MNIST:

Activate function results	Relu	sigmoid	Square
Test Accuracy	0.989	0.9652	0.098
Runing time /second (Training and Testing)	1124	1142	1168

Training data:
10000*batch(50)=50000 records
Testing data:
20000 records

Platform:
CPU:intel core i5 1.6GHz
OS: MacOS 10.12

NN structure:

1. convolution layer
   strides: [1,2,2,1]
   kernel size: 5*5
   feature map: 5*14*14(padding='SAME')
2. square activation layer
   square the value at each node
3. pool layer
   strides: [1,1,1,1]
   kernel size: 1*3*3
   output: 5*14*14(padding='SAME')
4. convolution layer
   strides: [1,2,2,1]
   kernel size: 5*5
5. pool layer
6. fully connected layer
7. square activation layer
8. fully connected layer
9. softmax activation layer

BreastCancer-Wisconsin(Diagnostic)
Dataset Desciption:

Data Set Characteristics:	Multivariate	**Number of Instances:**	569	**Area:**	Life
Attribute Characteristics:	Real	**Number of Attributes:**	32	**Date Donated**	1995-11-01
Associated Tasks:	Classification	**Missing Values?**	No	**Number of Web Hits:**	545099

Attribute information
1) ID number
2) Diagnosis (M = malignant, B = benign)
3-32)

Ten real-valued features are computed for each cell nucleus:

a) radius (mean of distances from center to points on the perimeter)
b) texture (standard deviation of gray-scale values)
c) perimeter
d) area
e) smoothness (local variation in radius lengths)
f) compactness (perimeter^2 / area - 1.0)
g) concavity (severity of concave portions of the contour)
h) concave points (number of concave portions of the contour)
i) symmetry
j) fractal dimension ("coastline approximation" - 1)

NN Structures and Training results
3 hidden layer deep neural networks,with hidden units of [10,20,10]
Training steps: 20000
Training data: 458 records Testing data: 111 records
Training time: 36 seconds Testing time: 0 second
Test Accuracy:0.924

Note:
Some warnings appears due to the Estimator is decoupled from Scikit Learn interface by moving into separate class SKCompat and tensorflow's V1 checkpoint format has been deprecated.

BreastCancer-Wisconsin(Origianl)
Dataset Desciption:

Data Set Characteristics:	Multivariate	**Number of Instances:**	699	**Area:**	Life
Attribute Characteristics:	Integer	**Number of Attributes:**	10	**Date Donated**	1992-07-15
Associated Tasks:	Classification	**Missing Values?**	Yes	**Number of Web Hits:**	281785

Attribute information
1) ID number
2) Diagnosis (M = malignant, B = benign)
3-32)
Ten real-valued features are computed for each cell nucleus:

a) radius (mean of distances from center to points on the perimeter)
b) texture (standard deviation of gray-scale values)
c) perimeter
d) area
e) smoothness (local variation in radius lengths)
f) compactness (perimeter^2 / area - 1.0)
g) concavity (severity of concave portions of the contour)
h) concave points (number of concave portions of the contour)
i) symmetry
j) fractal dimension ("coastline approximation" - 1)

NN Structures and Training results
3 hidden layer deep neural networks,with hidden units of [10,20,10]
Training steps: 20000
Training data: 677 records Testing data: 6 records
Training time: 41 seconds Testing time: 1 second
Test Accuracy: 1.0000

Note:
Some warnings appears due to the Estimator is decoupled from Scikit Learn interface by moving into separate class SKCompat and tensorflow's V1 checkpoint format has been deprecated.

Arcene Dataset

Data Set Characteristics:	Multivariate	**Number of Instances:**	900	**Area:**	Life
Attribute Characteristics:	Real	**Number of Attributes:**	10000	**Date Donated**	2008-02-29
Associated Tasks:	Classification	**Missing Values?**	N/A	**Number of Web Hits:**	87358

training data: 705 steps
loss : [12.035118]
runing time: 45.3 seconds

predictions and weights matrix:

```
[[ 0.  0.  0. ...,  0.  0.  0.]
 [ 0.  0.  0. ...,  0.  0.  0.]
 [ 0.  0.  0. ...,  0.  0.  0.]
 ...,
 [ 0.  0.  0. ...,  0.  0.  0.]
 [ 1.  1.  1. ...,  1.  1.  1.]
 [ 0.  0.  0. ...,  0.  0.  0.]]
[[ 0.02676865  0.02676865  0.02676865 ...,  0.02676865  0.02676865
   0.02676865]
 [ 0.03606885  0.03606885  0.03606885 ...,  0.03606885  0.03606885
   0.03606885]
 [ 0.01180069  0.01180069  0.01180069 ...,  0.01180069  0.01180069
   0.01180069]
 ...,
 [ 0.88694274  0.88694274  0.88694274 ...,  0.88694274  0.88694274
   0.88694274]
 [-0.01524068 -0.01524068 -0.01524068 ..., -0.01524068 -0.01524068
  -0.01524068]
 [-0.02150274 -0.02150274 -0.02150274 ..., -0.02150274 -0.02150274
  -0.02150274]]
Runing time.45.3340861797 Seconds
('Model saved in file:', '/Users/rat_racer/Desktop/tensorflow/saved models/arcene/save_net.ckpt')
```

Nursery Dataset

To be continued