▾ Convolutional neural network (CNN) (Any One from the following)

Use any dataset of plant disease and design a plant disease detection system using CNN.

Use MNIST Fashion Dataset and create a classifier to classify fashion clothing into categories

```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from keras.datasets import fashion_mnist
import tensorflow.keras as tk
```

```python
get_ipython().run_line_magic('matplotlib', 'inline')
```

```python
df=fashion_mnist.load_data()
df
```

[+ Code] [+ Text]

```python
(x_train, y_train), (x_test, y_test) = fashion_mnist.load_data()
```

```python
y_train.shape
```

```python
y_test.shape
```

```python
display(x_train.shape,x_test.shape)
```

```python
figure=plt.figure(figsize=(18,10))
for i in range(1,200):
  plt.subplot(20,10,i)
  plt.imshow(x_train[i],cmap=plt.get_cmap('BrBG_r'))
plt.show()
```

```python
model=tk.Sequential()
```

```python
model.add(tk.layers.Conv2D(32,3,3,input_shape=(28,28,1),activation='relu'))
```

```python
model.add(tk.layers.MaxPooling2D(pool_size=(2,2)))
```

```python
model.add(tk.layers.Flatten())
```

```python
model.add(tk.layers.Dense(32,activation="relu"))
```

```python
model.add(tk.layers.Dense(10,activation="softmax"))
```

```python
model.compile(optimizer='Adam',loss='sparse_categorical_crossentropy',metrics=['accuracy'])
```

```python
model.fit(x=x_train,y=y_train,epochs=50,batch_size=512,validation_data=(x_test,y_test))
```

```python
evalution=model.evaluate(x_test,y_test)
```

```python
print('Test Accuracy : {:.3f}'.format(evalution[1]))
```

```python
predict=np.argmax(model.predict(x_test),axis=-1)
```

```python
predict
```

```python
L = 10
W = 10
fig,axes = plt.subplots(L,W,figsize = (18,10))
axes = axes.ravel()
for i in np.arange(0,L*W):
    axes[i].imshow(x_test[i].reshape(28,28))
    axes[i].set_title('Prediction Class:{1} \n true class: {1}'.format(predict[i], y_test[i]))
```

```
        axes[i].axis('off')
    plt.subplots_adjust(wspace = 0.75)
```