

```
# Установка необходимых библиотек
```

```
!pip install kaggle tensorflow numpy matplotlib
```

```
Requirement already satisfied: kaggle in /usr/local/lib/python3.10/dist-packages (1.6.17)
Requirement already satisfied: tensorflow in /usr/local/lib/python3.10/dist-packages (2.17.1)
Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages (1.26.4)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (3.8.0)
Requirement already satisfied: six>=1.10 in /usr/local/lib/python3.10/dist-packages (from kaggle) (1.16.0)
Requirement already satisfied: certifi>=2023.7.22 in /usr/local/lib/python3.10/dist-packages (from kaggle) (2024.8)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.10/dist-packages (from kaggle) (2.8.2)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from kaggle) (2.32.3)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-packages (from kaggle) (4.66.6)
Requirement already satisfied: python-slugify in /usr/local/lib/python3.10/dist-packages (from kaggle) (8.0.4)
Requirement already satisfied: urllib3 in /usr/local/lib/python3.10/dist-packages (from kaggle) (2.2.3)
Requirement already satisfied: bleach in /usr/local/lib/python3.10/dist-packages (from kaggle) (6.2.0)
Requirement already satisfied: absl-py>=1.0.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.4.0)
Requirement already satisfied: astunparse>=1.6.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.6)
Requirement already satisfied: flatbuffers>=24.3.25 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (24.3.25)
Requirement already satisfied: gast!=0.5.0,!=0.5.1,!=0.5.2,>=0.2.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (0.6.0)
Requirement already satisfied: google-pasta>=0.1.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (0.2.0)
Requirement already satisfied: h5py>=3.10.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (3.12.1)
Requirement already satisfied: libclang>=13.0.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (18.1.0)
Requirement already satisfied: ml-dtypes<0.5.0,>=0.3.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (0.4.0)
Requirement already satisfied: opt-einsum>=2.3.2 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (3.4.0)
Requirement already satisfied: packaging in /usr/local/lib/python3.10/dist-packages (from tensorflow) (24.2)
Requirement already satisfied: protobuf!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!=4.21.4,!=4.21.5,<5.0.0dev,>=3.20.3 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (4.21.5)
Requirement already satisfied: setuptools in /usr/local/lib/python3.10/dist-packages (from tensorflow) (75.1.0)
Requirement already satisfied: termcolor>=1.1.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (2.5.0)
Requirement already satisfied: typing-extensions>=3.6.6 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (4.12.0)
Requirement already satisfied: wrapt>=1.11.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.17.0)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.65.0)
Requirement already satisfied: tensorboard<2.18,>=2.17 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (2.17.0)
Requirement already satisfied: keras>=3.2.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (3.5.0)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (0.37.0)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (1.3.0)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (4.54.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (1.4.5)
Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (11.0.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (3.2.0)
Requirement already satisfied: wheel<1.0,>=0.23.0 in /usr/local/lib/python3.10/dist-packages (from astunparse>=1.6) (0.43.0)
Requirement already satisfied: rich in /usr/local/lib/python3.10/dist-packages (from keras>=3.2.0->tensorflow) (13.9.0)
Requirement already satisfied: namex in /usr/local/lib/python3.10/dist-packages (from keras>=3.2.0->tensorflow) (0.0.8)
Requirement already satisfied: optree in /usr/local/lib/python3.10/dist-packages (from keras>=3.2.0->tensorflow) (0.12.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->kaggle) (3.3.0)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests->kaggle) (3.10.1)
Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.18,>=2.17) (3.7.0)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.18,>=2.17) (0.7.0)
Requirement already satisfied: werkzeug>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.18,>=2.17) (3.0.6)
Requirement already satisfied: webencodings in /usr/local/lib/python3.10/dist-packages (from bleach->kaggle) (0.5.1)
Requirement already satisfied: text-unidecode>=1.3 in /usr/local/lib/python3.10/dist-packages (from python-slugify->kaggle) (1.3)
Requirement already satisfied: MarkupSafe>=2.1.1 in /usr/local/lib/python3.10/dist-packages (from werkzeug>=1.0.1) (2.1.5)
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.10/dist-packages (from rich->keras) (3.0.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.10/dist-packages (from rich->keras) (2.18.0)
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.10/dist-packages (from markdown-it-py>=2.2.0->rich) (0.1.2)
```

```
!mkdir -p ~/.kaggle
```

```
!mv kaggle.json ~/.kaggle/
```

```
!chmod 600 ~/.kaggle/kaggle.json
```

```
!kaggle datasets download -d shaunthesheep/microsoft-catsvsdogs-dataset
```

```
!unzip microsoft-catsvsdogs-dataset.zip -d ./dataset
```



```

inflating: ./dataset/PetImages/Dog/9959.jpg
inflating: ./dataset/PetImages/Dog/996.jpg
inflating: ./dataset/PetImages/Dog/9960.jpg
inflating: ./dataset/PetImages/Dog/9961.jpg
inflating: ./dataset/PetImages/Dog/9962.jpg
inflating: ./dataset/PetImages/Dog/9963.jpg
inflating: ./dataset/PetImages/Dog/9964.jpg
inflating: ./dataset/PetImages/Dog/9965.jpg
inflating: ./dataset/PetImages/Dog/9966.jpg
inflating: ./dataset/PetImages/Dog/9967.jpg
inflating: ./dataset/PetImages/Dog/9968.jpg
inflating: ./dataset/PetImages/Dog/9969.jpg
inflating: ./dataset/PetImages/Dog/997.jpg
inflating: ./dataset/PetImages/Dog/9970.jpg
inflating: ./dataset/PetImages/Dog/9971.jpg
inflating: ./dataset/PetImages/Dog/9972.jpg
inflating: ./dataset/PetImages/Dog/9973.jpg
inflating: ./dataset/PetImages/Dog/9974.jpg
inflating: ./dataset/PetImages/Dog/9975.jpg
inflating: ./dataset/PetImages/Dog/9976.jpg
inflating: ./dataset/PetImages/Dog/9977.jpg
inflating: ./dataset/PetImages/Dog/9978.jpg
inflating: ./dataset/PetImages/Dog/9979.jpg
inflating: ./dataset/PetImages/Dog/998.jpg
inflating: ./dataset/PetImages/Dog/9980.jpg
inflating: ./dataset/PetImages/Dog/9981.jpg
inflating: ./dataset/PetImages/Dog/9982.jpg
inflating: ./dataset/PetImages/Dog/9983.jpg
inflating: ./dataset/PetImages/Dog/9984.jpg
inflating: ./dataset/PetImages/Dog/9985.jpg
inflating: ./dataset/PetImages/Dog/9986.jpg
inflating: ./dataset/PetImages/Dog/9987.jpg
inflating: ./dataset/PetImages/Dog/9988.jpg
inflating: ./dataset/PetImages/Dog/9989.jpg
inflating: ./dataset/PetImages/Dog/999.jpg
inflating: ./dataset/PetImages/Dog/9990.jpg
inflating: ./dataset/PetImages/Dog/9991.jpg
inflating: ./dataset/PetImages/Dog/9992.jpg
inflating: ./dataset/PetImages/Dog/9993.jpg
inflating: ./dataset/PetImages/Dog/9994.jpg
inflating: ./dataset/PetImages/Dog/9995.jpg
inflating: ./dataset/PetImages/Dog/9996.jpg
inflating: ./dataset/PetImages/Dog/9997.jpg
inflating: ./dataset/PetImages/Dog/9998.jpg
inflating: ./dataset/PetImages/Dog/9999.jpg
inflating: ./dataset/PetImages/Dog/Thumbs.db
inflating: ./dataset/readme[1].txt

