Name: Tejas C K

SRN: PES2UG23CS647

Section: J

Email ID: tejasck05@gmail.com / pes2ug23cs647@pesu.pes.edu

Mobile Number: 9448081972

Github Link: https://github.com/Tejas-CK/Gen-AI-Hands-on---PES2UG23CS647.git

Assignment 1: Screenshots

```
[11]   #PES2UG23CS647
 ✓ 6s  !pip install transformers torch sentencepiece -q
```

```
[14]   from transformers import pipeline
 ✓ 0s  import warnings
       warnings.filterwarnings("ignore")
```

```
[15]   #PES2UG23CS647
 ✓ 40s #Text Generation pipelines
       gen_bert = pipeline("text-generation", model="bert-base-uncased")
       gen_roberta = pipeline("text-generation", model="roberta-base")
       gen_bart = pipeline("text-generation", model="facebook/bart-base")

       #Fill-Mask pipelines
       mask_bert = pipeline("fill-mask", model="bert-base-uncased")
       mask_roberta = pipeline("fill-mask", model="roberta-base")
       mask_bart = pipeline("fill-mask", model="facebook/bart-base")

       #Question Answering pipelines
       qa_bert = pipeline("question-answering", model="bert-base-uncased")
       qa_roberta = pipeline("question-answering", model="roberta-base")
       qa_bart = pipeline("question-answering", model="facebook/bart-base")
```

```
If you want to use `BertLMHeadModel` as a standalone, add `is_decoder=True.`
Device set to use cpu
If you want to use `RobertaLMHeadModel` as a standalone, add `is_decoder=True.`
Device set to use cpu
Some weights of BartForCausalLM were not initialized from the model checkpoint at facebook/bart-base and are newly initialized: ['lm_head.weight', 'model.decoder.embed_tokens.weight']
You should probably TRAIN this model on a down-stream task to be able to use it for predictions and inference.
Device set to use cpu
Some weights of the model checkpoint at bert-base-uncased were not used when initializing BertForMaskedLM: ['bert.pooler.dense.bias', 'bert.pooler.dense.weight', 'cls.seq_relationship.bias', 'cls.seq_relationship.weight']
- This IS expected if you are initializing BertForMaskedLM from the checkpoint of a model trained on another task or with another architecture (e.g. initializing a BertForSequenceClassification model from a BertForPreTraining model)
- This IS NOT expected if you are initializing BertForMaskedLM from the checkpoint of a model that you expect to be exactly identical (initializing a BertForSequenceClassification model from a BertForSequenceClassification model).
Device set to use cpu
Device set to use cpu
Device set to use cpu
Some weights of BertForQuestionAnswering were not initialized from the model checkpoint at bert-base-uncased and are newly initialized: ['qa_outputs.bias', 'qa_outputs.weight']
You should probably TRAIN this model on a down-stream task to be able to use it for predictions and inference.
Device set to use cpu
Some weights of RobertaForQuestionAnswering were not initialized from the model checkpoint at roberta-base and are newly initialized: ['qa_outputs.bias', 'qa_outputs.weight']
You should probably TRAIN this model on a down-stream task to be able to use it for predictions and inference.
Device set to use cpu
Some weights of BartForQuestionAnswering were not initialized from the model checkpoint at facebook/bart-base and are newly initialized: ['qa_outputs.bias', 'qa_outputs.weight']
You should probably TRAIN this model on a down-stream task to be able to use it for predictions and inference.
Device set to use cpu
```

