# MediTransformer_Backend

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## 1 MediTransformer App Backend Demonstration

This Jupyter Notebook shows an example for each of the 3 main functionalities of our proposed MediTransformer app: 1) Multi-Format, 2) Multi-Media and 3) Multi-Source learning.

## 2 Import Required Packages

[57]:
```
import time
from openai import OpenAI
from pathlib import Path
from IPython.display import Audio
from PyPDF2 import PdfReader
```

## 3 OpenAI API Key

For privacy and security reasons, we have removed our personal API key here. Enter your own personal API key in order to run the code.

[58]:
```
global personal_apikey
personal_apikey = # Enter your own API key here
```

## 4 Processing of Input Learning Material

The MediTransformer app enables the user to upload any online-based learning material of their choice. For demonstration purposes, we show the processing of a set of medical lecture notes in PDF form.

[59]:
```
reader = PdfReader('Scoliosis-lecture-notes.pdf')
page = reader.pages[0]
learning_material = page.extract_text()
```

## 5 Functionality 1: Multi-Format

The below code demonstrates the generation of flashcards from the example input learning material provided above.

[60]:
```
def generate_flashcards(input_prompt, num_flashcards):
    time.sleep(3)
    system_prompt = "You are a helpful assistant."
    input = f"""
      Generate {num_flashcards} flashcards from the following text to aid in␣
 ↪easy information retention. Text: {input_prompt}
      """
    client = OpenAI(api_key=personal_apikey)
    response = client.chat.completions.create(
    model="gpt-3.5-turbo",
    messages=[
      {"role": "system", "content": system_prompt},
      {"role": "user", "content": input},
    ],
    temperature=0.3
    )
    return response.choices[0].message.content
```

[61]:
```
output = generate_flashcards(learning_material, num_flashcards = 4)
print(output)
```

```
Flashcard 1:
Term: Scoliosis
Definition: Abnormal side-to-side curvature of the spine

Flashcard 2:
Term: Idiopathic scoliosis
Definition: Most common type of scoliosis with an unknown cause, often runs in
families

Flashcard 3:
Term: Congenital scoliosis
Definition: Rare spine abnormality detected at birth, caused by improper
formation of vertebrae during embryonic development

Flashcard 4:
Term: Neuromuscular scoliosis
Definition: Type of scoliosis caused by abnormalities in the muscles and nerves
supporting the spine, often associated with neurological or muscular conditions
such as cerebral palsy or muscular dystrophy
```

## 6 Functionality 2: Multi-Media

The below code demonstrates the conversion of the given learning material into an audio podcast for users to listen to on-the-go.

[62]:
```
def generate_podcast(input_learning_material):

    client = OpenAI(api_key=personal_apikey)

    speech_file_path = Path("podcast.mp3")
    response = client.audio.speech.create(
      model="tts-1",
      voice="alloy",
      input=input_learning_material
    )

    response.stream_to_file(speech_file_path)
    print("The audio podcast has been generated successfully! Click the Play␣
 ↪button to listen to the podcast.")
```

[63]:
```
generate_podcast(learning_material)
Audio("podcast.mp3", autoplay=False)
```

```
The audio podcast has been generated successfully! Click the Play button to
listen to the podcast.
```

[63]:
```
<IPython.lib.display.Audio object>
```

## 7 Functionality 3: Multi-Source

The below code demonstrates the answering of questions based (only) on the given learning material provided by the user.

[64]:
```
def answer_question(input_learning_material, question):
    time.sleep(3)
    system_prompt = "You are a helpful assistant."
    input = f"""
      Answer the following question only based on the learning material␣
 ↪provided.
      Question to answer: {question}
      Input learning material provided: {input_learning_material}
      """
    client = OpenAI(api_key=personal_apikey)
    response = client.chat.completions.create(
    model="gpt-3.5-turbo",
    messages=[
      {"role": "system", "content": system_prompt},
      {"role": "user", "content": input},
    ],
    temperature=0.3
    )
    return response.choices[0].message.content
```

[66]:
```
question = "What is scoliosis?"
generated_answer = answer_question(learning_material, question)
print("Generated Answer: ", generated_answer)
```

```
Generated Answer:  Scoliosis is an abnormal side-to-side curvature of the spine.
It can cause the spine to curve into a C or S shape. Most cases of scoliosis are
mild and do not cause symptoms or require treatment. However, severe cases can
lead to uneven posture and pain. There are three types of scoliosis: idiopathic
scoliosis, congenital scoliosis, and neuromuscular scoliosis. Idiopathic
scoliosis is the most common type and its cause is unknown. Congenital scoliosis
is a rare abnormality that is present at birth and occurs when the vertebrae do
not form properly during embryonic development. Neuromuscular scoliosis is
caused by abnormalities in the muscles and nerves that support the spine and is
often associated with neurological or muscular conditions such as cerebral palsy
or muscular dystrophy. Treatment for scoliosis may include wearing a brace or
surgery.
```