```

```

import os
from PIL import Image

def clean_dataset(directory):
    for root, _, files in os.walk(directory):
        for file in files:
            file_path = os.path.join(root, file)
            try:
                with Image.open(file_path) as img:
                    img.verify() # Проверяем файл
            except Exception as e:
                print(f"Удаляю файл: {file_path} - Ошибка: {e}")
                os.remove(file_path)

dataset_dir = './dataset'
clean_dataset(dataset_dir)

```

```

Удаляю файл: ./dataset/MSR-LA - 3467.docx - Ошибка: cannot identify image file '/content/dataset/MSR-LA - 3467.docx'
Удаляю файл: ./dataset/readme[1].txt - Ошибка: cannot identify image file '/content/dataset/readme[1].txt'
Удаляю файл: ./dataset/PetImages/Cat/Thumbs.db - Ошибка: cannot identify image file '/content/dataset/PetImages/Ca
Удаляю файл: ./dataset/PetImages/Cat/666.jpg - Ошибка: cannot identify image file '/content/dataset/PetImages/Cat/
/usr/local/lib/python3.10/dist-packages/PIL/TiffImagePlugin.py:935: UserWarning: Truncated File Read
warnings.warn(str(msg))
Удаляю файл: ./dataset/PetImages/Dog/Thumbs.db - Ошибка: cannot identify image file '/content/dataset/PetImages/Do
Удаляю файл: ./dataset/PetImages/Dog/11702.jpg - Ошибка: cannot identify image file '/content/dataset/PetImages/Do

