A REPORT

**ON**

**SENTIMENT AND BEHAVIOR ANALYTICS**

**NLP MODEL MAKING TO ANALYZE THE TRANSCRIPT TO ANALYZE THE INTERVIEWEE’S ANSWER - RELEVANTNESS TO THE QUESTION ASKED**

BY

Name of the student ID.No.

AMBAR BRAHMACHARI 2021B1A82811G

AT

iQuadra Information Services Pvt. Ltd(Online), Nellore, Andhra Pradesh

A Practice School-I Station of



**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI**

**(JUNE - JULY, 2023)**

A REPORT

**ON**

**SENTIMENT AND BEHAVIOR ANALYTICS**

**NLP MODEL MAKING TO ANALYZE THE TRANSCRIPT TO ANALYZE THE INTERVIEWEE’S ANSWER - RELEVANTNESS TO THE QUESTION ASKED**

BY

Name of the student ID.No. Discipline

AMBAR BRAHMACHARI 2021B1A82811G M.Sc. Biology B.E

Electronics & Instrumentation

Prepared in partial fulfillment of the

Practice School-I Course Nos.

BITS C221/BITSC231/BITS C241

AT

iQuadra Information Services Pvt. Ltd(Online), Nellore, Andhra Pradesh

A Practice School-I Station of



**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI**

**(JUNE - JULY, 2023)**

**Acknowledgments**

I am incredibly indebted to my Industry Mentor, Mr. N. Srihari Rao, for his precious guidance and encouragement. Without his guidance and support, the report would have been incomplete. I also express gratitude towards my Faculty Mentor, Dr Arnab Guha for his support and constant monitoring of the work on this project and Practice School division for providing the fantastic opportunity to work at iQuadra Services Pvt Ltd.

I would like to acknowledge the role of the Birla Institute of Technology and Science,

Pilani University in giving me exposure through the Practise School course. I have

learned many new things during the project and gained insight into

industrial and client work.

Lastly, I want to thank my Friends and Family, who constantly supported me, provided crucial inputs, and made the report more reliable.

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI**

**(GOA)**

**Practice School Division**

**Station:** iQuadra Information Services Pvt. Ltd(Online)  **Centre**: Nellore, A.P

**Duration:** 51 days. **Date of Start:** 30.05.2023

**Date of Submission:** 20.07.2023

**Title of the Project:** SENTIMENT AND BEHAVIOR ANALYTICS

NLP MODEL MAKING TO ANALYZE THE TRANSCRIPT TO

ANALYZE THE INTERVIEWEE’S ANSWER - RELEVANTNESS

TO THE QUESTION ASKED

**ID No.:** 2021B1A82811G

**Name:** Ambar Brahmachari

**Discipline(s)/of the student:** M.Sc. Biology B.E. Electronics and Instrumentation

**Name of the Expert:** Mr. N. Srihari Rao

**Designation of the Expert:** Head of Offshore Development Centre

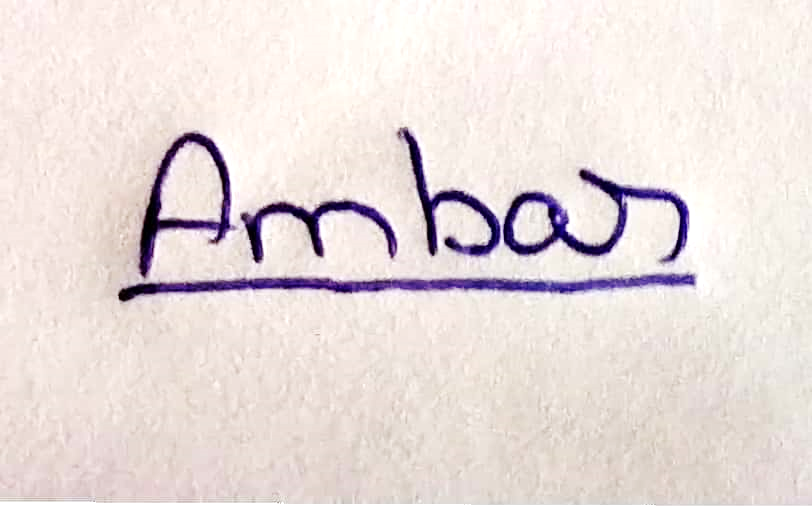
**Name(s) of the PS Faculty:** Dr. Arnab Guha

**Key Words:** NLP, Hugging Face, Transformer, Prompt

Engineering, Answer Relevantness

**Project Areas:** OpenAI, Machine Learning, Transformers

**Signature of Student Signature of PS Faculty**



**Date: 20.07.2023 Date:**

**Abstract**:

…………………………………………………………….

NLP is used to [understand the structure and meaning of human language](https://monkeylearn.com/blog/natural-language-understanding/) by analyzing different aspects like syntax, semantics, pragmatics, and morphology. An introduction to NLP was discussed.

The goal was to make an NLP model to analyze the interviewee’s answer- relevantness to the question asked.

Some key areas of NLP progress are discussed such as-

1. Transformer-based Models

2. Pre-trained Language Models

3. Transfer Learning, Fine-tuning

4. Multimodal Learning

5. Ethical and Bias Considerations

6. Few-shot and Zero-shot Learning

Methodology to make an NLP model to analyze the interviewee’s answer- relevantness to the question asked was discussed. Due to the time limitation, and lack of a proper pre-trained model and relevant data set, Hugging Face Method was used to learn the fundamental of making NLP models and understand the step involved. Later, the methodology to make a small but functional model with OpenAI and GPT4all and a limited dataset was discussed. The Hugging Face model and the OpenAI model could be much better with a larger dataset. The OpenAI model is small but functional.

**Table of Contents**

Acknowledgments ……………………………………………………….3

Abstract ……………………………………………………….5

1. Introduction ……………………………………………………………...7

2. Objective ……………………………………………………………. 7

3. Related Work …………………………………………………………… 8

4. Work Done …………………………………………………………….10

4.1. Intro to Hugging Face …………………………………………….11

4.1.1. Pre-Trained Model …………………………………………….11

4.1.2. Fine-tuning & Transfer Learning ………………………………..11

4.1.3. Tokenization ……………………………………………12

4.1.4. Model Interpretability …………………………………………13

4.1.5. Model Deployment and Serving …………………………..13

4.2. Application of Hugging Face in the Project ……………………..14

4.3. Intro to OpenAI ………………………………………………………17

4.3.1. Accessing OpenAI Models ……………………………………17

4.3.2. Prompt Engineering …………………………………………….17

4.3.3. Fine-tuning …………………………………………….17

4.3.4. Prompt Context & System Message ………………………….18

4.3.5. Ethical Consideration ………………………………………….18

4.4. Application of OpenAI in the Project ……………………………..19

References ………………………………………………………………...22

Appendix …………………………………………………………………24

1. **Introduction**

**……………………………………………………………**

Natural language processing (NLP) refers to the branch of computer science—and more specifically, the branch of artificial intelligence or AI that enables the computer system to understand and comprehend information the same way humans do. It helps the computer system understand the literal meaning and recognize the sentiments, tone, opinions, thoughts, and other components that construct a proper conversation.

NLP is used to [understand the structure and meaning of human language](https://monkeylearn.com/blog/natural-language-understanding/) by analyzing different aspects like syntax, semantics, pragmatics, and morphology. Then, computer science transforms this linguistic knowledge into rule-based, [machine-learning](https://monkeylearn.com/blog/machine-learning-algorithms/) that can solve specific problems and perform desired tasks.

