

Neural Networks for Machine Learning Cheat Sheet by lwebzem56 via cheatography.com/51511/cs/14084/

Neural Netw	orks Types and Main Features
Feedfo- rward neural network	connections between nodes do not have a cycle
Multilayer perceptron (MLP)	has at least three layers of nodes
Reccurent neural network (RNN)	connections between units have a directed cycle
Self-Organising Maps (SOM)	convert input data to low dimensional space
Deep Belief Network (DBN)	has connections between layers but not within layer
Convolutional Neural Network (CNN)	has one or more convolutional layers and then followed by one or more fully connected layers
Generative Advers- arial Networks (GAN)	system of two neural nets, contesting with each other
Spiking Neural Netorks (SNN)	time information is processed in the form of spikes and there is more than one synapse between neurons

Neural Networks Types and Main Features (cont)		
Wavelet neural network	use wavelet function as activation function in the neuron	
Wavelet convol- utional neural network	combine wavelet transform and CNN	
Long short- term memory (LSTM)	type of RNN, model for the short-term memory which can last for a long period of time	

Building Neural Network with Keras and Python

from keras.models import

```
Sequential
model = Sequen tial()
from keras.l ayers import Dense
model.a dd (De nse (un its=64,
activa tio n=' relu', input -
dim = 100))
model.a dd (De nse (un its=10,
activa tio n=' sof tmax'))
model.c om pil e(l oss ='c ate -
gor ica l_c ros sen tropy',
opt imi zer ='sgd',
met ric s=[ 'ac cur acy'])
model.c om pil e(l oss =ke -
ras.lo sse s.c ate gor ica l c -
ros sen tropy,
opt imi zer =ke ras.op tim ize -
rs.S GD (lr =0.01, moment -
um=0.9, nester ov= True))
model.f it (x train, y train,
epochs=5, batch siz e=32)
```

Building Neural Network with Keras and Python (cont)

> loss_and_metrics = model.evaluate(x_test, y_test, batch_size=128)
classes = model.predict(x_test, batch_size=128)

Keras

Data Preparation for Input to Neural Network

```
from sklearn import
preprocessing
def normal ize da ta(m, XData):
      if m == " ":
               m="s cal ing -
no "
       if m == " sca lin g-n o":
               return XData
      if m == " Sta nda rdS -
cal er":
               std scale =
prepro ces sin g.S tan dar dSc -
ale r().fi t(X Data)
               XDa ta_new =
std sc ale.tr ans for m(X Data)
     if m == " Min Max Sca -
ler ":
               min max scale =
prepro ces sin g.M inM axS cal -
er().f it(XData)
               XDa ta new =
minmax sc ale.tr ans for m(X -
Data)
       return XData new
```

Cheat Sheets about Python and Machine Learning

Quick and Easy Way to get started with common and most used python tasks in data processing



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Neural Network Applications and Most Used Networks		
Image classification	CNN	
Image recognition	CNN	
Time series prediction	RNN, LSTM	
Text generation	RNN, LSTM	
Classification	MLP	
Visualization	SOM	

Neural Net Weight Update Methods		
Adam	based on adaptive estimates of lower order moments	
AdaGrad	Adagrad is an adaptive learning rate method	
RMSProp	adaptive learning rate method, modification of Adagrad method	
SGD	Stochastic gradient descent	
AdaDelta	modification of Adagrad to reduce its aggressive, monotonically decreasing learning rate	
Newton method	second order method, is not used in deep learning	
Momentum	method that helps accelerate SGD in the relevant direction	

Neural Net Weight Update Methods (cont)		
Nesterov accelerated gradient	evaluate the gradient at next position instead of current	
References: ADAM: A METHOD FOR STOCHASTIC OPTIMIZATION Convolutional Neural Networks for Visual Recognition. An overview of gradient descent optimization algorithms Wikipedia -Artificial neural network		
Links		
Neural Networks with Python on the Web		
Time Series Prediction with LSTM Recurrent Neural Networks in Python with Keras		
Implementing a recurrent neural network in python		
Time Series Prediction with Convolutional		



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Neural Networks and Keras

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