College name : Computer science and artificial intelligence

Course name : Selected CS-2

Team number : 55

Name (Arabic)	ID
سامح وليد محمد الشافعي	201900335
سعيد مليجي سيد مليجي	201900341
سعيد عماد ماهر محمد	201900339
زياد احمد عبدالتواب سعيد	201900322
ستيف عادل فاروق حبيب	201900337
محمد شريف فتحي محمد سالم	201900688

(Paper Details)

- Paper Name : OBJECT DETECTION USING CNN

- Publishers Name : Ms.Gunasundari , Lokesh , Gopirengaraj

-Year Of Publication : 2 April 2018

-The Implemented Algorithm : Convolution Neural Network (CNN) , Deep learning algorithm

- The Results : After implementation , a highest accuracy 98% has been gained using Kaggle dataset

(Project Description Document)

1) General Information on the selected dataset

- Name of the dataset used: American Sign Language

- The link of dataset: https://www.kaggle.com/datasets/kapillondhe/american-sign-language

- The total number of samples in the dataset : 121,608 samples

- Dimension of images (150 , 150)

- Number of classes & their labels : 27 classes with labels (from a to z and space sign)

- The ratio used for training, and testing : Training (86.84% of the training dataset) = 86,400 images testing dataset (13.51 % of the testing dataset) = 13,500 images

2) Implementation details:

-The hyperparameters used in the model

```python
kerasModel=keras.models.Sequential([
    keras.layers.Conv2D(200,kernel_size=(3,3),activation='relu',input_shape=(size,size,3)),
    keras.layers.Conv2D(150,kernel_size=(3,3),activation='relu'),
    keras.layers.MaxPool2D(4,4),
    keras.layers.Conv2D(120,kernel_size=(3,3),activation='relu'),
    keras.layers.Conv2D(80,kernel_size=(3,3),activation='relu'),
    keras.layers.Conv2D(50,kernel_size=(3,3),activation='relu'),
    keras.layers.MaxPool2D(4,4),
    keras.layers.Flatten(),
    keras.layers.Dense(120,activation='relu'),
    keras.layers.Dense(100,activation='relu'),
    keras.layers.Dense(50,activation='relu'),
    keras.layers.Dropout(rate=0.5),
    keras.layers.Dense(27,activation='softmax'),
])
```

- model summery

```
model details are:
Model: "sequential"
```

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 62, 62, 200)	5600
conv2d_1 (Conv2D)	(None, 60, 60, 150)	270150
max_pooling2d (MaxPooling2D)	(None, 15, 15, 150)	0
conv2d_2 (Conv2D)	(None, 13, 13, 120)	162120
conv2d_3 (Conv2D)	(None, 11, 11, 80)	86480
conv2d_4 (Conv2D)	(None, 9, 9, 50)	36050
max_pooling2d_1 (MaxPooling2	(None, 2, 2, 50)	0
flatten (Flatten)	(None, 200)	0
dense (Dense)	(None, 120)	24120
dense_1 (Dense)	(None, 100)	12100
dense_2 (Dense)	(None, 50)	5050
dropout (Dropout)	(None, 50)	0
dense_3 (Dense)	(None, 27)	1377

```
Total params: 603,047
Trainable params: 603,047
Non-trainable params: 0


None
```
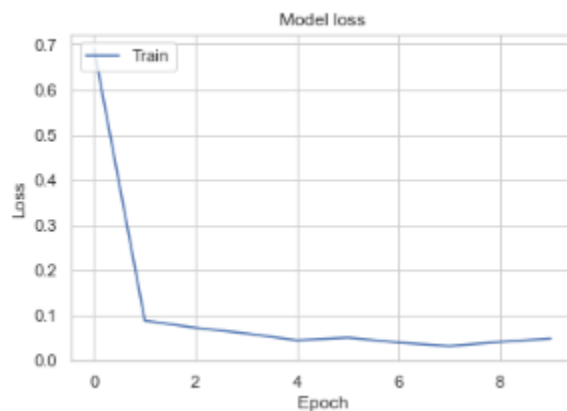
- running epochs details

```
Epoch 1/10
2700/2700 [==============================] - 113s 39ms/step - loss: 0.6892 - accuracy: 0.7858
Epoch 2/10
2700/2700 [==============================] - 107s 40ms/step - loss: 0.0873 - accuracy: 0.9719
Epoch 3/10
2700/2700 [==============================] - 108s 40ms/step - loss: 0.0714 - accuracy: 0.9794
Epoch 4/10
2700/2700 [==============================] - 108s 40ms/step - loss: 0.0589 - accuracy: 0.9837
Epoch 5/10
2700/2700 [==============================] - 108s 40ms/step - loss: 0.0436 - accuracy: 0.9868
Epoch 6/10
2700/2700 [==============================] - 109s 40ms/step - loss: 0.0496 - accuracy: 0.9863
Epoch 7/10
2700/2700 [==============================] - 110s 41ms/step - loss: 0.0387 - accuracy: 0.9894
Epoch 8/10
2700/2700 [==============================] - 110s 41ms/step - loss: 0.0309 - accuracy: 0.9903
Epoch 9/10
2700/2700 [==============================] - 110s 41ms/step - loss: 0.0401 - accuracy: 0.9891
Epoch 10/10
2700/2700 [==============================] - 110s 41ms/step - loss: 0.0475 - accuracy: 0.9887
```

3) Results details:

- The Accuracy : 97.99%
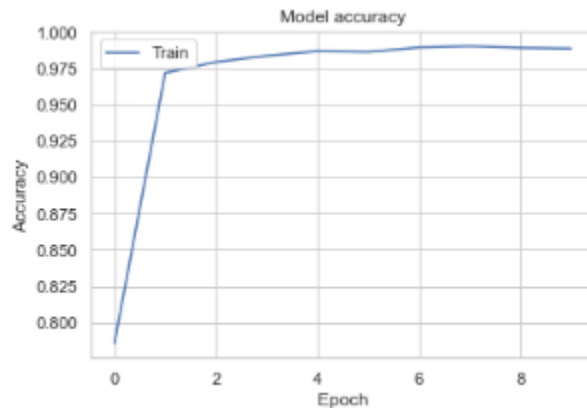
- The loss : 13.22%

- The Confusion Matrix