A ONTOLOGY OF KNOWLEDGE REPRESENTATION:
AN APPROACH TO KNOWLEDGE GRAPH
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ABSTRACT
Knowledge is the collection of raw facts and rules. Knowledge is the information about objects, attributes and relations between objects, situations, events, states and time, causes and effects. Knowledge representation provides the way to represent all the above defined things. The main characteristic of knowledge is that it is hard to characterize. So it is very difficult to us to represent it properly. We have to represent the knowledge in such way that we can infer new knowledge also. Recently new concept of knowledge graph is introduced by structuring knowledge into a graph. There are various techniques available to represent the knowledge. But none of them is perfect. In this paper I have analyzed different knowledge representation technique and the major challenges of knowledge graph.

KEYWORDS: Knowledge Representation, Knowledge Base, Knowledge Graph.

1. INTRODUCTION
Knowledge base system represents knowledge rather than data. Knowledge can be classified in declarative and procedural. Declarative knowledge means simple raw facts. It does not contain any information related to how to apply the knowledge where as procedural knowledge means it specifies how to do some task. In other way we can say knowledge is of two types. One is common sense knowledge and other is domain specific knowledge. We have to design a system such a way that we can store any type of knowledge.

2. ISSUES OF KNOWLEDGE REPRESENTATION SYSTEM
Different types of knowledge have different types of requirement to represent it. So before going to design a system to represent knowledge we have to consider the syntactic, semantic and inferential aspect. Syntax means the structure required to represent the knowledge where as semantic means the meaning of that structure. Inference rule is independent and totally different from the actual knowledge that will be stored in the knowledge base. So in implementation level we have to consider how the knowledge can be stored in computer and how indexing can be done. Similarly we have to think what type of inference rules can be used and which type of primitives required and actually needed.

3. KNOWLEDGE REPRESENTATION SCHEMA
All the knowledge representation can be categorized into four different schemas.

- Simple Relational Knowledge: the simplest way to store the knowledge is to use tables to store each fact in each column about a set of objects. This representation gives little opportunity for inference.

- Inheritable Knowledge: An object is described by a set of attributes and associated values. Objects must be organized into classes and classes must be arranged in a generalization hierarchy. One of the most useful forms of inference is propery inheritance, in which elements of a specific classes inherit attributes and values from more general classes in which they are included.

- Inferential Knowledge: Represent knowledge as formal logic. It has a set of strict rules. It can be used to derive more facts. Truths of new statements can be verified. It also guarantees correctness.

- Procedural Knowledge: Knowledge encoded in some procedures. Operational or Procedural knowledge specifies what to do when.

3. KNOWLEDGE GRAPH
The term Knowledge Graph becomes very important recently because information giants like Google, Facebook, Yahoo, Microsoft has started their move from traditional search and data management to Knowledge Graphs. In Enterprise, the typical goal of a Knowledge Graph is to collect information about every entity of interest in a domain (and their relationships) and make it easy to reuse for any other application. The Knowledge Graph is a knowledge base. It is a graph that understands real-world entities and their relationships to one another. All of these are linked in a graph. It’s not just a catalog of objects; it also models all these inter-relationships. The Knowledge Graph also helps us understand the relationships between things.

4. CHALLENGES OF KNOWLEDGE GRAPH
The main challenge in knowledge graph is to filter the actual knowledge. Information is coming form different sources in a consistent manner. Sources are uncertain and changing. Now problem occurs when we get multiple values which cause inconsistency in the knowledge graph. It results duplicate data. Not only that sometime it also requires updating based on evidence. Information extraction from different sources gives noisy and incomplete information. So it is very hard to convert it into useful knowledge.

5. CONCLUSION
So we can see there are various knowledge representation techniques. Each of them has their merits and demerits. We can combine two or more knowledge representation techniques to increase efficiency and KR will be more perfect. Language can be ambiguous but knowledge graph will help us to find the right thing. Knowledge graph can be used to add extra facility to explore knowledge quickly instead of replacing the existing knowledge management system.

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