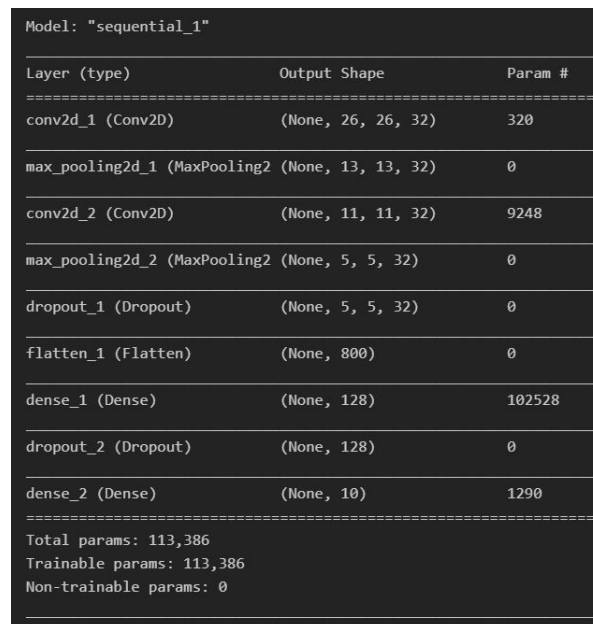# Minut Exercise

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1 Introduction

- Do a small exploration of the dataset. What is the dataset representing? How many samples of each class does in include?

    - The data consists of images of clothes belonging to 10 classes. It is divided into training and test sets, and the training set contains 6 000 pictures of each class (thus 60 000 training images in total), whereas the test set contains 1000 images per class (thus 10 000 in total.

- Present some performance metrics of your choice.

    - The model we built consists of two convolutional layers, two drop out layers and two dense layers. The specifics can be seen in the image below.

```
Model: "sequential_1"
_____
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 26, 26, 32)        320
_____
max_pooling2d_1 (MaxPooling2 (None, 13, 13, 32)        0
_____
conv2d_2 (Conv2D)            (None, 11, 11, 32)        9248
_____
max_pooling2d_2 (MaxPooling2 (None, 5, 5, 32)          0
_____
dropout_1 (Dropout)          (None, 5, 5, 32)          0
_____
flatten_1 (Flatten)          (None, 800)               0
_____
dense_1 (Dense)              (None, 128)               102528
_____
dropout_2 (Dropout)          (None, 128)               0
_____
dense_2 (Dense)              (None, 10)                1290
=================================================================
Total params: 113,386
Trainable params: 113,386
Non-trainable params: 0
```

Figure 1: Model specifics.

- When compiling the model, we used an EarlyStopping callback to stop the training when the validation loss no longer improved, and a ModelCheckpoint to save the best model. To be able to use validation loss, we split the training set into 80% training data and 20% validation data, i.e. two new sets of 48000 images and 12000 images. Finally, we achieved an f1 score of 91%, see the full result in the image below.

	precision	recall	f1-score	support
T-shirt/top	0.85	0.85	0.85	1000
Trouser	0.99	0.97	0.98	1000
Pullover	0.88	0.86	0.87	1000
Dress	0.89	0.91	0.90	1000
Coat	0.84	0.88	0.86	1000
Sandal	0.98	0.98	0.98	1000
Shirt	0.74	0.71	0.72	1000
Sneaker	0.95	0.97	0.96	1000
Bag	0.97	0.97	0.97	1000
Ankle boot	0.97	0.97	0.97	1000
accuracy			0.91	10000
macro avg	0.91	0.91	0.91	10000
weighted avg	0.91	0.91	0.91	10000

Figure 2: Model results.