Creation and Testing of a CNN

The objective of this document is to create a CNN. I started with a very basic CNN that determines whether an image depicts a dog or a cat.

1. **Project Decision**
   - Objective: create a CNN (Convolutional Neural Network) capable of recognizing images of dogs and cats.
   - Define the main steps: data preparation, model creation, training, saving, and testing.

2. **Installing Python 3.11**
   - Chose Python 3.11 to ensure compatibility with TensorFlow and other necessary libraries.

3. **Creating a virtual environment with Python 3.11**
   - Command:
     - `py -3.11 -m venv tf_env`
   - Used to isolate the project and its dependencies.
   - Activation:
     - Windows: `tf_env\Scripts\activate`
     - Linux/macOS: `source tf_env/bin/activate`

4. **Data Preparation**
   - Collect images of dogs vs cats.
   - Resize, normalize, and optionally split into training/test datasets.

5. **Creating the Python program to generate the model (.h5)**
   - Define the CNN architecture (convolutional layers, pooling, fully connected layers, etc.).
   - Compile the model (optimizer, loss function, metrics).
   - Train the model on the prepared images.
   - Save the trained model to a `.h5` file.

6. **Running the program to create the model (.h5)**
   - Launch the Python script:
   - `python my_cnn_script.py`
   - Result: a `.h5` file containing the trained model.

7. Creating the program to test the AI

- Script to load the `.h5` model and test new images.
- Steps:

  a. Load the model:

  tf.keras.models.load_model("my_model.h5")

  b. Prepare the test image.

    - Make a prediction: model.predict(test_image)
    - Display the result (dog or cat).

8. Running the AI testing program

- Run the test script and check if the model correctly recognizes the images.
- Optionally adjust the architecture or parameters if the accuracy is not satisfactory.