```

```

import shutil

cats_dir = './dataset/cats'
dogs_dir = './dataset/dogs'

os.makedirs(cats_dir, exist_ok=True)
os.makedirs(dogs_dir, exist_ok=True)

for file in os.listdir(dataset_dir):
    if 'cat' in file.lower():
        shutil.move(os.path.join(dataset_dir, file), cats_dir)
    elif 'dog' in file.lower():
        shutil.move(os.path.join(dataset_dir, file), dogs_dir)

from tensorflow.keras.preprocessing.image import ImageDataGenerator

train_datagen = ImageDataGenerator(
    rescale=1.0/255,
    validation_split=0.2 # 20% данных для валидации
)

train_generator = train_datagen.flow_from_directory(
    './dataset',
    target_size=(150, 150),
    batch_size=32,
    class_mode='binary',
    subset='training'
)

validation_generator = train_datagen.flow_from_directory(
    './dataset',
    target_size=(150, 150),
    batch_size=32,
    class_mode='binary',
    subset='validation'
)

🔗 Found 19999 images belonging to 3 classes.
🔗 Found 4999 images belonging to 3 classes.

from tensorflow.keras import layers, models

model = models.Sequential([
    layers.Conv2D(32, (3, 3), activation='relu', input_shape=(150, 150, 3)),
    layers.MaxPooling2D((2, 2)),
    layers.Conv2D(64, (3, 3), activation='relu'),
    layers.MaxPooling2D((2, 2)),
    layers.Conv2D(128, (3, 3), activation='relu'),
    layers.MaxPooling2D((2, 2)),
    layers.Flatten(),
    layers.Dense(512, activation='relu'),
    layers.Dense(1, activation='sigmoid') # Для бинарной классификации
])

model.compile(
    optimizer='adam',
    loss='binary_crossentropy',
    metrics=['accuracy']
)

history = model.fit(
    train_generator,
    steps_per_epoch=train_generator.samples // train_generator.batch_size,
    epochs=1, # Можно изменить количество эпох
    validation_data=validation_generator,
    validation_steps=validation_generator.samples // validation_generator.batch_size
)

```

624/624 — 55s 83ms/step - accuracy: 0.9888 - loss: 0.0085 - val\_accuracy: 1.0000 - val\_loss: 0.

```
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing.image import load_img, img_to_array
import numpy as np

# Сохранение и загрузка модели
model.save('cats_vs_dogs_model.h5')
model = load_model('cats_vs_dogs_model.h5')

def predict_image(image_path, model):
    img = load_img(image_path, target_size=(150, 150))
    img_array = img_to_array(img)
    img_array = np.expand_dims(img_array, axis=0) / 255.0 # Нормализация
    prediction = model.predict(img_array)
    class_label = 'Это ИТ' if prediction[0] > 0.5 else 'Это МЫШЬ'
    confidence = prediction[0][0] if prediction[0] > 0.5 else 1 - prediction[0][0]
    return class_label, confidence

# Загрузка изображения через Colab
from google.colab import files
uploaded = files.upload()

# Прогноз
for file_name in uploaded.keys():
    label, conf = predict_image(file_name, model)
    print(f"Image: {file_name}, Prediction: {label}, Confidence: {conf:.2f}")
```

WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or `keras.saving.save\_model(model)`. This WARNING:absl:Compiled the loaded model, but the compiled metrics have yet to be built. `model.compile\_metrics` will

Выбрать файлы square\_1...2a71a.jpg

- **square\_1280\_ce4e213dafa5cc66ab7dc1e9ba2a71a.jpg**(image/jpeg) - 127820 bytes, last modified: 07.12.2024 - 100% done

Saving square\_1280\_ce4e213dafa5cc66ab7dc1e9ba2a71a.jpg to square\_1280\_ce4e213dafa5cc66ab7dc1e9ba2a71a (1).jpg

1/1 — 0s 207ms/step

Image: square\_1280\_ce4e213dafa5cc66ab7dc1e9ba2a71a (1).jpg, Prediction: Это МЫШЬ, Confidence: 1.00