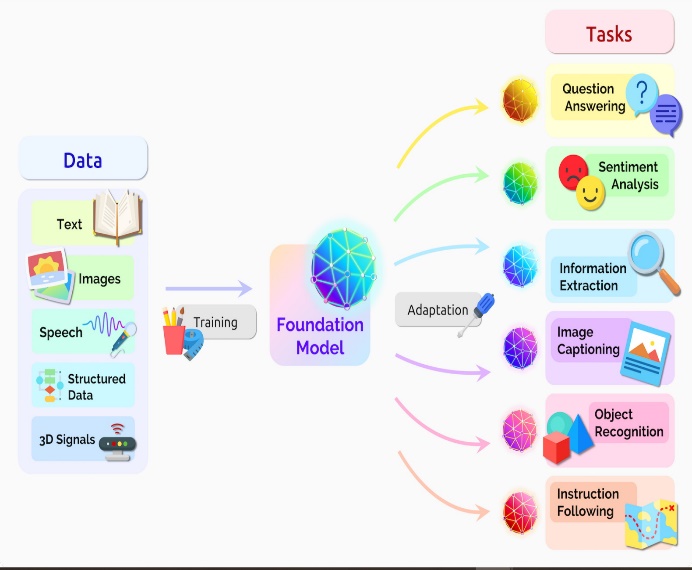
Natural language processing is transforming the way we analyze and interact with language-based data by training machines to make sense of text and speech and perform automated tasks like translation, summarization, classification, and extraction.

1. **Objective:**

**……………………………………………………….**

Make an NLP model to analyze the interviewee’s answer- relevantness to the question asked.

1. **Related Work:**

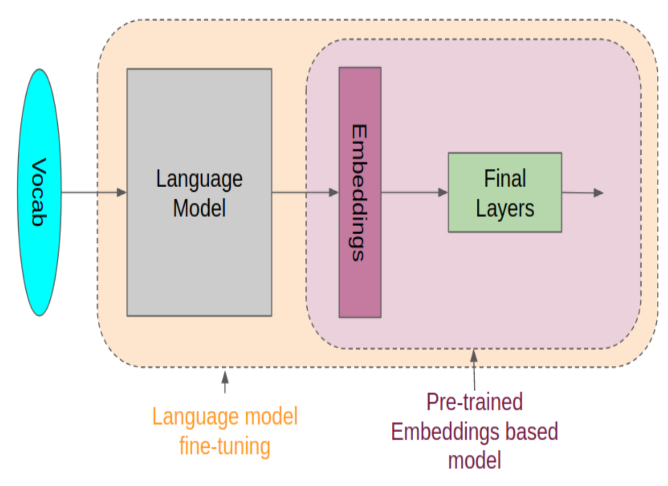
**……………………………………………………………**

1. **Transformer-based Models:** Transformer models, introduced in the paper "Attention Is All You Need" by Vaswani et al. (2017), have revolutionized NLP by capturing long-range dependencies in text and enabling parallel processing. Transformers have achieved remarkable results across various tasks, such as language translation, question answering, and text generation.

Progress in Natural Language Processing (NLP) has been advancing rapidly in recent years, driven by breakthroughs in deep learning architectures, large-scale pre-training, and transfer learning.

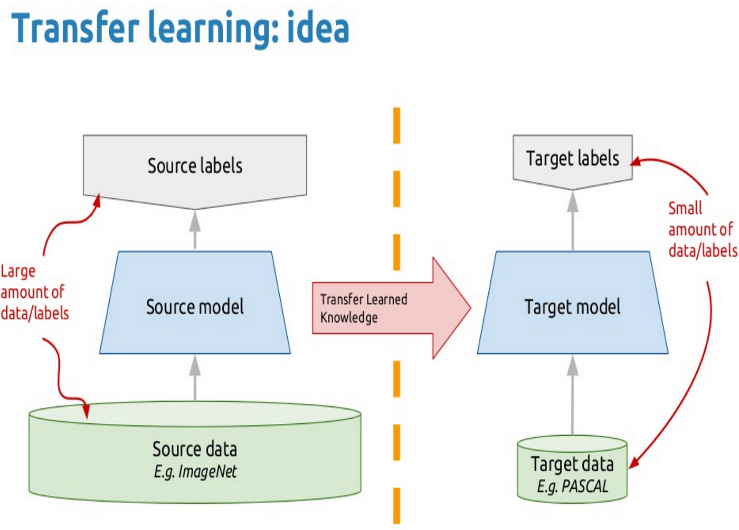
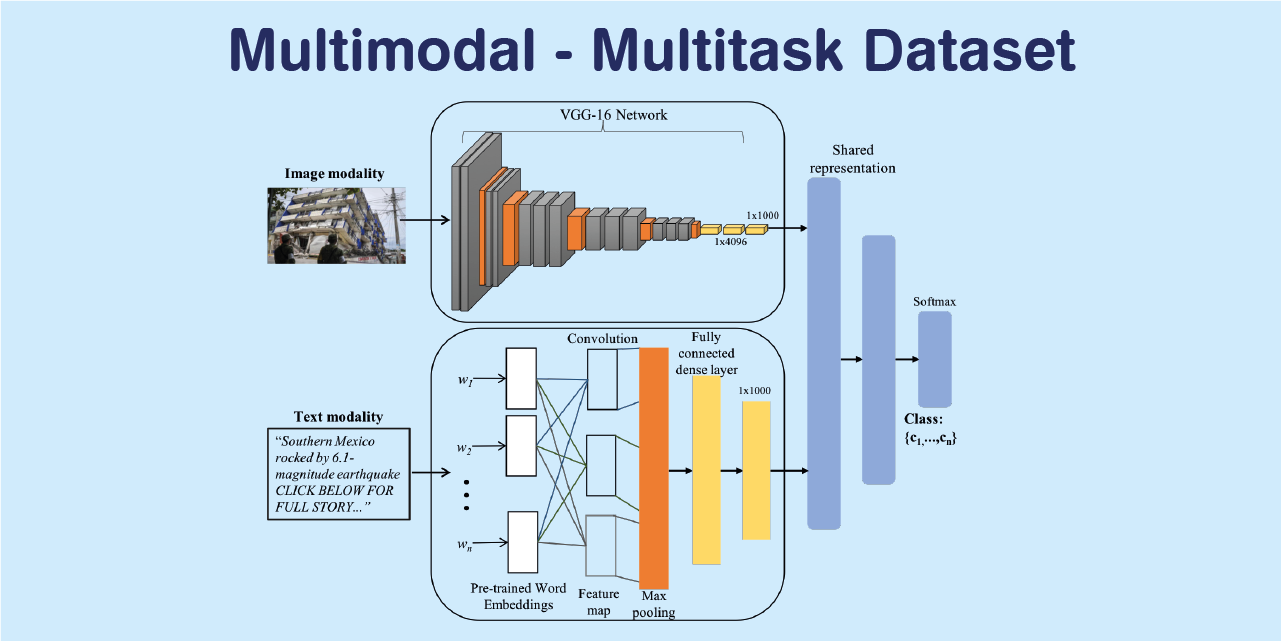
Key areas of progress in NLP, along with relevant references

Merritt, 2022



**2. Pre-trained Language Models:** Pre-trained language models, such as BERT (Bidirectional Encoder Representations from Transformers) and GPT (Generative Pre-trained Transformer), have demonstrated significant improvements in various NLP benchmarks. BERT, introduced in the paper "BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding" by Devlin et al. (2018), has shown remarkable performance in tasks like text classification, named entity recognition, and sentiment analysis. GPT models, including GPT-2 and GPT-3, have showcased exceptional text generation capabilities, as described in the paper "Language Models are Unsupervised Multitask Learners" by Radford et al. (2019).

