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"from tensorflow.keras.preprocessing.image import ImageDataGenerator"

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"train\_datagen = ImageDataGenerator(rescale=1./255,zoom\_range=0.2,horizontal\_flip=True, vertical\_flip=False)\n",

"test\_datagen= ImageDataGenerator(rescale=1./255)"

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"x\_train = train\_datagen.flow\_from\_directory(r\"/content/drive/MyDrive/dataset project/TRAIN\_SET\",target\_size=(64,64),class\_mode='categorical')"

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"Found 2626 images belonging to 5 classes.\n"

]

}

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"Found 1055 images belonging to 5 classes.\n"

]

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]

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"from tensorflow.keras.layers import Dense, Convolution2D, MaxPooling2D, Flatten\n",

"model = Sequential()\n",

"model.add(Convolution2D(32, (3,3), input\_shape=(64,64,3),activation = 'relu')) #Feature map\n",

"model.add(MaxPooling2D(pool\_size = (2,2))) #Pooled matrix\n",

"model.add(Flatten())\n",

"model.summary()"

],

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"Model: \"sequential\"\n",

"\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n",

" Layer (type) Output Shape Param # \n",

"=================================================================\n",

" conv2d (Conv2D) (None, 62, 62, 32) 896 \n",

" \n",

" max\_pooling2d (MaxPooling2D (None, 31, 31, 32) 0 \n",

" ) \n",

" \n",

" flatten (Flatten) (None, 30752) 0 \n",

" \n",

"=================================================================\n",

"Total params: 896\n",

"Trainable params: 896\n",

"Non-trainable params: 0\n",

"\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"

]

}

]

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"model.add(Dense(300,activation='relu'))\n",

"model.add(Dense(150,activation='relu'))\n",

"model.add(Dense(5,activation='softmax'))"

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

"len(x\_train)"

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"33"

]

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"metadata": {},

"execution\_count": 10

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]

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"model.fit\_generator(x\_train, steps\_per\_epoch=len(x\_train), validation\_data=x\_test, validation\_steps=len(x\_test),epochs=10)"

],

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"Epoch 1/10\n"

]

},

{

"output\_type": "stream",

"name": "stderr",

"text": [

"/usr/local/lib/python3.7/dist-packages/ipykernel\_launcher.py:1: UserWarning: `Model.fit\_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.\n",

" \"\"\"Entry point for launching an IPython kernel.\n"

]

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{

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"83/83 [==============================] - 1020s 12s/step - loss: 0.1905 - accuracy: 0.9337 - val\_loss: 0.0019 - val\_accuracy: 1.0000\n",

"Epoch 2/10\n",

"83/83 [==============================] - 23s 270ms/step - loss: 0.0026 - accuracy: 0.9996 - val\_loss: 0.0500 - val\_accuracy: 0.9773\n",

"Epoch 3/10\n",

"83/83 [==============================] - 25s 303ms/step - loss: 0.0039 - accuracy: 0.9989 - val\_loss: 0.0232 - val\_accuracy: 0.9934\n",

"Epoch 4/10\n",

"83/83 [==============================] - 23s 280ms/step - loss: 4.9200e-04 - accuracy: 1.0000 - val\_loss: 0.0600 - val\_accuracy: 0.9735\n",

"Epoch 5/10\n",

"83/83 [==============================] - 24s 292ms/step - loss: 1.2082e-04 - accuracy: 1.0000 - val\_loss: 0.0830 - val\_accuracy: 0.9630\n",

"Epoch 6/10\n",

"83/83 [==============================] - 23s 271ms/step - loss: 6.9097e-05 - accuracy: 1.0000 - val\_loss: 0.0885 - val\_accuracy: 0.9621\n",

"Epoch 7/10\n",

"83/83 [==============================] - 24s 290ms/step - loss: 4.2475e-05 - accuracy: 1.0000 - val\_loss: 0.0878 - val\_accuracy: 0.9621\n",

"Epoch 8/10\n",

"83/83 [==============================] - 24s 281ms/step - loss: 3.6641e-05 - accuracy: 1.0000 - val\_loss: 0.0884 - val\_accuracy: 0.9630\n",

"Epoch 9/10\n",

"83/83 [==============================] - 25s 302ms/step - loss: 3.9334e-05 - accuracy: 1.0000 - val\_loss: 0.0746 - val\_accuracy: 0.9678\n",

"Epoch 10/10\n",

"83/83 [==============================] - 23s 273ms/step - loss: 2.4468e-05 - accuracy: 1.0000 - val\_loss: 0.0799 - val\_accuracy: 0.9668\n"

]

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"model.save('fruits.h5')"

