In [183]:

```
from keras.models import Sequential
from keras.layers import Dense
from sklearn.model_selection import train_test_split
import numpy as np
np.random.seed(1337)
```

In [184]:

```
import numpy as np
import pandas as pd
from sklearn.preprocessing import StandardScaler
from pandas.plotting import scatter_matrix
from sklearn.metrics import classification_report
```

In [185]:

```
df=pd.read_csv("C:\\Users\\USER\\Downloads\\pathway data set1111.csv")
```

In [186]:

```
df=df.drop(["Unnamed: 11"],axis=1)
df=df.drop(["Unnamed: 12"],axis=1)
df=df.drop(["Unnamed: 13"],axis=1)
```

In [187]:

```
df.path[df.path =="AKT"] =1
df.path[df.path =="FASL"] =2
df.path[df.path =="MAPK"] =3
df.path[df.path =="NOTCH"] =4
df.path[df.path =="SHH"]=5
df.path[df.path =="TNF"] =6
df.path[df.path =="WNT"] =7
df.path[df.path =="MTOR"] =8
print(df)
```

```
    path   c1   c2   c3   c4   c5    c6   c7   c8   c9 Outcome
0      1  5.5  1.5  1.5  1.5  2.5   1.5  3.5  1.5  1.5      no
1      1  5.5  4.5  4.5  5.5  7.5  10.5  3.5  2.5  1.5     yes
2      1  3.5  1.5  1.5  1.5  2.5   2.5  3.5  1.5  1.5      no
3      1  6.5  8.5  8.5  1.5  3.5   4.5  3.5  7.5  1.5     yes
4      1  4.5  1.5  1.5  3.5  2.5   1.5  3.5  1.5  1.5      no
..   ...  ...  ...  ...  ...  ...   ...  ...  ...  ...     ...
595    8  5.5  1.5  1.5  1.5  2.5   1.5  2.5  1.5  1.5     yes
596    8  4.5  1.5  2.5  1.5  2.5   1.5  2.5  1.5  1.5      no
597    8  5.5  1.5  3.5  1.5  2.5   1.5  3.5  1.5  1.5     yes
598    8  3.5  1.5  1.5  1.5  2.5   1.5  2.5  1.5  1.5      no
599    8  5.5  2.5  4.5  1.5  1.5   1.5  1.5  1.5  1.5     yes

[600 rows x 11 columns]

C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
  """Entry point for launching an IPython kernel.
C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)

C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
  This is separate from the ipykernel package so we can avoid doing imports
 until
C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
```

```
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
  after removing the cwd from sys.path.
C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
  """
C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:6: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)

C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
  import sys
C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:8: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
```

In [188]:

```
df.Outcome[df.Outcome=="no"] = 0
df.Outcome[df.Outcome =="yes"] = 1
df
```

```
C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
  """Entry point for launching an IPython kernel.
C:\Users\USER\Anacondan3\envs\tensorflow\lib\site-packages\ipykernel_launche
r.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/s
table/user_guide/indexing.html#returning-a-view-versus-a-copy (http://panda
s.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy)
```

Out[188]:

	path	c1	c2	c3	c4	c5	c6	c7	c8	c9	Outcome
0	1	5.5	1.5	1.5	1.5	2.5	1.5	3.5	1.5	1.5	0
1	1	5.5	4.5	4.5	5.5	7.5	10.5	3.5	2.5	1.5	1
2	1	3.5	1.5	1.5	1.5	2.5	2.5	3.5	1.5	1.5	0
3	1	6.5	8.5	8.5	1.5	3.5	4.5	3.5	7.5	1.5	1
4	1	4.5	1.5	1.5	3.5	2.5	1.5	3.5	1.5	1.5	0
...	...	...	...	...	...	...	...	...	...	...	...
595	8	5.5	1.5	1.5	1.5	2.5	1.5	2.5	1.5	1.5	1
596	8	4.5	1.5	2.5	1.5	2.5	1.5	2.5	1.5	1.5	0
597	8	5.5	1.5	3.5	1.5	2.5	1.5	3.5	1.5	1.5	1
598	8	3.5	1.5	1.5	1.5	2.5	1.5	2.5	1.5	1.5	0
599	8	5.5	2.5	4.5	1.5	1.5	1.5	1.5	1.5	1.5	1

600 rows × 11 columns

In [189]:

```
#Lets seperste Data
X=df.iloc[:,:10].values
Y=df.iloc[:,10].values
num_train=X.shape[0]
input_dim=X.shape[1]
Y.shape=(num_train,1)
```

In [190]:

```
input_dim
```

Out[190]:

```
10
```

In [191]:

```
X_train,X_test,Y_train,Y_test=train_test_split(X,Y,test_size=0.2,random_state=42,)
```

In [192]:

```
#LAyers and Neurons
model=Sequential()
#first Layer
model.add(Dense(12,input_dim=10,activation='relu'))
#Second LAyer
#model.add(Dense(8,activation='relu'))
#third LAyer
model.add(Dense(10,activation='relu'))
#Output
model.add(Dense(1,activation='sigmoid'))
```

In [193]:

```
#Compile Model
model.compile(loss='binary_crossentropy',optimizer='adam',metrics=['accuracy'])
```

In [194]:

```
#fitmodel
model.fit(X_train,Y_train,batch_size=20,epochs=100,verbose=1)
```

```
cc: 0.9667
Epoch 96/100
480/480 [==============================] - 0s 71us/step - loss: 0.1003 - a
cc: 0.9708
Epoch 97/100
480/480 [==============================] - 0s 73us/step - loss: 0.1011 - a
cc: 0.9687
Epoch 98/100
480/480 [==============================] - 0s 66us/step - loss: 0.0985 - a
cc: 0.9667
Epoch 99/100
480/480 [==============================] - 0s 71us/step - loss: 0.0958 - a
cc: 0.9708
Epoch 100/100
480/480 [==============================] - 0s 112us/step - loss: 0.0948 -
acc: 0.9729
```

Out[194]:

```
<keras.callbacks.History at 0x26a431aba88>
```

In [195]:

```
scores = model.evaluate(X_test, Y_test, batch_size=32, verbose=1)
print("\n%s: %.2f%%" % (model.metrics_names[1], scores[1]*100))
```

```
120/120 [==============================] - 0s 2ms/step

acc: 90.00%
```

In [196]:

```
prediction=model.predict(np.array([[1,6.5,8.5,8.5,1.5,3.5,4.5,3.5,7.5,1.5]]))
if(prediction<=0.5):
    print("NO")
elif(prediction>0.5):
    print("Yes")
```

```
Yes
```

In [197]:

```
prediction=model.predict(np.array([[8,4.5,1.5,2.5,1.5,2.5,1.5,2.5,1.5,1.5]]))
#labels=np.argmax(prediction,axis=-1)
labels=(prediction>0.5).astype(np.int)
if(labels==1):
    print("Yes")
elif(labels==0):
    print("No")
```

```
No
```

In [ ]:

```

```

In [ ]:

```

```