

## #1 custom keras model

## Neural Network settings



## Training settings

## Minimum confidence rating ⓘ

## Neural network architecture

```
1 import tensorflow as tf
2 from tensorflow.keras.models import Sequential
3 from tensorflow.keras.layers import Dense, InputLayer, Dropout, Conv1D, Conv2D, Flatten,
   Reshape, MaxPooling1D, MaxPooling2D, BatchNormalization
4 from tensorflow.keras.optimizers import Adam
5 sys.path.append('./resources/libraries')
6 import ei_tensorflow.training
7
8 # model architecture
9 model = Sequential()
10 # model architecture
11 model = Sequential()
12 model.add(Reshape((int(input_length / 13), 13), input_shape=(input_length, )))
13 model.add(Conv1D(64, kernel_size=3, activation='relu', padding='same'))
14 model.add(Conv1D(64, kernel_size=3, activation='relu', padding='same'))
15 model.add(Conv1D(64, kernel_size=3, activation='relu', padding='same'))
16 model.add(MaxPooling1D(pool_size=2, strides=2, padding='same'))
17 model.add(Dropout(0.25))
18 model.add(Conv1D(32, kernel_size=3, activation='relu', padding='same'))
19 model.add(MaxPooling1D(pool_size=2, strides=2, padding='same'))
20 model.add(Conv1D(32, kernel_size=3, activation='relu', padding='same'))
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23 model.add(MaxPooling1D(pool_size=2, strides=2, padding='same'))
24 model.add(Dropout(0.25))
25 model.add(Flatten())
26 model.add(Dense(classes, activation='softmax', name='y_pred'))
27
28 # this controls the learning rate
29 opt = Adam(lr=0.005, beta_1=0.9, beta_2=0.999)
30 # this controls the batch size, or you can manipulate the tf.data.Dataset objects yourself
31 BATCH_SIZE = 512
32 train_dataset, validation_dataset = ei_tensorflow.training.set_batch_size(BATCH_SIZE,
```

Start training

## Training output

## Model

Model version: ⓘ

Quantized (int8) ▾

## Last training performance (validation set)

ACCURACY  
83.0%LOSS  
0.93

## Confusion matrix (validation set)

	_NOI	_UN	BAC	DOWN	FOR	GO	LEFT	NO	OFF	ON	RIGHT	STOP	UP	VISU	YES
_NOISE	97.5%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.8%	0.4%	0.8%	0%
_UNKNOWN	3.5%	57.6%	1.7%	3.1%	9.2%	2.6%	1.3%	1.7%	4.8%	3.5%	3.9%	1.7%	1.7%	2.2%	1.3%



	_NOI	_UN	BAC	DOWN	FOR	GO	LEFT	NO	OFF	ON	RIGHT	STOP	UP	VISU	YES
BACKWARD	1.7%	4.5%	83.9%	1.2%	0.8%	0%	2.5%	0%	0.4%	0%	0%	0.4%	2.1%	2.1%	0.4%
DOWN	1.2%	3.6%	1.2%	83.0%	0%	2.4%	0%	5.7%	0%	0.8%	0.4%	0.4%	1.2%	0%	0%
FORWARD	1.1%	5.2%	1.1%	0%	85.9%	0.7%	0%	0%	2.2%	3.3%	0%	0%	0%	0.4%	0%
GO	2.1%	4.5%	0.8%	2.5%	2.1%	80.7%	0%	4.5%	0.8%	0%	0%	0.8%	0%	0%	1.2%
LEFT	0.8%	3.8%	2.9%	0%	0.4%	0.4%	83.2%	0.8%	1.3%	0%	0.8%	0.4%	0%	1.3%	3.8%
NO	1.3%	3.9%	0%	5.6%	0.4%	5.2%	1.3%	80.2%	0.9%	0%	0%	0%	0%	0.9%	0.4%
OFF	1.4%	2.8%	0%	0.5%	1.9%	0.5%	0.9%	0%	85.5%	1.9%	0%	0.5%	4.2%	0%	0%
ON	0.9%	3.9%	0.4%	0%	5.2%	0.4%	0%	0%	6.1%	81.3%	0%	0%	1.7%	0%	0%
RIGHT	0.8%	10.0%	1.2%	0%	1.2%	0%	2.5%	0%	0%	0%	83.8%	0.4%	0%	0%	0%
STOP	2.3%	0.5%	0.5%	0.9%	0%	0.9%	0%	1.4%	1.8%	0%	0%	87.8%	4.1%	0%	0%
UP	1.6%	0.8%	1.2%	0%	0%	0%	0.8%	0%	14.2%	1.2%	0%	1.6%	78.7%	0%	0%
VISUAL	2.1%	2.9%	1.3%	0%	0.8%	0.4%	0.8%	0.4%	0%	0.4%	0%	0.8%	0%	89.1%	0.8%
YES	2.7%	4.7%	0%	0%	0.4%	0%	4.3%	1.2%	0%	0%	0.4%	0%	0%	1.2%	85.2%
F1 SCORE	0.88	0.54	0.85	0.85	0.84	0.83	0.84	0.82	0.77	0.84	0.89	0.89	0.82	0.90	0.88

Feature explorer (full training set) ?

- \_noise - correct
- \_unknown - correct
- backward - correct
- down - correct
- forward - correct
- go - correct
- left - correct
- no - correct
- off - correct
- on - correct
- right - correct
- stop - correct
- up - correct
- visual - correct
- yes - correct
- \_noise - incorrect

On-device performance ?



INFERRENCING TIME  
215 ms.



PEAK RAM USAGE  
16.0K



ROM USAGE  
80.5K