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{

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"name": "stdout",

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"\u001b[0m\u001b[01;34mdrive\u001b[0m/ fruits.h5 \u001b[01;34msample\_data\u001b[0m/\n"

]

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"from tensorflow.keras.models import load\_model"

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"metadata": {

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"outputs": []

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"from tensorflow.keras.preprocessing import image"

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"metadata": {

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"data": {

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"'/content'"

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"type": "string"

}

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"metadata": {},

"execution\_count": 21

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]

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"id": "djAIHvazaoUX"

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"data": {

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],

"image/png": "\n"

},

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"execution\_count": 24

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"img"

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"image/png": "\n"

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"execution\_count": 26

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"outputId": "99605498-9f19-4930-fe64-9648355caae4"

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" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" ...,\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]]], dtype=float32)"

]

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"metadata": {},

"execution\_count": 27

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"outputId": "8cb10999-6454-46e2-8091-55cc33f1a51d"

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"data": {

"text/plain": [

"(64, 64, 3)"

]

},

"metadata": {},

"execution\_count": 28

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"x= np.expand\_dims(x,axis=0)\n",

"x"

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" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" ...,\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]],\n",

"\n",

" [[255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" ...,\n",

" [255., 255., 255.],\n",

" [255., 255., 255.],\n",

" [255., 255., 255.]]]], dtype=float32)"

]

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"metadata": {},

"execution\_count": 29

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"source": [

"x.shape"

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"id": "7I0spa-zbZDz",

"outputId": "a8434177-85ee-4bd7-fb14-8489512d5ed2"

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"data": {

"text/plain": [

"(1, 64, 64, 3)"

]

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"metadata": {},

"execution\_count": 30

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"y= np.argmax(model.predict(x),axis=1)\n",

"y"

],

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"colab": {

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},

"id": "UDjaG1TSbddS",

"outputId": "3c1edcbc-5fcd-4dc0-a0a5-88886e8bd0e6"

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"output\_type": "stream",

"name": "stdout",

"text": [

"1/1 [==============================] - 0s 111ms/step\n"

]

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"output\_type": "execute\_result",

"data": {

"text/plain": [

"array([4])"

]

},

"metadata": {},

"execution\_count": 31

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{

"cell\_type": "code",

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"id": "nWXBM4-LbijA",

"outputId": "6b998ccb-b5b4-41fc-bdf1-14a527324221"

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"output\_type": "execute\_result",

"data": {

"text/plain": [

"{'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}"

]

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"metadata": {},

"execution\_count": 32

}

]

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"cell\_type": "code",

"source": [

"index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']"

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"metadata": {

"id": "5yfW\_9YZboEt"

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"execution\_count": null,

"outputs": []

},

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"cell\_type": "code",

"source": [

"index[y[0]]"

],

"metadata": {

"colab": {

"base\_uri": "https://localhost:8080/",

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},

"id": "V6OACEkAbzwG",

"outputId": "8e9a41c0-559f-46de-acf9-5179c4af3c1e"

},

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"output\_type": "execute\_result",

"data": {

"text/plain": [

"'WATERMELON'"

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"application/vnd.google.colaboratory.intrinsic+json": {

"type": "string"

}

},

"metadata": {},

"execution\_count": 34

}

]

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"cell\_type": "code",

"source": [

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"img"

],

"metadata": {

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"height": 81

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"id": "UKhRg1qYb\_PT",

"outputId": "9fa4b1db-f941-4f1e-f7e2-5a8042d72f6b"

},

"execution\_count": null,

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{

"output\_type": "execute\_result",

"data": {

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"<PIL.Image.Image image mode=RGB size=64x64 at 0x7F03A9416890>"

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"image/png": "\n"

},

"metadata": {},

"execution\_count": 35

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]

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"source": [

"x=image.img\_to\_array(img)\n",

"x=np.expand\_dims(x,axis=0)\n",

"y=np.argmax(model.predict(x),axis=1)\n",

"y"

],

"metadata": {

"colab": {

"base\_uri": "https://localhost:8080/"

},

"id": "bl\_67xaecQZs",

"outputId": "30dd0d7e-0160-453a-bcb9-8c42e9723233"

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"name": "stdout",

"text": [

"1/1 [==============================] - 0s 31ms/step\n"

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]

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"metadata": {},

"execution\_count": 36

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]

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"source": [

"index=['APPLES','BANANA','ORANGE','PINEAPPLE','WATERMELON']\n",

"index[y[0]]"

],

"metadata": {

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"application/vnd.google.colaboratory.intrinsic+json": {

"type": "string"

}

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"metadata": {},

"execution\_count": 39

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