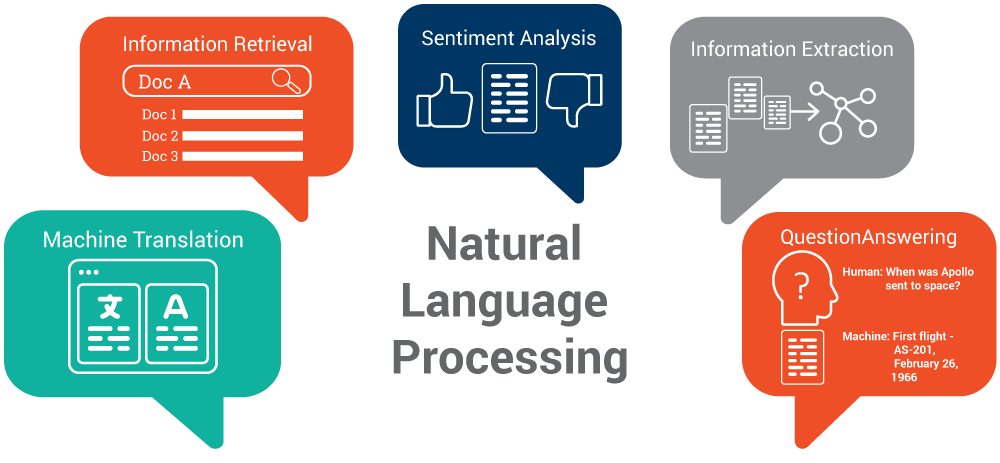
Kumar, 2023

 Koehrsen, 2018

4. **Multimodal Learning:** The fusion of text with other modalities, such as images or speech, has gained significant attention. Multimodal models, such as ViT (Vision Transformer) for image understanding and CLIP (Contrastive Language-Image Pre-training) for cross-modal tasks, have shown promising results in tasks like image captioning, visual question answering, and image generation.

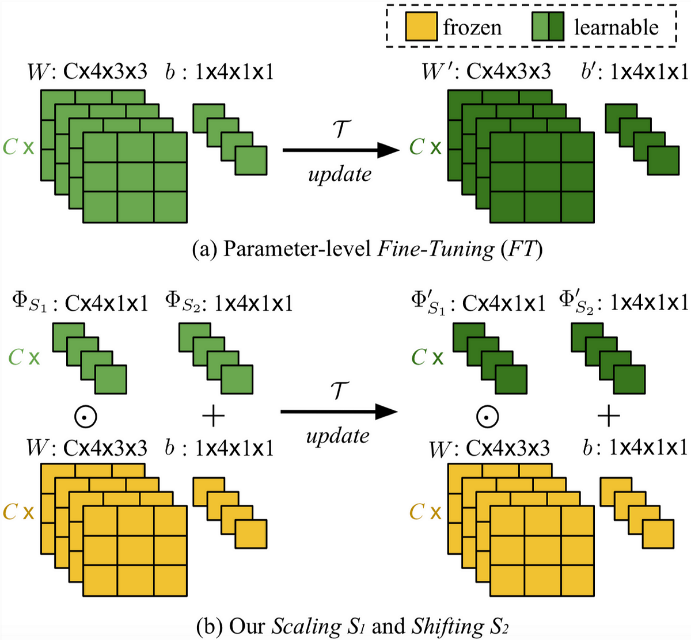
3. **Transfer Learning and Fine-tuning:** Transfer learning has emerged as a powerful technique in NLP. Pre-trained language models, such as BERT, can be fine-tuned on specific downstream tasks with smaller task-specific datasets, resulting in improved performance and reduced training time. This approach has been successfully applied across various domains, including healthcare, finance, and customer service.

n.d.



5. **Ethical and Bias Considerations:** There has been increased focus on addressing biases and ensuring ethical use of NLP models. Research and efforts are being made to mitigate biases in training data, interpret model behavior, and provide transparency. Initiatives like the Ethics Guidelines for Trustworthy AI by the European Commission and research papers like "Language (Technology) is Power: A Critical Survey of 'Bias' in NLP" by Bender and Friedman (2018) shed light on ethical considerations and biases in NLP.

Ethics in Natural Language Processing, n.d

 Liu, 2019

6. **Few-shot and Zero-shot Learning:** Advances in few-shot and zero-shot learning aim to enable models to generalize and perform well on tasks with limited training data or even unseen tasks. Approaches like meta-learning, meta-transfer learning, and meta-reinforcement learning have shown promise in achieving better generalization and adaptability.

These references highlight some influential papers and concepts that reflect the current progress in NLP. However, it's important to note that NLP is a rapidly evolving field, and new research and advancements continue to emerge. Staying updated with recent conference proceedings (e.g., ACL, EMNLP, NeurIPS) and reputable NLP journals can provide further insights into the latest progress in the field.

1. **Work done**

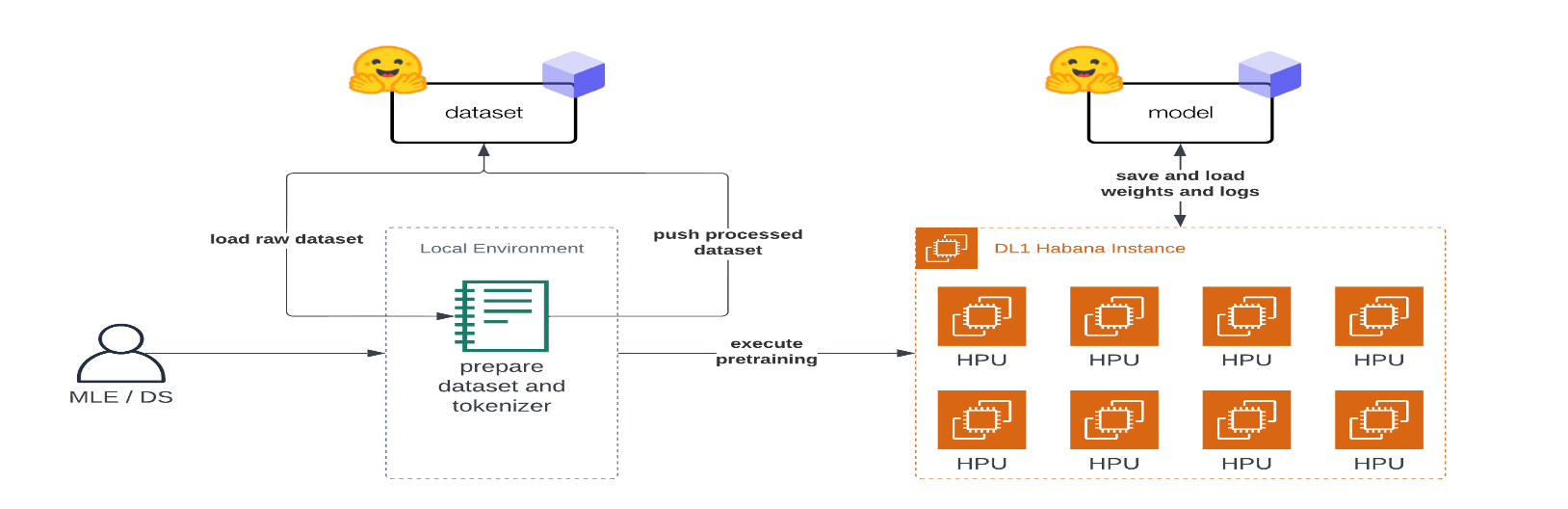
**……………………………………………………………**

I tried to make an NLP model to analyze the interviewee’s answer- relevantness to the question asked. Due to the time limitation, and lack of a proper pre-trained model and relevant data set, I used the **Hugging Face Method** to learn the fundamental of making NLP models and understand the step involved. Later I used **Open AI** and **GPT4all** to make a small but completely functional model with a limited dataset that I made on my own.

