Reference links:  
<https://www.youtube.com/watch?v=qNcoLpxW8QE&list=PLOVj5rNdLbTfk5iwtIU6sH3GBt12p1mrs&index=1&ab_channel=GyanDEEP>   
NER and RE playlist

<https://www.youtube.com/watch?v=SMZQrJ_L1vo&list=PLZoTAELRMXVNNrHSKv36Lr3_156yCo6Nn&index=13&ab_channel=KrishNaik>   
Transformers indepth intuition by Krish Naik

<http://nlpprogress.com/english/relationship_extraction.html#:~:text=Relationship%20extraction%20is%20the%20task,employed%20by%2C%20lives%20in>).   
NLP Updates

<https://huggingface.co/datasets/conll2003>  
dataset for NER

<https://www.expert.ai/blog/entity-extraction-work/#:~:text=Entity%20Extraction%20at%20Work&text=This%20is%20the%20process%20of,to%20identify%20the%20primary%20entities>.   
Entity extraction concept

<https://domino.ai/blog/named-entity-recognition-ner-challenges-and-model> NER task using BiLSTM CRF model

Models:

* BERT: best model for language understanding, trained on two artificial tasks Mask modlelling and Next sentence prediction.(input:word embeddings , tokenizer used here is wordpiece)
* RoBERTa: (Robustly optimized BERT pretraining approach) : changed mask modelling task of BERT from static to dynamic masks.(tokenizer used is byteEncoder)
* GPT3: decoders
* T5
* XLNET
* CRF
* BiLSTM-CRF
* Graphical neural networks
* Spacy ( dependency parsing models): used for NER and it’s application smainly for information extraction from documents.

Entity extraction can be done using Models (BERT, RoBERTa etc.). For relationship identification , we can use spacy library for dependency parsing.

How does dependency parsing help in relationship identification?  
Dependency parsing can be a useful technique for relationship identification because it provides information about the syntactic dependencies between words in a sentence. By analyzing the dependency parse tree, you can extract information about how words are related to each other in terms of their roles and functions in the sentence. By using dependency parsing, you can capture the grammatical structure of the sentence and identify patterns that indicate relationships between entities

How attention Masking works: <https://medium.com/analytics-vidhya/masking-in-transformers-self-attention-mechanism-bad3c9ec235c>

<https://github.com/balamurugan1603/Named-Entity-Recognition-using-Tranformers/blob/main/named-entity-recognition-using-transfer-learning.ipynb> (bert fine tuned model for entity extraction task)

<https://github.com/sujitpal/ner-re-with-transformers-odsc2022/tree/main> (NER -RE technique amazing github repo by Sujit Das)

All fine tuned NER models for different task available here on hugging face: <https://huggingface.co/models?pipeline_tag=token-classification&sort=trending&search=ner>

Relation extraction task methods (Article): <https://medium.com/@andreasherman/different-ways-of-doing-relation-extraction-from-text-7362b4c3169e>

RE tutorials 1: <https://www.youtube.com/watch?v=DnP5uN2EuWA&ab_channel=RafaelMerinoGarc%C3%ADa>   
<https://www.youtube.com/watch?v=3HNhhqj0di0&ab_channel=RafaelMerinoGarc%C3%ADa>

RE research paper:  
<https://arxiv.org/abs/1906.03158> Matching the blank  
code repositories: <https://www.catalyzex.com/paper/arxiv:1906.03158/code>

Spacy English models for entity and relation extraction transformer based : <https://huggingface.co/spacy/en_core_web_trf>   
Used coz contains more labels than other models and can be fine tuned on any other dataset for specific tasks.   
RoBERTa model is used here and working fine for multi sentence text corpus. Labels available: CARDINAL, DATE, EVENT, FAC, GPE, LANGUAGE, LAW, LOC, MONEY, NORP, ORDINAL, ORG, PERCENT, PERSON, PRODUCT, QUANTITY, TIME, WORK\_OF\_ART.   
Entity extraction can be more precise with specific task using model stacking and taking advantage of fine tuned models which are required for our tasks.

Dependency parsing papers with code link : <https://paperswithcode.com/task/dependency-parsing>