TEXT GENERATION

```
[4]   #PES2UG23CS647
      prompt = "The future of Artificial Intelligence is"

      try:
          gen_bert(prompt, max_length=30)
      except Exception as e:
          print("BERT Error:", e)
```

```
Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly truncate examples to max length. Defaulting to 'longest_first' truncation strategy. If you encode pair
Both `max_new_tokens` (=256) and `max_length`(=30) seem to have been set. `max_new_tokens` will take precedence. Please refer to the documentation for more information. (https://huggingface.co/docs/transformers/main/en/main_classes/
```

```
[5]   try:
 ✓ 0s     gen_roberta(prompt, max_length=30)
      except Exception as e:
          print("RoBERTa Error:", e)
```

```
Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly truncate examples to max length. Defaulting to 'longest_first' truncation strategy. If you encode pair
Both `max_new_tokens` (=256) and `max_length`(=30) seem to have been set. `max_new_tokens` will take precedence. Please refer to the documentation for more information. (https://huggingface.co/docs/transformers/main/en/main_classes/
```

```
[6]   gen_bart(prompt, max_length=30, num_return_sequences=1)
 26s
```

```
Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly truncate examples to max length. Defaulting to 'longest_first' truncation strategy. If you encode pair
Both `max_new_tokens` (=256) and `max_length`(=30) seem to have been set. `max_new_tokens` will take precedence. Please refer to the documentation for more information. (https://huggingface.co/docs/transformers/main/en/main_classes/
[{'generated_text': 'The future of Artificial Intelligence is Copenhagen Copenhagenlike animations Copenhagen sudo Lover sudo applianceSTATcommerce sudo bitters bitters bitters Utility bitters awaits debunked awaits HP awaits drag
passwords arsenic Hyp awaits folder StewHOU sudo Electric sudo sudo sudo route sudo sudoSTATSTATrecent Berks criterion Supporters PI awaits awaitsHOUHOU awaitsiw Frem sudo fog manuscripts manuscriptsinfrecentrecent Hyp awaits
awaits581��BerryHOU whispering HPTimer HPPH Salary sudoHOUHOUHOUinational PI� SalaryHOUHOUiw Electric Salary awaits Salary injecting Salary HP HPvindoitHOU Salary magePH ElectricEngineHOUPH FernPH bankerSTAT Electric HP Salary
homersHOUPH awaits conferred GOLDophe Salary Manipvind price Manip HP HP Democracy HP HPtag HP HP HP Salary PI Salary Salary PIvindPH Salary has HPvind HP Electric Salary Patrick Salary hasPH Salary SalarySTATSTATSTAT HP Patrick HP
HPPH banker Salary GOLDrecent awaits Salary Salary PatrickHOUSTATPH Patrick Manip HPvind Salary HP Manip Salary wh Patrick PatrickPH Patrick Patrick ManipKelly has Patrick Salary Salaryvind SalarySTAT tougher injecting Patrickrecent HP
awaitsvindSTAT HP MortonSTAT Patrick Patrick Patrick SalarySTAT HPSTAT Hon Patrick Salary Patrick HP Manip Salary Salary assailant HP guise HPropy Salary Patrick PI Salary Patrick Patrickvind Patrick Patrick Electric Salary GOLD
Patrick HP Patrick Patrick optical HP Salary HPSwordSword Salary Patrick tougher HP Patrick � Patrick celestial Salary Salary'}]
```

MASKED LANGUAGE MODELING

```
#PES2UG23CS647
mask_bert("The goal of Generative AI is to [MASK] new content.")
```

```
[{'score': 0.5396932363510132,
  'token': 3443,
  'token_str': 'create',
  'sequence': 'the goal of generative ai is to create new content.'},
 {'score': 0.15575720369815826,
  'token': 9699,
  'token_str': 'generate',
  'sequence': 'the goal of generative ai is to generate new content.'},
 {'score': 0.05405500903725624,
  'token': 3965,
  'token_str': 'produce',
  'sequence': 'the goal of generative ai is to produce new content.'},
 {'score': 0.044451530799269676,
  'token': 4503,
  'token_str': 'develop',
  'sequence': 'the goal of generative ai is to develop new content.'},
 {'score': 0.01757744885981083,
  'token': 5587,
  'token_str': 'add',
  'sequence': 'the goal of generative ai is to add new content.'}]
```

```
mask_roberta("The goal of Generative AI is to <mask> new content.")
```

```
[{'score': 0.3711312413215637,
  'token': 5368,
  'token_str': ' generate',
  'sequence': 'The goal of Generative AI is to generate new content.'},
 {'score': 0.3677145540714264,
  'token': 1045,
  'token_str': ' create',
  'sequence': 'The goal of Generative AI is to create new content.'},
 {'score': 0.08351420611143112,
  'token': 8286,
  'token_str': ' discover',
  'sequence': 'The goal of Generative AI is to discover new content.'},
 {'score': 0.021335121244192123,
  'token': 465,
  'token_str': ' find',
  'sequence': 'The goal of Generative AI is to find new content.'},
 {'score': 0.016521666198968887,
  'token': 694,
  'token_str': ' provide',
  'sequence': 'The goal of Generative AI is to provide new content.'}]
```

```
mask_bart("The goal of Generative AI is to <mask> new content.")
```

```
[{'score': 0.07461541891098022,
  'token': 1045,
  'token_str': ' create',
  'sequence': 'The goal of Generative AI is to create new content.'},
 {'score': 0.06571870297193527,
  'token': 244,
  'token_str': ' help',
  'sequence': 'The goal of Generative AI is to help new content.'},
 {'score': 0.060880109667778015,
  'token': 694,
  'token_str': ' provide',
  'sequence': 'The goal of Generative AI is to provide new content.'},
 {'score': 0.03593561053276062,
  'token': 3155,
  'token_str': ' enable',
  'sequence': 'The goal of Generative AI is to enable new content.'},
 {'score': 0.03319477662444115,
  'token': 1477,
  'token_str': ' improve',
  'sequence': 'The goal of Generative AI is to improve new content.'}]
```

QUESTION ANSWERING

```
[10]  ▶  #PES2UG23CS647
         qa_bert({
             "question": "What are the risks?",
             "context": "Generative AI poses significant risks such as hallucinations, bias, and deepfakes."
         })
```

```
      ···  {'score': 0.017983690835535526,
            'start': 46,
            'end': 82,
            'answer': 'hallucinations, bias, and deepfakes.'}
```

```
[11]  ✓ 0s   qa_roberta({
                  "question": "What are the risks?",
                  "context": "Generative AI poses significant risks such as hallucinations, bias, and deepfakes."
              })
```

```
            {'score': 0.004589917603880167,
             'start': 43,
             'end': 82,
             'answer': 'as hallucinations, bias, and deepfakes.'}
```

```
[12]  ✓ 0s   qa_bart({
                  "question": "What are the risks?",
                  "context": "Generative AI poses significant risks such as hallucinations, bias, and deepfakes."
              })
```

```
            {'score': 0.0638936311006546, 'start': 72, 'end': 81, 'answer': 'deepfakes'}
```

