB_mini_microphone_on_Raspbian

Create a wave record (right sampling rate and format, 3 seconds, plugin hardware `plughw:<card>,<device>`)

```
arecord -D plughw:1,0 -V mono -d 3 -f S16_LE -r 16000 test.wav

aplay test.wav
```

Store `test.wav` in folder `DeepSpeechData/audio`.

Testing via CLI

```
deepspeech --model ./DeepSpeechData/deepspeech-0.6.1-models/output_graph.tflite --lm ./DeepSpeechData/deepspeech-0.6.1-models/lm.binary --trie ./DeepSpeechData/deepspeech-0.6.1-models/trie --audio ~./DeepSpeechData/audio/test.wav
```

Testing via Python script

Once again done by: https://www.seeedstudio.com/blog/2020/01/23/offline-speech-recognition-on-raspberry-pi-4-with-respeaker/comment-page-1/

Clone repo https://github.com/mozilla/DeepSpeech-examples.git.

Of special interest ist the example `mic_vad_streaming`, therefore a copy was also put in the current repository.

Navigate to `mic_vad_streaming` and install the dependencies with:

```
pip3 install -r requirements.txt
```

And now let us have a streaming recording, starting from repo root folder:

```
python3 ./mic_vad_streaming/mic_vad_streaming.py -m ./DeepSpeechData/deepspeech-0.6.1-models/output_graph.tflite -l ./DeepSpeechData/deepspeech-0.6.1-models/lm.binary -t ./DeepSpeechData/deepspeech-0.6.1-models/trie -v 3
```

> BEWARE! This ATM not working (dependecies?) or audio recording in python script. -> check audio recording with python.

Next Steps

- get `mic_vad_streaming` running
- create own keyword-database
  - make some recordings and store the result texts
  - use the result texts (might not even be useful sentences) as base for keyword detection
- everything else...