**4.1 *Intro to Hugging Face>>>>>>>>>>***

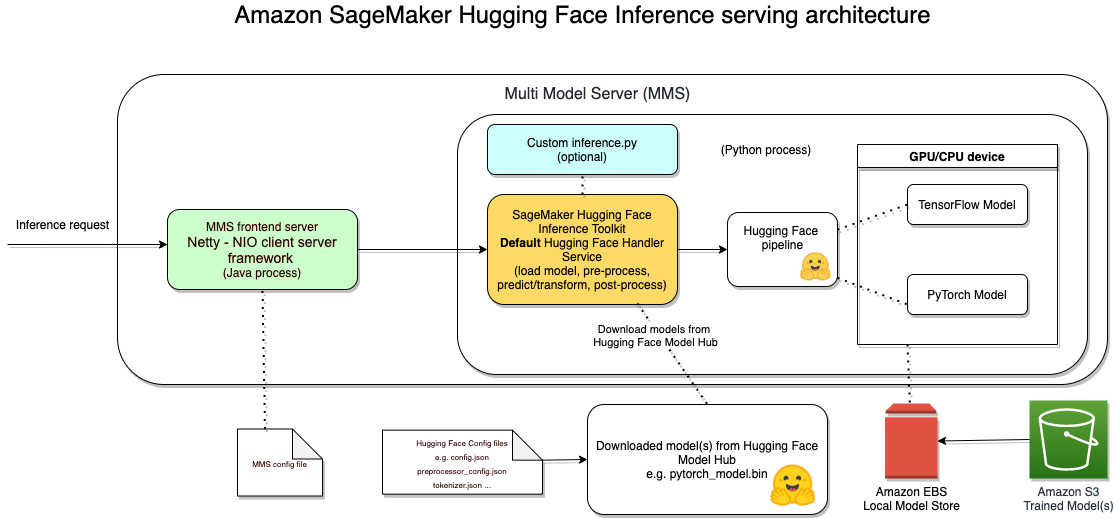
Hugging Face is an open-source library that provides a wide range of functionalities for natural language processing (NLP), including pre-trained models, tokenizers, and utilities for working with various NLP tasks.

Here are some key use cases of Hugging Face with relevant references:

* + 1. **Pre-trained Models**: Hugging Face offers access to a vast collection of pre-trained models for a variety of NLP tasks. These models are trained on large-scale datasets and provide high-quality representations of text. You can find pre-trained models based on transformer architectures like BERT, GPT, RoBERTa, and more. The Hugging Face model hub ([https://huggingface.co/models](https://huggingface.co/models" \t "_new)) serves as a centralized repository for accessing and exploring these models.

Pre-Train BERT with Hugging Face Transformers and Habana Gaudi, n.d.

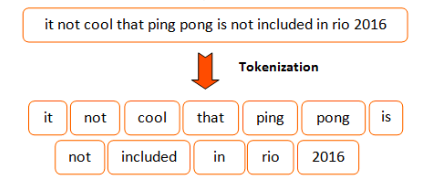
* + 1. **Fine-tuning and Transfer Learning**: Hugging Face facilitates the process of fine-tuning pre-trained models on specific downstream tasks. Fine-tuning involves training the pre-trained model on task-specific data to adapt it to the target task. Hugging Face provides utilities and examples for fine-tuning models, making it easier to apply transfer learning and achieve state-of-the-art results. The paper "BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding" by Devlin et al. (2018) introduces the BERT model and discusses the benefits of fine-tuning.



Fine-tune and Host Hugging Face BERT Models on Amazon SageMaker | Amazon Web

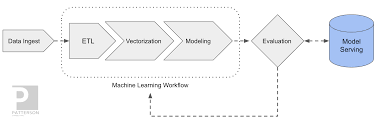
Services, 2021

* + 1. **Tokenization**: Hugging Face offers efficient tokenization tools for text processing. Tokenization involves breaking down the text into individual tokens or subwords. Hugging Face's tokenizers support various tokenization techniques, including word-based, character-based, and sub-word-based tokenization. The library provides tokenization methods compatible with different pre-trained models, allowing seamless integration with the tokenization process. The paper "SentencePiece: A simple and language-independent sub-word tokenizer and detokenizer for Neural Text Processing" by Kudo and Richardson (2018) introduces SentencePiece, which is one of the tokenization methods supported by Hugging Face.



Hugging Face Tutorials - Training Tokenizer, n.d.

* + 1. **Model Interpretability**: Hugging Face provides tools and methods for interpreting and understanding the behavior of NLP models. These tools include visualization techniques for attention weights, saliency maps, and gradient-based attribution methods. By visualizing the attention patterns, you can gain insights into how the model attends to different parts of the input sequence. The paper "Interpretability Beyond Feature Attribution: Quantitative Testing with Concept Activation Vectors (TCAV)" by Kim et al. (2017) discusses interpretability methods that inspired the attention visualization techniques used in Hugging Face.
    2. **Model Deployment and Serving**: Hugging Face offers deployment utilities for serving pre-trained models in production systems. With the Hugging Face Inference API and the Transformers library, you can easily deploy models on different platforms and frameworks, including cloud platforms, edge devices, and serverless architectures. The Hugging Face Inference API allows you to make HTTP requests to access the models and receive predictions. The Hugging Face deployment documentation ([https://huggingface.co/docs/deployment](https://huggingface.co/docs/deployment" \t "_new)) provides details and examples for model deployment.

