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[illegible]

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Flatten, Dense"
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    "# Build a CNN block\n",
    "\n",
    "model = Sequential() # Initializing sequential model\n",

"model.add(Convolution2D(32, (3,3), activation='relu', input_shape=(64,64,3)
)) # convolution layer\n",
    "model.add(MaxPooling2D(pool_size=(2, 2))) # Max pooling
layer\n",
    "model.add(Flatten()) # Flatten layer\n",
    "model.add(Dense(300, activation='relu')) # Hidden layer 1\n",
    "model.add(Dense(150, activation='relu')) # Hidden layer 2\n",
    "model.add(Dense(4, activation='softmax')) # Output layer"
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    "# Compiling the model\n",
    "\n",

"model.compile(optimizer='adam', loss='categorical_crossentropy', metrics=[
'accuracy'])"
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{
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    "# Train model\n",
    "\n",
    "model.fit_generator(xtrain,\n",

```

```

        "steps_per_epoch=len(xtrain),\n",
        "epochs=10,\n",
        "validation_data=xtest,\n",
        "validation_steps=len(xtest))"
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                "/usr/local/lib/python3.7/dist-
packages/ipykernel_launcher.py:7: UserWarning: `Model.fit_generator` is
deprecated and will be removed in a future version. Please use
`Model.fit`, which supports generators.\n",
                " import sys\n"
            ]
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        {
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                "Epoch 1/10\n",
                "13/13 [=====] - 18s 490ms/step -
loss: 1.8822 - accuracy: 0.2908 - val_loss: 1.2656 - val_accuracy:
0.3558\n",
                "Epoch 2/10\n",
                "13/13 [=====] - 6s 493ms/step -
loss: 1.2039 - accuracy: 0.4661 - val_loss: 1.0490 - val_accuracy:
0.6319\n",
                "Epoch 3/10\n",
                "13/13 [=====] - 6s 473ms/step -
loss: 1.0134 - accuracy: 0.5969 - val_loss: 0.9052 - val_accuracy:
0.6135\n",
                "Epoch 4/10\n",
                "13/13 [=====] - 6s 471ms/step -
loss: 0.8838 - accuracy: 0.6470 - val_loss: 0.7871 - val_accuracy:
0.6442\n",
                "Epoch 5/10\n",
                "13/13 [=====] - 6s 462ms/step -
loss: 0.7732 - accuracy: 0.6963 - val_loss: 0.6946 - val_accuracy:
0.7423\n",
                "Epoch 6/10\n",
                "13/13 [=====] - 6s 467ms/step -
loss: 0.6976 - accuracy: 0.7229 - val_loss: 0.6000 - val_accuracy:
0.7669\n",
                "Epoch 7/10\n",
                "13/13 [=====] - 6s 470ms/step -
loss: 0.6408 - accuracy: 0.7585 - val_loss: 0.4942 - val_accuracy:
0.8405\n",
                "Epoch 8/10\n",

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        "13/13 [=====] - 6s 473ms/step -
loss: 0.5708 - accuracy: 0.7779 - val_loss: 0.5511 - val_accuracy:
0.7945\n",
        "Epoch 9/10\n",
        "13/13 [=====] - 6s 466ms/step -
loss: 0.5394 - accuracy: 0.7981 - val_loss: 0.5997 - val_accuracy:
0.8006\n",
        "Epoch 10/10\n",
        "13/13 [=====] - 6s 459ms/step -
loss: 0.5215 - accuracy: 0.7948 - val_loss: 0.4270 - val_accuracy:
0.8620\n"
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        "# Testing model"
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{
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        "from tensorflow.keras.preprocessing import image\n",
        "import numpy as np"
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    "\n",
    "img =
image.load_img('/content/dataset/Testing/elephants/photo_1552055570_5c41e
f975579.jpeg',target_size=(64,64)) # Reading image\n",
    "x = image.img_to_array(img) # Converting image into array\n",
    "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
    "pred = np.argmax(model.predict(x)) # Predicting the higher
probability index\n",
    "op = ['bears','crows','elephants','rats'] # Creating list\n",
    "op[pred] # List indexing with output"
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        ],
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image.load_img('/content/dataset/Testing/bears/ml0.jpeg',target_size=(64,
64)) # Reading image\n",
    "x = image.img_to_array(img) # Converting image into array\n",
    "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
    "pred = np.argmax(model.predict(x)) # Predicting the higher
probability index\n",
    "op = ['bears','crows','elephants','rats'] # Creating list\n",
    "op[pred] # List indexing with output"
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  "metadata": {
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```



```

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            }
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        "metadata": {},
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        "\n",
        "img = image.load_img('/content/dataset/Testing/crows/Z1\n",
(65).jpg',target_size=(64,64)) # Reading image\n",
        "x = image.img_to_array(img) # Converting image into array\n",
        "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
        "pred = np.argmax(model.predict(x)) # Predicting the higher\n",
probability index\n",
        "op = ['bears','crows','elephants','rats'] # Creating list\n",
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        "\n",
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(55).jpeg',target_size=(64,64)) # Reading image\n",
        "x = image.img_to_array(img) # Converting image into array\n",
        "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
        "pred = np.argmax(model.predict(x)) # Predicting the higher
probability index\n",
        "op = ['bears','crows','elephants','rats'] # Creating list\n",
        "op[pred] # List indexing with output"
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```

```

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        "metadata": {},
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ReduceLROnPlateau"
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        "early_stop = EarlyStopping(monitor='val_accuracy', \n",
        "                             patience=5)\n",
        "\n",
        "lr = ReduceLROnPlateau(monitor='val_accuaracy', \n",
        "                        factor=0.5, \n",
        "                        min_lr=0.00001)\n",
        "\n",
        "callback = [early_stop,lr]"
    ],
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        "# Train model\n",
        "\n",
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        "                    steps_per_epoch=len(xtrain),\n",
        "                    epochs=100,\n",

```

[illegible]

[illegible]

[illegible]

[illegible]







[illegible]

[illegible]

[illegible]

```

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(55).jpeg',target_size=(64,64)) # Reading image\n",
        "x = image.img_to_array(img) # Converting image into array\n",
        "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
        "pred = np.argmax(model.predict(x)) # Predicting the higher
probability index\n",
        "op = ['bears','crows','elephants','rats'] # Creating list\n",
        "op[pred] # List indexing with output"
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WW294883.jpg',target_size=(64,64)) # Reading image\n",
        "x = image.img_to_array(img) # Converting image into array\n",
        "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
        "pred = np.argmax(model.predict(x)) # Predicting the higher
probability index\n",
        "op = ['bears','crows','elephants','rats'] # Creating list\n",
        "op[pred] # List indexing with output"
    ],

```

```

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# Reading image\n",
    "x = image.img_to_array(img) # Converting image into array\n",
    "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
    "pred = np.argmax(model.predict(x)) # Predicting the higher
probability index\n",
    "op = ['bears','crows','elephants','rats'] # Creating list\n",
    "op[pred] # List indexing with output"
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```

```

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        "x = image.img_to_array(img) # Converting image into array\n",
        "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
        "pred = np.argmax(model.predict(x)) # Predicting the higher probablity index\n",
        "op = ['bears','crows','elephants','rats'] # Creating list\n",
        "op[pred] # List indexing with output"
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        "x = image.img_to_array(img) # Converting image into array\n",
        "x = np.expand_dims(x,axis=0) # expanding Dimensions\n",
        "pred = np.argmax(model.predict(x)) # Predicting the higher probablity index\n",
        "op = ['bears','crows','elephants','rats'] # Creating list\n",

```

```

    "op[pred] # List indexing with output"
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