# Notes taking - Build is ctrl alt b

August 22, 2023

# Chapter 1

# Knowledge Graph

## 1.1 Definition

[https://www.ibm.com/topics/knowledge-graph: :text=A

A knowledge graph, also known as a semantic network, represents a network of real-world entities—i.e. objects, events, situations, or concepts—and illustrates their relationship. This information is usually stored in a graph database and visualized as a graph structure, prompting the term knowledge "graph."

### 1.1.1 Ontologies

- serves to create a formal representation of the entities in the graph - based on a taxonomy (since there are multiple, ontologies has its own definition) - Ontology example: Madison Square Garden - distinguish between events at the location using variables such as time

### 1.1.2 how it works

- schemas -¿ Provide the framework for the knowledge graph - identities -¿ classify the underlying nodes appropriately - context -¿ determines the setting in which that knowledge exists - help distinguish words with multiple meanings

- fueled by machine learning, NLP to construct a comperhensive view of nodes, edges and labels through a process called semantic enrichment

## 1.2 Combining Graph Neural Networks and Sentence Encoders for Knowledge-aware Recommendations

- first exploited **graph neural networks** to encode both **collaborative features**, such as the interactions between users and items, and structured prop-

erties of the items - Next, we used a **sentence encoder** that relies on transformers to learn a representation based on textual content describing the items. - Finally, these **embeddings are combined** by **exploiting a deep neural network** where both *self-attention* and *cross-attention* mechanisms are used to learn the relationships between the initial embeddings and to further refine the representation

# Chapter 2

# Natural Language Processing

- Rule based modelling of human language

## 2.1 Tasks

- Speech Recognising - Part of speech tagging (whether its a noun or a verb etc. as some words can be both - word sense disambiguation (semantic analysis of word) - Named entity recognition -¿ eg. Fred is a name, Germany is a location, etc - Co-reference resolution -¿ 2 words refer to the same entity. eg. Lea = she but could also be a metaphor or idiom - Sentiments analysis: attempt to extract subjective quality (sarcasm, confusion) - Natural language generation

## 2.2 BERT

- train deep bidirectional representation of unlabeled text by joint conditioning on both left and right context in all layers