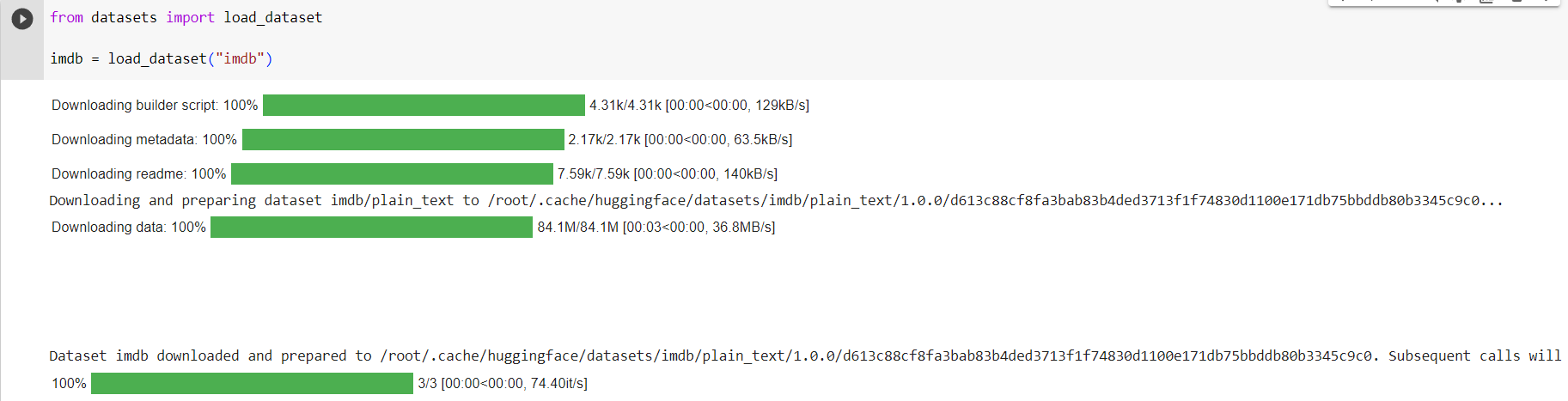


Consulting, n.d.

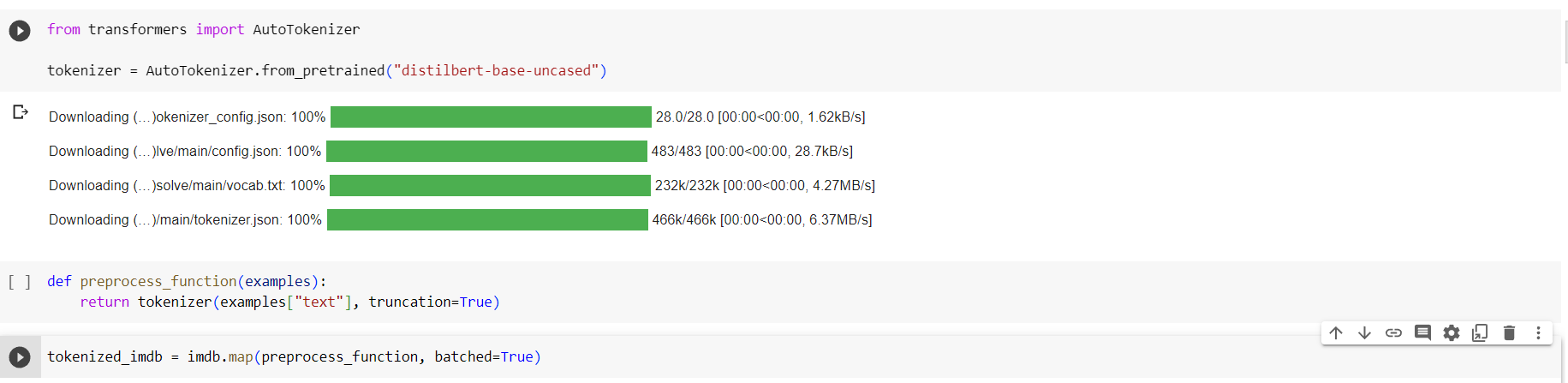
These references should provide you with more information on the capabilities and use cases of Hugging Face. You can refer to the Hugging Face website ([https://huggingface.co/](https://huggingface.co/" \t "_new)) and the associated documentation for detailed usage instructions, tutorials, and additional resources.

* 1. ***Application of Hugging Face in the Project***

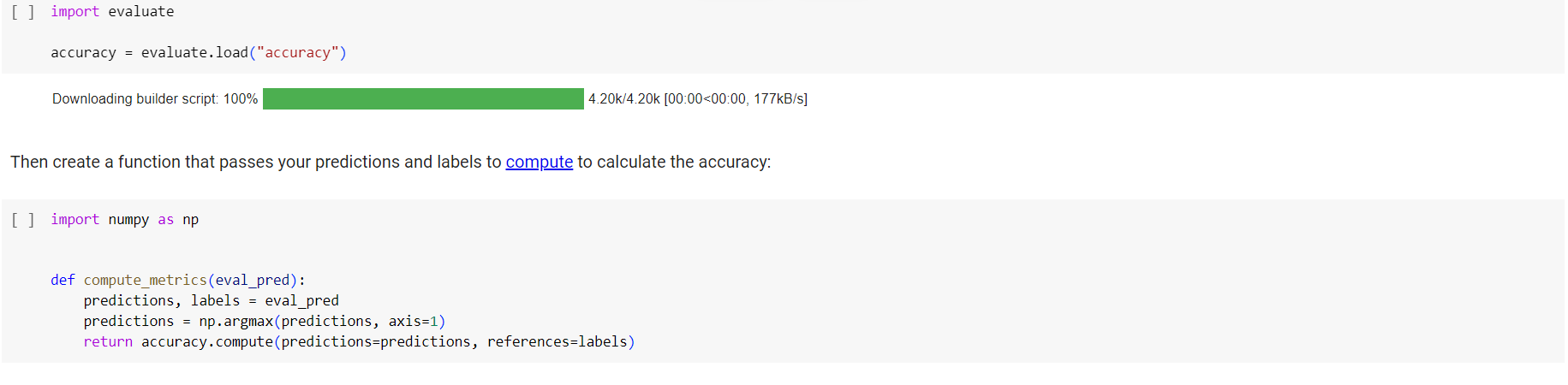
Hugging Face models are trained on vast parameters. I used a pre-trained model **Distilbert**. DistilBERT is a transformers model, smaller and faster than BERT, which was pre-trained on the same corpus in a self-supervised fashion, using the BERT base model as a teacher. This means it was pre-trained on the raw texts only, with no humans labeling them in any way (which is why it can use lots of publicly available data) with an automatic process to generate inputs and labels from those texts using the BERT base model. This was finetuned with the IMDb dataset to predict whether reviews are positive or negative.

