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TEXT COMPLETION GENERATION - GEN AI PROJECT PHASE 2 SUBMISSION DOCUMENT

Phase 2: Project Execution and Demonstration

1. **Project Title:**
   Complete Sentence Prediction using Generative AI

2. **Objective Recap:**
   The objective of this project is to build a Complete Sentence Prediction system using Generative AI models. The system takes an input sentence or sentence fragment and generates a single, coherent complete sentence using a state-of-the-art language model.

3. **Technologies Used:**
   - Python
   - HuggingFace Transformers
   - IPyWidgets (for UI)
   - Google Colab / Jupyter Notebook
   - Pre-trained GPT-2 Model

4. **Full Code Implementation:**

Step 1: Install Required Libraries

```
!pip install transformers ipywidgets
```

Step 2: Import Required Libraries

```
from transformers import pipeline, set_seed
import ipywidgets as widgets
from IPython.display import display
```

Step 3: Load the Pretrained GPT-2 Model

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```
def load_text_completer(model_name='gpt2', temperature=0.7, top_p=0.9,
repetition_penalty=1.2, seed=42):
    set_seed(seed)
    return pipeline('text-generation', model=model_name,
                    config={'temperature': temperature, 'top_p': top_p, 'repetition_penalty':
repetition_penalty})
```

Step 4: Define Text Completion Function

```
def complete_text(completer, prompt, max_length=50):
    output = completer(prompt, max_length=max_length, num_return_sequences=1)[0]
    completion = output['generated_text'].strip()
    if '.' in completion:
        first_sentence = completion.split('.')[0].strip() + '.'
    else:
        first_sentence = completion.strip()
    return first_sentence
```

Step 5: Build Interactive UI in Google Colab

```
prompt_input = widgets.Textarea(
    value='',
    placeholder='Enter the beginning of a sentence...',
    description='Prompt:',
    layout=widgets.Layout(width='400px', height='100px')
)

output_box = widgets.Output(layout=widgets.Layout(
    border='2px solid gray', padding='10px', width='500px', height='150px', overflow_y='auto'
))

def on_button_click(b):
    output_box.clear_output()
    prompt = prompt_input.value.strip()
    if not prompt:
        with output_box:
            print("⚠️ Please enter a prompt!")
        return
    text_completer = load_text_completer()
    completed_text = complete_text(text_completer, prompt)
    with output_box:
        print(f"📝 Generated Text:\n\n{completed_text}")
```

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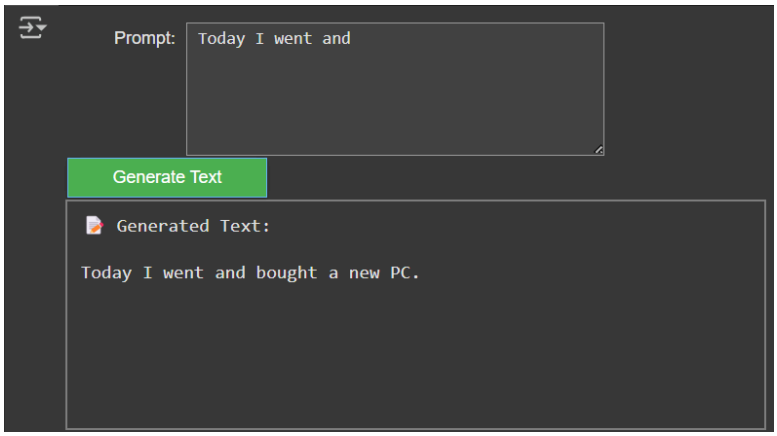
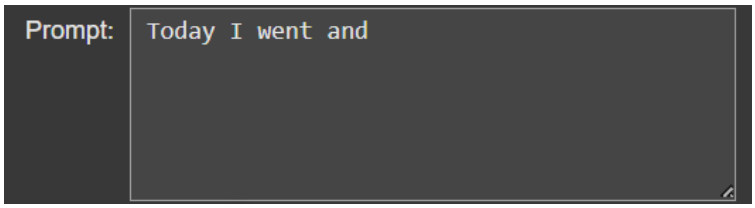
```
generate_button = widgets.Button(description="Generate Text", button_style='success')
generate_button.on_click(on_button_click)

display(prompt_input, generate_button, output_box)
```

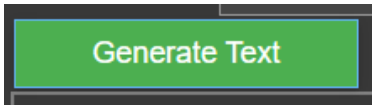
5. **Output Screenshots:**



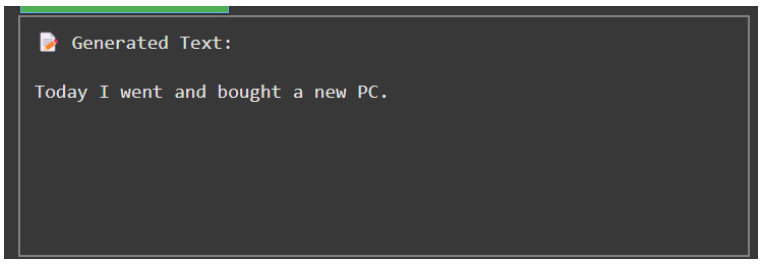
- Input prompt text area



- Generate button



- Displayed generated sentence



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6. **Conclusion:**
   This project successfully implements a Complete Sentence Prediction system using GPT-2 in Google Colab. It uses interactive widgets to simulate a user-friendly interface for sentence completion. The results demonstrate how Generative AI can enhance productivity tools, chatbot responses, and intelligent auto-completion systems.

7. **References:**

- HuggingFace Transformers Documentation
- OpenAI GPT-2 Model
- IPyWidgets Official Documentation