Reproducing an Existing Image Using Text-to-Image AI Tools

Aim

The aim of this experiment is to demonstrate the capability of text-to-image generation tools to recreate an existing image by crafting precise and descriptive prompts. The objective is to analyze key visual elements in the original image and use them to guide the AI model in generating an image that closely resembles it.

Software and Tools Required

1. **Python 3.8+** and an IDE (e.g., Jupyter, VS Code).
2. **Libraries**:
    - openai for GPT-based audio prompt design.
    - requests for API communication.
    - Optional: torchaudio for audio playback.
3. **APIs**:
    - OpenAI Whisper (Speech synthesis).
    - Hugging Face (MusicGen for music; Sound Effects models).
    - Google Cloud Text-to-Speech (Narration).

Experiment Design

Experiment 1: Speech Generation

- **Objective**: Test different prompts for generating speech with distinct tones and contexts.
- **Prompts**:
    - **Basic**: "Say hello in a friendly tone."
    - **Detailed**: "Generate a formal greeting for a corporate meeting."
    - **Contextual**: "Speak as if you're introducing a new product to a global audience."

Code:

python

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```
import requests


def generate_speech(prompt):
    API_KEY = "your_google_api_key"
    url = "https://texttospeech.googleapis.com/v1/text:synthesize"
    headers = {"Authorization": f"Bearer {API_KEY}"}
    payload = {
        "input": {"text": prompt},
        "voice": {"languageCode": "en-US", "name": "en-US-Wavenet-D"},
        "audioConfig": {"audioEncoding": "MP3"}
    }
    response = requests.post(url, headers=headers, json=payload)
    if response.status_code == 200:
        with open("speech.mp3", "wb") as file:
            file.write(response.content)
        print("Speech generated: speech.mp3")
    else:
        print("Error:", response.json())


# Example usage
generate_speech("Welcome to the AI audio generation experiment!")
```

Experiment 2: Music Generation

- **Objective**: Evaluate how prompt specificity affects the style and quality of AI-generated music.
- **Prompts**:
    - **Genre-Specific**: "Compose a jazz piano melody."

- **Mood-Specific**: "Create an uplifting electronic track for a workout."
- **Detailed**: "Generate a soft acoustic guitar tune with a soothing rhythm."

Code:

python

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```
import requests


def generate_music(prompt):
    API_KEY = "your_huggingface_api_key"
    url = "https://api-inference.huggingface.co/models/facebook/musicgen"
    headers = {"Authorization": f"Bearer {API_KEY}"}
    payload = {"inputs": prompt}
    response = requests.post(url, headers=headers, json=payload)
    if response.status_code == 200:
        print("Generated music audio:", response.json().get("audio_url"))
    else:
        print("Error:", response.json())


# Example usage
generate_music("Compose a calm instrumental background for meditation.")
```

Experiment 3: Sound Effect Generation

- **Objective**: Understand the impact of descriptive and contextual prompts on sound effect quality.
- **Prompts**:
  - **Simple**: "Sound of rain."
  - **Detailed**: "Gentle rain on a tin roof at night."
  - **Contextual**: "A bustling coffee shop with quiet chatter and clinking cups."

Code:

python

```
def generate_sound_effect(prompt):
    API_KEY = "your_huggingface_api_key"
    url = "https://api-inference.huggingface.co/models/sound-effect-model"
    headers = {"Authorization": f"Bearer {API_KEY}"}
    payload = {"inputs": prompt}
    response = requests.post(url, headers=headers, json=payload)
    if response.status_code == 200:
        print("Generated sound effect URL:", response.json().get("audio_url"))
    else:
        print("Error:", response.json())

# Example usage
generate_sound_effect("Sound of waves crashing on a beach.")
```

Output and Results

1. Speech:
    - Basic prompts yield simple tones.
    - Detailed prompts produce clear, expressive speech suitable for professional use.
2. Music:
    - Genre and mood-specific prompts align better with expectations.
3. Sound Effects:
    - Context-rich prompts generate realistic, vivid audio.