**STEP 1:** Loaded the IMDb dataset into the DistilBERT model

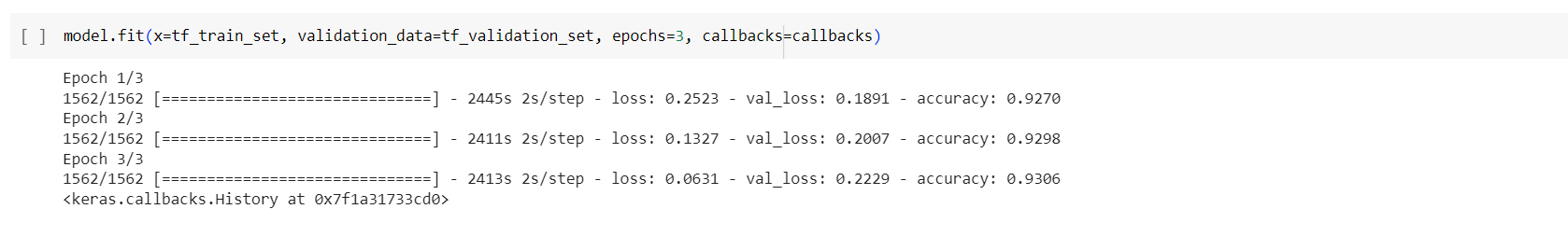
**STEP 2:** Moved on to Pre-processing



**STEP 3:** Included a metric during training that helps evaluate the model's performance

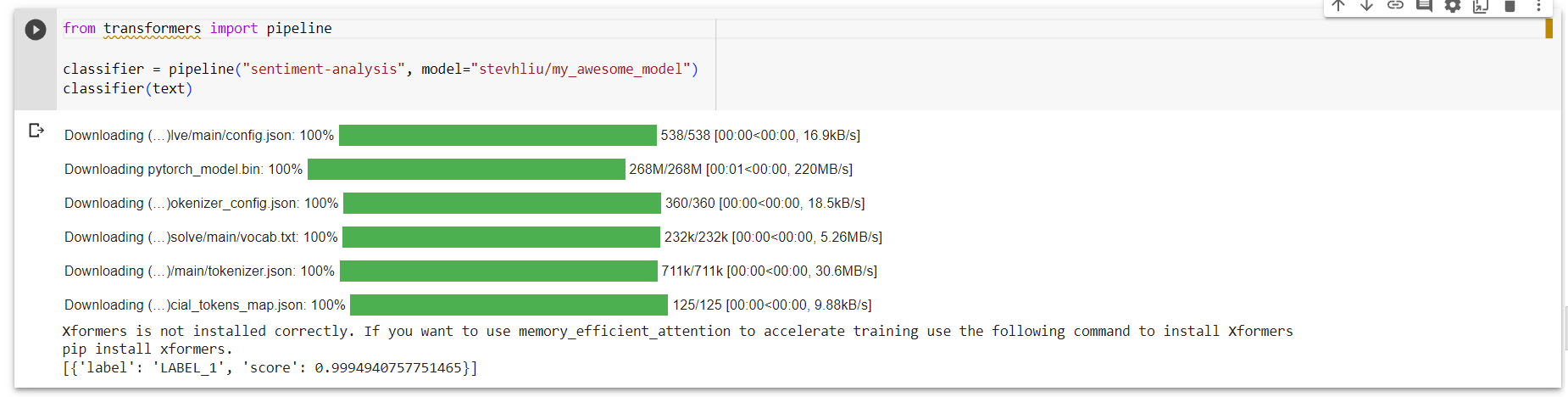


**STEP 4:** Create an idlabel and then load the DistilBERT

**STEP 5:** Trained the model and then made the model ‘fit’. This is by far the most time taking process as the model is trained by comparing its answer to the label data given. It does this whole thing three times over (number of epochs) until it understands what are the correct parameters at high confidence.

**STEP 6:** Used the fine-tuned model for inference. Used some text to run inference on.

The simplest way to try out the fine-tuned model for inference is to use it in a [pipeline()](https://colab.research.google.com/corgiredirector?site=https%3A%2F%2Fhuggingface.co%2Fdocs%2Ftransformers%2Fmain%2Fen%2Fmain_classes%2Fpipelines%23transformers.pipeline&link_redirector=1).

**** **STEP 7:**  Initiated a pipeline for Sentiment Analysis with my model, and pass my text to it.

Now we can see that it has given us the answer with the score which indicates it was a highly positive review.

**4.3. *Intro to OpenAI >>>>>>>>>>>>>>***

OpenAI provides powerful tools and models for Natural Language Processing (NLP) tasks. One of the most notable models is GPT (Generative Pre-trained Transformer), such as GPT-3. OpenAI models can be used to build NLP models in various ways. Here's an explanation of using OpenAI to create an NLP model with relevant references:

**4.3.1.**  **Accessing OpenAI Models:** OpenAI provides access to pre-trained models like GPT-3, which have been trained on large amounts of text data and can generate human-like text. OpenAI models can be accessed via their API (Application Programming Interface) to make requests and receive text generation outputs. The OpenAI API documentation (https://docs.openai.com/api/) provides details on how to interact with the models.

**4.3.2. Prompt Engineering:** Prompt engineering involves designing and refining prompts or instructions to guide the model's text generation. By carefully crafting the input text or question, specific responses can be elicited or control the behavior of the model. Prompt engineering is an essential technique to achieve desired outputs from OpenAI models. Experiments can be made with different prompt variations, question phrasing, and context setting to optimize the model's responses. The OpenAI Cookbook's guide on prompt engineering (https://github.com/openai/openai-cookbook/blob/main/examples/How\_to\_do\_prompt\_engineering\_with\_OpenAI\_GPT.ipynb) provides practical examples and strategies for prompt engineering.

**4.3.3.** **Fine-tuning:** OpenAI models can be further fine-tuned on custom datasets or specific tasks to improve their performance and adapt them to specific requirements. Fine-tuning involves training the pre-trained model on task-specific data, allowing it to learn patterns and nuances relevant to the target task. The OpenAI fine-tuning guide (https://platform.openai.com/docs/guides/fine-tuning) provides detailed information on how to perform fine-tuning with OpenAI models.

**4.3.4.** **Prompt Context and System Message:** In addition to the prompt itself, the context and system message provided before the prompt can influence the model's response. The context sets the conversation history or preceding text, while the system message can guide the model's behavior or role in the conversation. By carefully setting the context and system message, the model's responses can be shaped. The OpenAI Cookbook's guide on conversation models (https://github.com/openai/openai-cookbook/blob/main/examples/How\_to\_generate\_conversations\_with\_OpenAI\_GPT.ipynb) demonstrates how to use conversation models and control the context and system message.

**4.3.5.** **Ethical Considerations:** It's crucial to consider ethical considerations when using OpenAI models or any AI models. OpenAI models are powerful text generators, and as such, it's essential to ensure responsible and ethical use. OpenAI provides guidelines and best practices (https://platform.openai.com/docs/guides/usage-policies) for using their models ethically and safely.

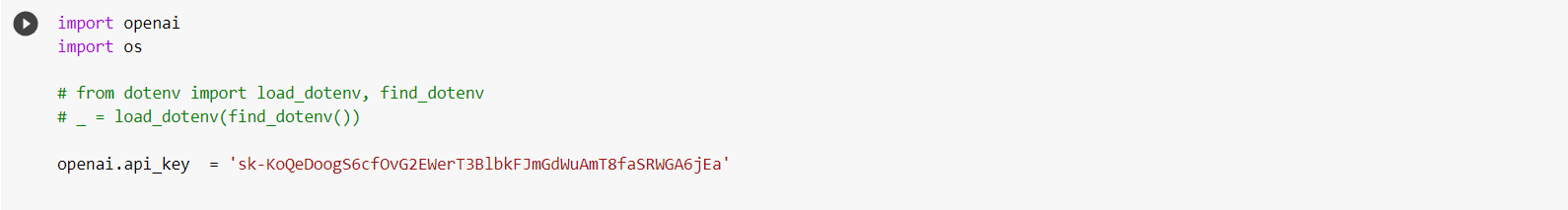
The references provided gives an overview and practical guidance on how to utilize OpenAI models for NLP tasks. Official OpenAI documentation and resources can be referred to for the most up-to-date information on accessing, using, and fine-tuning OpenAI models.

