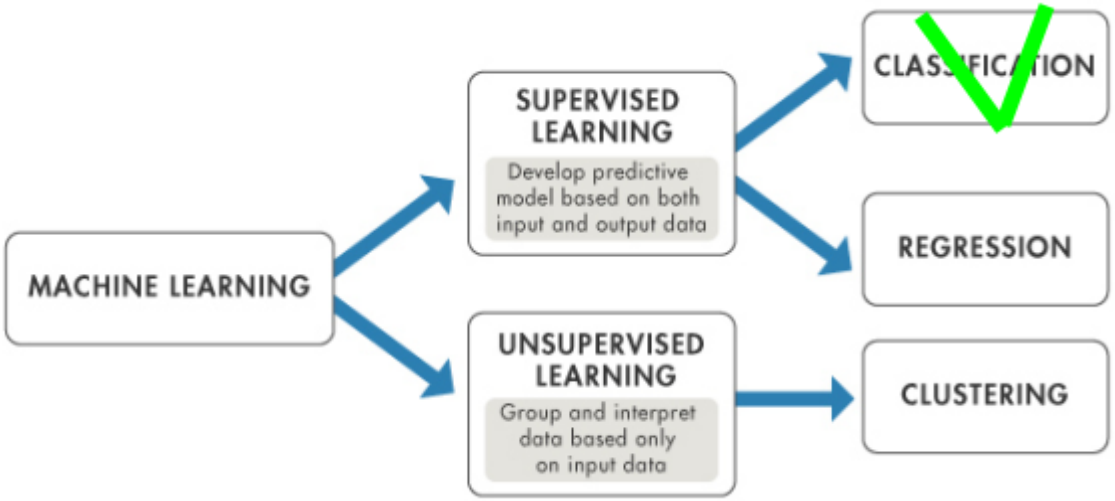
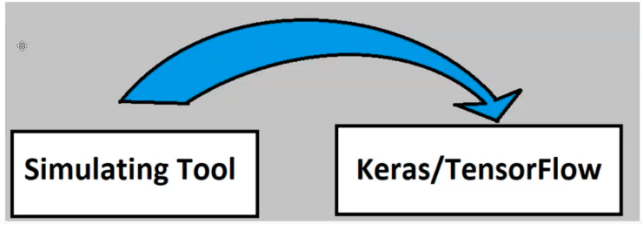
[2021.09] Python Keras exercise (Classification) (AND, OR, XOR)



Video Get started with Machine Learning i Python. See Video *"From DNN Simulator til Keras"* (11 min)	

Tips:

Get Python to your Google Drive account

Official Colab welcome video (3 min.)

Code

Here is the Python code for the solution to NAND gate, as shown in the video above.

```
import numpy as np
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Activation
from tensorflow.keras import optimizers
```

```
model = Sequential()
model.add(Dense(2, input_dim=2,activation='relu'))
model.add(Dense(1, activation='sigmoid'))
adam = optimizers.Adam(learning_rate=0.01)
model.compile(loss='mean_squared_error', optimizer=adam)
```

```
x = np.array([[0,0],[1,0],[0,1],[1,1]])
y = np.array([[1],[1],[1],[0]])
```

```
history = model.fit(x,y,epochs=1000, batch_size=2, verbose=1)
```

```
prediction = model.predict([[1,1]])
print(prediction)
```

Exercise

Again we use the same data, seen here to the right.

Now you need to use this data and make a Classification solution with Python and Keras, using the code from the website above.

Start with AND, then OR and finally XOR.

Table 6.2 Truth tables for the basic logical operations

Input variables		AND	OR	Exclusive-OR
x_1	x_2	$x_1 \cap x_2$	$x_1 \cup x_2$	$x_1 \oplus x_2$
0	0	0	0	0
0	1	0	1	1
1	0	0	1	1
1	1	1	1	0