* <https://www.kaggle.com/code/itsmohammadshahid/7-cnn-handwritten-digit-recognition>

We have used Sequential Keras model which has two pairs of Convolution2D and MaxPooling2D layers. The MaxPooling layer acts as a sort of downsampling using max values in a region instead of averaging. After that we will use Flatten layer to convert multidimensional parameters to vector.

The last layer has a Dense layer with 10 Softmax outputs. The output represents the network guess. The 0-th output represents a probability that the input digit is 0, the 1-st output represents a probability that the input digit is 1 and so on..

* <https://machinelearningmastery.com/how-to-develop-a-convolutional-neural-network-from-scratch-for-mnist-handwritten-digit-classification/>

MNIST

def define\_model():

model = Sequential()

model.add(Conv2D(32, (3, 3), activation='relu', kernel\_initializer='he\_uniform', input\_shape=(28, 28, 1)))

model.add(MaxPooling2D((2, 2)))

model.add(Flatten())

model.add(Dense(100, activation='relu', kernel\_initializer='he\_uniform'))

model.add(Dense(10, activation='softmax'))

# compile model

opt = SGD(learning\_rate=0.01, momentum=0.9)

model.compile(optimizer=opt, loss='categorical\_crossentropy', metrics=['accuracy'])

return model

* <https://www.analyticsvidhya.com/blog/2021/07/classification-of-handwritten-digits-using-cnn/>

convolutional\_neural\_network = models.Sequential([

layers.Conv2D(filters=25, kernel\_size=(3, 3), activation='relu', input\_shape=(28,28,1)),

layers.MaxPooling2D((2, 2)),

layers.Conv2D(filters=64, kernel\_size=(3, 3), activation='relu'),

layers.MaxPooling2D((2, 2)),

layers.Conv2D(filters=64, kernel\_size=(3, 3), activation='relu'),

layers.MaxPooling2D((2, 2)),

layers.Flatten(),

layers.Dense(64, activation='relu'),

layers.Dense(10, activation='softmax')

])

* Diagrama

  Descripción generada automáticamenteRecognition of Handwritten Digit using Convolutional Neural Network in Python with Tensorflow and Comparison of Performance for Various Hidden Layers
* Isolated Handwritten Character Recognition of Ancient Hebrew Manuscripts Tabita L. Tobing, Sule Y. Yayilgan; Department of Information Security and Communication Technology, NTNU - Norwegian University of Science and Technology; Gjøvik, Norway

Tabla

Descripción generada automáticamente