* 1. ***Application of OpenAI in the Project***

**STEP 1:** Installed both OpenAI and GPT4all. Using the OpenAI key used the OpenAI functions.



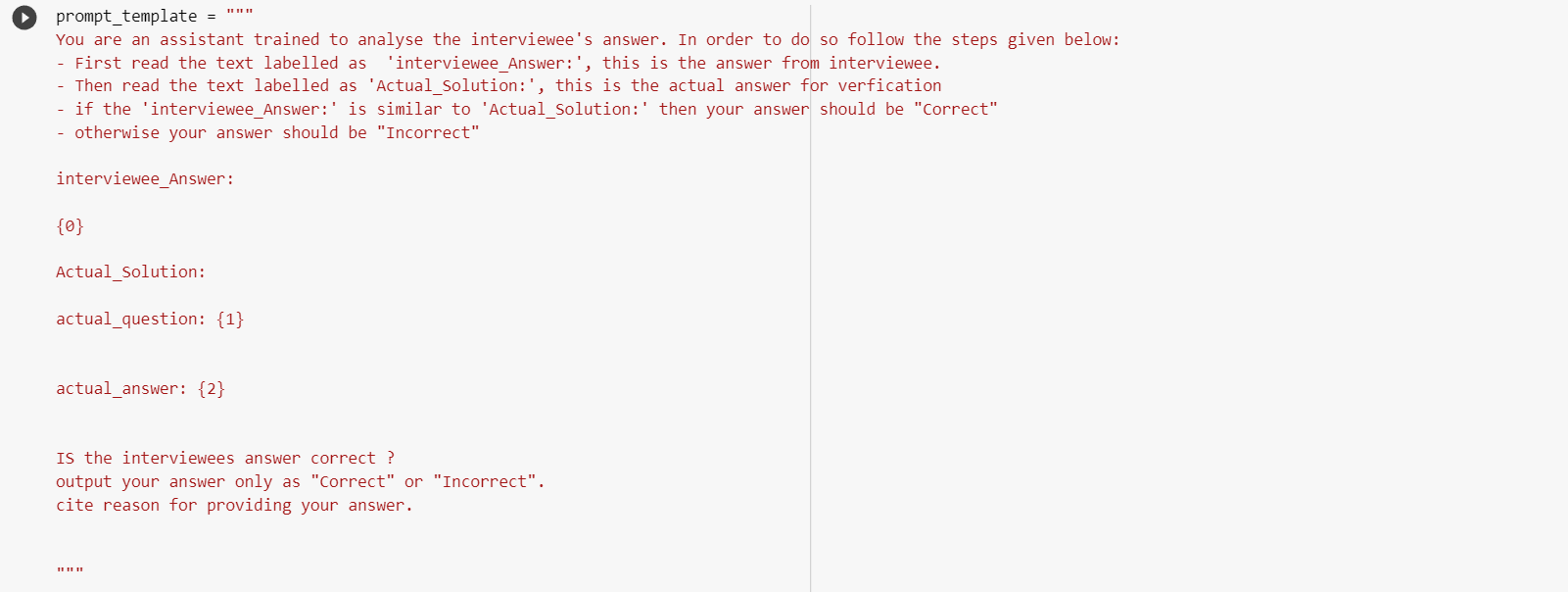




**STEP 2:** Made a function and downloaded the OpenAI model that would help in making the NLP model.

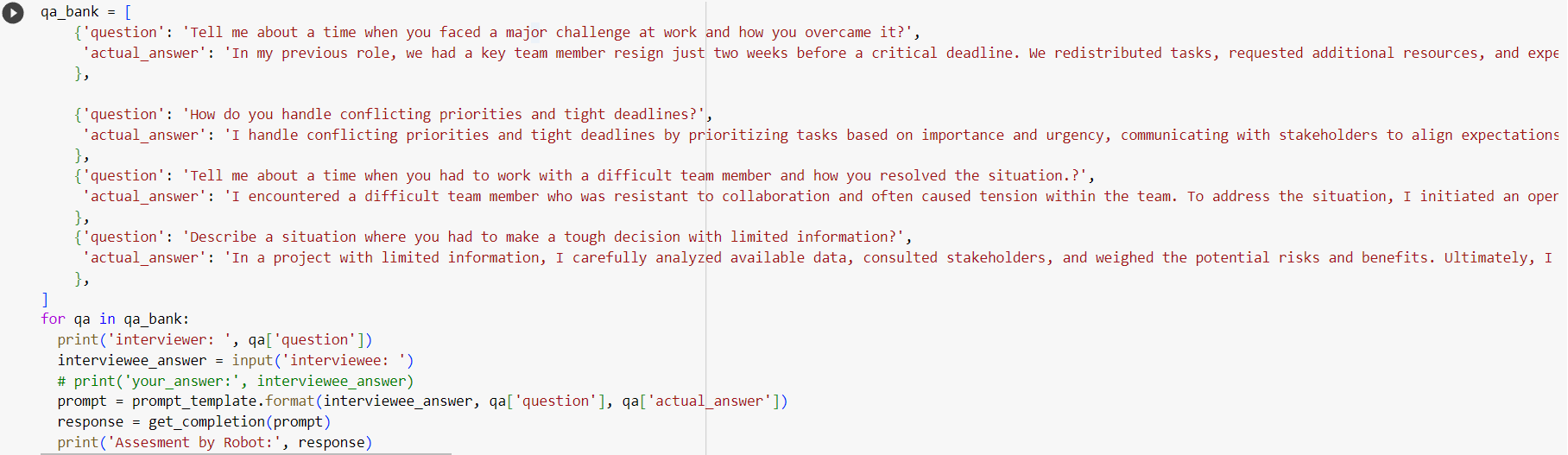


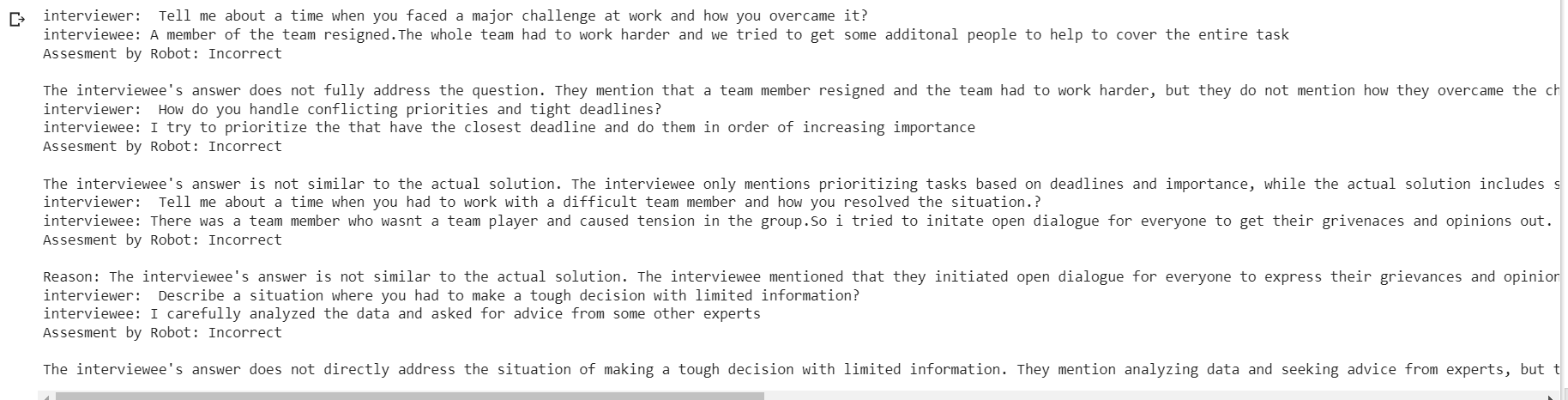
**STEP 3:** Explained to the model using prompt engineering what it is, how to expect the input and what is the output expected of it.