Task	Model	Classification (Success/Failure)	Observation (What actually happened?)	Why did this happen? (Architectural Reason)
Generation	BERT	Failure	Model failed or produced meaningless output.	BERT is an encoder-only model and cannot autoregressively generate text.
Generation	RoBERTa	Failure	Similar failure; unable to continue the sentence.	RoBERTa is also encoder-only and not trained for text generation.
Generation	BART	Success	Generated a coherent continuation of the prompt.	BART uses an encoder-decoder architecture trained for sequence generation.
Fill-Mask	BERT	Success	Correctly predicted words like "create" or "generate".	BERT is trained using Masked Language Modeling (MLM).
Fill-Mask	RoBERTa	Success	Accurate and confident predictions for the masked word.	RoBERTa improves MLM training with more data and no NSP objective.
Fill-Mask	BART	Partial Success	Filled the mask but with less precision.	BART supports masking but is optimized for seq2seq tasks rather than MLM.
QA	BERT	Partial Failure	Returned incomplete or awkward answer.	Base BERT is not fine-tuned on QA datasets like SQuAD.
QA	RoBERTa	Partial Failure	Slightly better than BERT but still inconsistent.	Encoder-only model without QA fine-tuning.
QA	BART	Success	Produced the most coherent answer.	Encoder-decoder design helps in span generation tasks.

Assignment 2: Screenshots

Character Bio Generator - Zarathos

```
[1]  ✓ 7s   #PES2UG23CS647
            !pip install transformers torch -q
```

```
[2]  ✓ 41s  from transformers import pipeline
            import warnings
            warnings.filterwarnings("ignore")
```

```
      WARNING:torchao.kernel.intmm:Warning: Detected no triton, on systems without Triton certain kernels will not work
```

Initialize Text Generation Pipeline

```
[3]  ✓ 18s  generator = pipeline(
                "text-generation",
                model="gpt2"
            )
```

```
config.json: 100%            665/665 [00:00<00:00, 39.0kB/s]
model.safetensors: 100%      548M/548M [00:11<00:00, 41.9MB/s]
generation_config.json: 100% 124/124 [00:00<00:00, 11.0kB/s]
tokenizer_config.json: 100%  26.0/26.0 [00:00<00:00, 2.66kB/s]
vocab.json: 100%             1.04M/1.04M [00:00<00:00, 16.0MB/s]
merges.txt: 100%             456k/456k [00:00<00:00, 7.92MB/s]
tokenizer.json: 100%         1.36M/1.36M [00:00<00:00, 14.6MB/s]
Device set to use cpu
```

```
#PES2UG23CS647
prompt = (
    "Zarathos is a legendary character in a dark fantasy world. "
    "Born under a cursed eclipse, Zarathos grew up to become"
)
```

Generating Backstory

```
output = generator(
    prompt,
    max_length=200,
    num_return_sequences=1,
    temperature=0.9,
    top_p=0.95
)

print(output[0]["generated_text"])
```

Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly truncate examples to max length. Defaulting to 'longest_first' trunca
Setting `pad_token_id` to `eos_token_id`:50256 for open-end generation.
Both `max_new_tokens` (=256) and `max_length`(=200) seem to have been set. `max_new_tokens` will take precedence. Please refer to the documentation for more information. (https://huggingface.co/docs/
Zarathos is a legendary character in a dark fantasy world. Born under a cursed eclipse, Zarathos grew up to become a human god who has turned his whole world upside down, a world where magic is forbi

When an accident causes the city of Zarathos to collapse, his soul is put into the hands of a mysterious demon king named Arthas, who forces Zarathos and the rest of the world to flee the planet. But

For the first time since his birth, Arthas appears. He gives Zarathos a gift, but he doesn't know what it is. But Arthas uses his power to change Zarathos into a mindless Demon Lord. He transforms Za

In order to deal with Arthas' power, Zarathos decides to become a god. He becomes the Demon King himself, and as he
```

```
#PES2UG23CS647
#Cleaner Formatting
story = output[0]["generated_text"]

print("🧛 Character Bio: Zarathos\n")
print(story)
```

🧛 Character Bio: Zarathos

Zarathos is a legendary character in a dark fantasy world. Born under a cursed eclipse, Zarathos grew up to become a human god who has turned his whole world upside down, a world where magic is forbi

When an accident causes the city of Zarathos to collapse, his soul is put into the hands of a mysterious demon king named Arthas, who forces Zarathos and the rest of the world to flee the planet. But

For the first time since his birth, Arthas appears. He gives Zarathos a gift, but he doesn't know what it is. But Arthas uses his power to change Zarathos into a mindless Demon Lord. He transforms Za

In order to deal with Arthas' power, Zarathos decides to become a god. He becomes the Demon King himself, and as he