コンピュータ科学A

(kerasによるmnistの学習)

from tensorflow.keras.utils import to\_categorical

from tensorflow.keras.datasets import mnist

from tensorflow.keras.models import Sequential

from tensorflow.keras.layers import Dense,Activation

from tensorflow.keras.callbacks import EarlyStopping

import matplotlib.pyplot as plt

(x\_train, y\_train), (x\_test, y\_test) = mnist.load\_data()

x\_train = x\_train.reshape(60000, 784).astype('float32')

x\_train = x\_train / 255

x\_test = x\_test.reshape(10000, 784).astype('float32')

x\_test = x\_test / 255

classes = 10

print(to\_categorical(y\_train[0], classes))

y\_train = to\_categorical(y\_train, classes)

y\_test = to\_categorical(y\_test, classes)

model = Sequential()

model.add(Dense(512, input\_shape=(784, )))

model.add(Activation('relu'))

model.add(Dense(512))

model.add(Activation('relu'))

model.add(Dense(10))

model.add(Activation('softmax'))

model.compile(loss='categorical\_crossentropy',

optimizer='sgd',

metrics=['accuracy'])

hist = model.fit(x\_train, y\_train,

batch\_size = 128,

epochs=10,

verbose=1,

validation\_data=(x\_test, y\_test))

plt.plot(hist.history['accuracy'])

plt.plot(hist.history['val\_accuracy'])

plt.title('model accuracy')

plt.ylabel('accuracy')

plt.xlabel('epoch')

plt.grid()

plt.legend(['train', 'test'], loc='upper left')

plt.show()

plt.plot(hist.history['loss'])

plt.plot(hist.history['val\_loss'])

plt.title('model accuracy')

plt.ylabel('accuracy')

plt.xlabel('epoch')

plt.grid()

plt.legend(['train', 'test'], loc='upper left')

plt.show()