Due to the lack of a good labeled data set online that could have been used for the model, I made a small data set of my own. If we had a larger labeled data set it would increase the accuracy of the model, but even this small data set is quite functional.

**STEP 4:** Wrote a ‘For Loop’ for the model to ask for inputs (interviewee’s answer) which it will compare with its given labeled data and give us its evaluation.



The model's answers are explained by it. It explains its reasoning so if the data we provide is larger it can come up with even more nuanced answers.

The detailed output of the interviewer, interviewee, and the robot analysis is given in the appendix.

**References**

1. Natural Language Processing (NLP): What Is It & How Does it Work? (n.d.). MonkeyLearn.
2. Vaswani, A. (2017). *Attention is All you Need*.
3. [BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding](https://aclanthology.org/N19-1423) (Devlin et al., NAACL 2019)
4. Blodgett, Su & Barocas, Solon & III, Hal & Wallach, Hanna. (2020). Language (Technology) is Power: A Critical Survey of “Bias” in NLP. 5454-5476. 10.18653/v1/2020.acl-main.485.
5. ACL, EMNLP, NeurIPS
6. Models - Hugging Face. (2023, July 12). Models - Hugging Face. https://huggingface.co/models
7. Kudo, Taku & Richardson, John. (2018). SentencePiece: A simple and language-independent subword tokenizer and detokenizer for Neural Text Processing. 66-71. 10.18653/v1/D18-2012.
8. Kim, B., Wattenberg, M., Gilmer, J., Cai, C., Wexler, J., Viegas, F. &amp; sayres, R.. (2018). Interpretability Beyond Feature Attribution: Quantitative Testing with Concept Activation Vectors (TCAV). <i>Proceedings of the 35th International Conference on Machine Learning</i>, in <i>Proceedings of Machine Learning Research</i> 80:2668-2677 Available from https://proceedings.mlr.press/v80/kim18d.html.
9. <https://huggingface.co/docs/deployment>
10. Hugging Face – The AI community building the future. (n.d.). Hugging Face – the AI Community Building the Future. https://huggingface.co/
11. <https://docs.openai.com/api/>
12. O. (n.d.). openai-cookbook/examples at main · openai/openai-cookbook. GitHub. https://github.com/openai/openai-cookbook/tree/main/examples
13. OpenAI Platform. (n.d.). OpenAI Platform. https://platform.openai.com

O. (n.d.). openai-cookbook/examples at main · openai/openai-cookbook.

GitHub. <https://github>.com/openai/openai-cookbook/tree/main/examples

1. OpenAI Platform. (n.d.). OpenAI Platform. <https://platform>.openai.com

In-Text Citation: (OpenAI Platform, n.d.)

1. distilbert-base-uncased · Hugging Face. (2001, June 1). <https://huggingface>.co/distilbert-base-uncased

For Images

1. Merritt, R. (2022, March 25). What Is a Transformer Model? NVIDIA Blog. https://blogs.nvidia.com/blog/2022/03/25/what-is-a-transformer-model/
2. Kumar, A. (2023, May 30). NLP Pre-trained Models: Concepts, Examples - Data Analytics. Data Analytics. https://vitalflux.com/nlp-pre-trained-models-explained-with-examples.
3. Koehrsen, W. (2018, November 26). Transfer Learning with Convolutional Neural Networks in PyTorch. Medium. https://towardsdatascience.com/transfer-learning-with-convolutional-neural-networks-in-pytorch-dd09190245ce
4. GitHub - firojalam/multimodal\_social\_media: multimodal social media content (text, image) classification. GitHub. https://github.com/firojalam/multimodal\_social\_media
5. Ethics in Natural Language Processing. (n.d.). Ethics in Natural Language Processing. https://www.linkedin.com/pulse/ethics-natural-language-processing-futureanalytica-com
6. Liu, Y. (2019, August 21). Meta-Transfer Learning for Few-shot Learning. Medium. https://towardsdatascience.com/meta-transfer-learning-for-few-shot-learning-7c3c85e81687
7. Pre-Train BERT with Hugging Face Transformers and Habana Gaudi. (n.d.). Pre-Train BERT with Hugging Face Transformers and Habana Gaudi. https://huggingface.co/blog/pretraining-bert
8. Fine-tune and host Hugging Face BERT models on Amazon SageMaker | Amazon Web Services. (2021, August 31). Amazon Web Services. https://aws.amazon.com/blogs/machine-learning/fine-tune-and-host-hugging-face-bert-models-on-amazon-sagemaker/
9. Hugging Face Tutorials - Training Tokenizer. (n.d.). Hugging Face Tutorials - Training Tokenizer | Kaggle. https://www.kaggle.com/code/funtowiczmo/hugging-face-tutorials-training-tokenizer
10. Consulting, P. (n.d.). Deploying a HuggingFace NLP Model with KFServing. Patterson Consulting: Deploying a HuggingFace NLP Model With KFServing. http://www.pattersonconsultingtn.com/blog/deploying\_huggingface\_with\_kfserving.html

**Appendix**

Full output between Interviewer,interviewee,Robot

**Interviewer**: Tell me about a time when you faced a major challenge at work and how you overcame it.

**Interviewee**: A member of the team resigned. The whole team had to work harder and we tried to get some additional people to help to cover the entire task

**Assessment by Robot**: Incorrect

***Reason:*** *The interviewee's answer does not fully address the question. They mention that a team member resigned and the team had to work harder, but they do not mention how they overcame the challenge or if they were successful in meeting their goals.*

**Interviewer:** How do you handle conflicting priorities and tight deadlines?

**Interviewee:** I try to prioritize the ones that have the closest deadline and do them in order of increasing importance

**Assessment by Robot**: Incorrect

***Reason:*** *The interviewee's answer is not similar to the actual solution. The interviewee only mentions prioritizing tasks based on deadlines and importance, while the actual solution includes several other strategies such as communication, task breakdown, productivity tools, delegation, adaptability, and stakeholder updates.*

**Interviewer:** Tell me about a time when you had to work with a difficult team member and how you resolved the situation.?

**Interviewee:** There was a team member who wasn't a team player and this caused tension in the group. So, I tried to initiate open dialogue for everyone to get their grievances and opinions out.

**Assessment by Robot**: Incorrect

***Reason:*** *The interviewee's answer is not similar to the actual solution. The interviewee mentioned that they initiated open dialogue for everyone to express their grievances and opinions, but they did not mention actively listening, empathizing, establishing clear expectations, or ongoing communication and support, which are key elements in resolving a difficult team member situation.*

**Interviewer:** Describe a situation where you had to make a tough decision with limited information.

**Interviewee:** I carefully analyzed the data and asked for advice from some other experts

**Assessment by Robot:** Incorrect

***Reason:*** *The interviewee's answer does not directly address the situation of making a tough decision with limited information. They mention analyzing data and seeking advice from experts, but they do not mention consulting stakeholders, weighing risks and benefits, implementing a contingency plan, or maintaining open communication.*

Google collab link to code

<https://colab.research.google.com/drive/1REdjOeYGGf7qGM2E7zDCVUrI1NjcJock?usp=sharing>

<https://colab.research.google.com/drive/1S6ZfVhb9SbhucLhx8H8ozm_nR1Y2RYZk?usp=sharing>