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raining\", target_size=(64,64), class_mode = \"categorical\", batch_size = 24
)"
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sting\",target_size=(64,64),class_mode =\"categorical\",batch_size = 24
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                ]
            }
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```

```

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        "from tensorflow.keras.layers import
Dense,Convolution2D,MaxPooling2D,Flatten"
    ],
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    },
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        "model = Sequential()"
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        "model.add(Convolution2D(32,(3,3),activation=\"relu\",strides=(1,1),input
_shape = (64,64,3)))"
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```

```

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      "model.add(Flatten())"
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      "model.summary()"
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```

```

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#   " 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",

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        " )
\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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}
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        "model.add(Dense(300,activation=\"relu\"))"
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    },
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{
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    "source": [
        "len(x_train)"

```



```

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    "metadata": {},
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]
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10,steps_per_epoch=len(x_train),validation_data=x_test,validation_steps=l
en(x_test))"
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        "Epoch 1/10\n",
        "14/14 [=====] - 7s 462ms/step -
loss: 2.5809 - accuracy: 0.2791 - val_loss: 1.3510 - val_accuracy:
0.2699\n",
        "Epoch 2/10\n",
        "14/14 [=====] - 6s 415ms/step -
loss: 1.2150 - accuracy: 0.4509 - val_loss: 0.9841 - val_accuracy:
0.7301\n",
        "Epoch 3/10\n",
        "14/14 [=====] - 7s 511ms/step -
loss: 0.8646 - accuracy: 0.7393 - val_loss: 0.6057 - val_accuracy:
0.8344\n",
        "Epoch 4/10\n",
        "14/14 [=====] - 6s 427ms/step -
loss: 0.5112 - accuracy: 0.8528 - val_loss: 0.3082 - val_accuracy:
0.9417\n",

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        "Epoch 5/10\n",
        "14/14 [=====] - 6s 421ms/step -
loss: 0.3095 - accuracy: 0.9018 - val_loss: 0.3219 - val_accuracy:
0.8988\n",
        "Epoch 6/10\n",
        "14/14 [=====] - 6s 432ms/step -
loss: 0.2028 - accuracy: 0.9479 - val_loss: 0.1639 - val_accuracy:
0.9601\n",
        "Epoch 7/10\n",
        "14/14 [=====] - 6s 418ms/step -
loss: 0.0996 - accuracy: 0.9847 - val_loss: 0.0515 - val_accuracy:
1.0000\n",
        "Epoch 8/10\n",
        "14/14 [=====] - 6s 425ms/step -
loss: 0.0511 - accuracy: 1.0000 - val_loss: 0.0320 - val_accuracy:
1.0000\n",
        "Epoch 9/10\n",
        "14/14 [=====] - 6s 419ms/step -
loss: 0.0454 - accuracy: 0.9939 - val_loss: 0.0206 - val_accuracy:
1.0000\n",
        "Epoch 10/10\n",
        "14/14 [=====] - 6s 424ms/step -
loss: 0.0270 - accuracy: 1.0000 - val_loss: 0.0195 - val_accuracy:
1.0000\n"

```

```

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    "from tensorflow.keras.models import load_model\n",
    "from tensorflow.keras.preprocessing import image"
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  "outputs": []
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image.load_img(r\"/content/drive/MyDrive/cnn/dataset/Testing/elephants/Z
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```

```
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                    "       [ 63.,  46.,  36.],\n",
                    "       [ 79.,  62.,  54.]],\n",
                    "\n",
                    "       [[141., 139., 150.],\n",
                    "       [144., 142., 153.],\n",
                    "       [147., 145., 156.],\n",
                    "       ..., \n",
                    "       [ 74.,  56.,  46.],\n",
                    "       [ 66.,  49.,  41.],\n",
                    "       [ 55.,  38.,  30.]],\n",
                    "\n",
                    "       [[142., 140., 151.],\n",
                    "       [144., 142., 153.],\n",
                    "       [148., 146., 157.],\n",
                    "       ..., \n",
                    "       [ 77.,  60.,  50.],\n",
                    "       [ 53.,  38.,  31.],\n",
                    "       [ 55.,  38.,  30.]],\n",
                    "\n",
                    "       ..., \n",
                    "\n",
                    "       [[172., 160., 162.],\n",
                    "       [177., 165., 167.],\n",
                    "       [180., 168., 170.],\n",
                    "       ..., \n",
                    "       [ 89.,  73.,  58.],\n",
                    "       [ 56.,  40.,  25.],\n",

```

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        "        [ 52.,  36.,  23.]],\n",
        "\n",
        "        [[175., 159., 160.],\n",
        "        [178., 162., 163.],\n",
        "        [175., 159., 160.],\n",
        "        ..., \n",
        "        [ 68.,  52.,  39.],\n",
        "        [ 57.,  41.,  28.],\n",
        "        [ 90.,  73.,  65.]],\n",
        "\n",
        "        [[170., 154., 155.],\n",
        "        [173., 157., 158.],\n",
        "        [172., 156., 157.],\n",
        "        ..., \n",
        "        [ 63.,  46.,  36.],\n",
        "        [ 61.,  44.,  34.],\n",
        "        [ 55.,  38.,  30.]]]], dtype=float32)"
    ]
    },
    "metadata": {},
    "execution_count": 50
  }
]
},
{
  "cell_type": "code",
  "source": [
    "pred = model.predict(x)"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "0uoBqCERu3WR",
    "outputId": "a50d0ae7-f3b1-4e18-8ab9-7836b6b305ad"
  },
  "execution_count": 52,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "1/1 [=====] - 0s 28ms/step\n"
      ]
    }
  ]
},
{
  "cell_type": "code",
  "source": [
    "pred"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "ol91hstovJ_R",
    "outputId": "49573769-5c53-47e3-c1de-99dbb58defbe"
  }
}

```

```

},
"execution_count": 53,
"outputs": [
  {
    "output_type": "execute_result",
    "data": {
      "text/plain": [
        "array([[0., 0., 1., 0.]], dtype=float32)"
      ]
    },
    "metadata": {},
    "execution_count": 53
  }
]
},
{
  "cell_type": "code",
  "source": [
    "x_test.class_indices"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "vWuOypaWvNDJ",
    "outputId": "08860e78-44ea-478f-e047-27aa886b2f30"
  },
  "execution_count": 54,
  "outputs": [
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          "{ 'bears': 0, 'crows': 1, 'elephants': 2, 'rats': 3}"
        ]
      },
      "metadata": {},
      "execution_count": 54
    }
  ]
},
{
  "cell_type": "code",
  "source": [
    "index = ['bears', 'crows', 'elephants', 'rats']"
  ],
  "metadata": {
    "id": "fg84qOZgvQow"
  },
  "execution_count": 55,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "index[np.argmax(pred)]"
  ],
  "metadata": {

```



```

    "colab": {
      "base_uri": "https://localhost:8080/",
      "height": 36
    },
    "id": "OeLxQ08dv0Fh",
    "outputId": "3db3d1d7-9cd3-452c-c7ee-a96841c73c48"
  },
  "execution_count": 56,
  "outputs": [
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          "'elephants'"
        ],
        "application/vnd.google.colaboratory.intrinsic+json": {
          "type": "string"
        }
      },
      "metadata": {},
      "execution_count": 56
    }
  ]
},
{
  "cell_type": "code",
  "source": [],
  "metadata": {
    "id": "-cg1tUGzwMpI"
  },
  "execution_count": null,
  "outputs": []
}
]
}

```