

Knowledge Graphs Visualization -Concepts

Ravi Sharma
OntologySummit2020
October 16, 2019

Typical Considerations Knowledge Graphs and Sea

October 2 2019: Ravi -promised to make first attempt using the of John, Janet, Ken and others. For Example, CL, FOL, Conceptual Graphs, Subset as Knowledge Graphs, and finally how KGs are related to ontology. Janet Scoping, AI, viewpoints, scoping diagram

- Semantics
- Triples
- Entities
- Link embedding /prediction
- Ontology and DOL, OMS

Semantic Web

- <http://iswc2018.semanticweb.org/wp-content/uploads/2018/10/Panel-all.pdf>
- Microsoft
- Facebook
- Google

Facebook: Anant Narayanan

Facebook is known for the world's largest social graph spanning of entities and *trillions* of assertions.

We've built technology over the last decade to enable rich connections between users and we're eager to apply it to build a deeper understanding of not just people, but also the things that people care about.

- Deliberately focused and small to start with, US only.
- ~500M assertions
- ~50M entities
- ~100s of types

MICROSOFT Gao: Active research and projects in knowledge

- Unsupervised knowledge extraction from unstructured data in domain
- Knowledge graph semantic embedding
- Autonomous knowledge inference & verification
- Real-time knowledge graph with archiving
- Large scale entity linking and disambiguation
- Ultra-scale knowledge representations
- Knowledge system for multi-lingual
- Knowledge Precision vs Comprehensiveness
- ...

Google: J Taylor

Knowledge Graph 1 Billion Things 70 Billion Facts

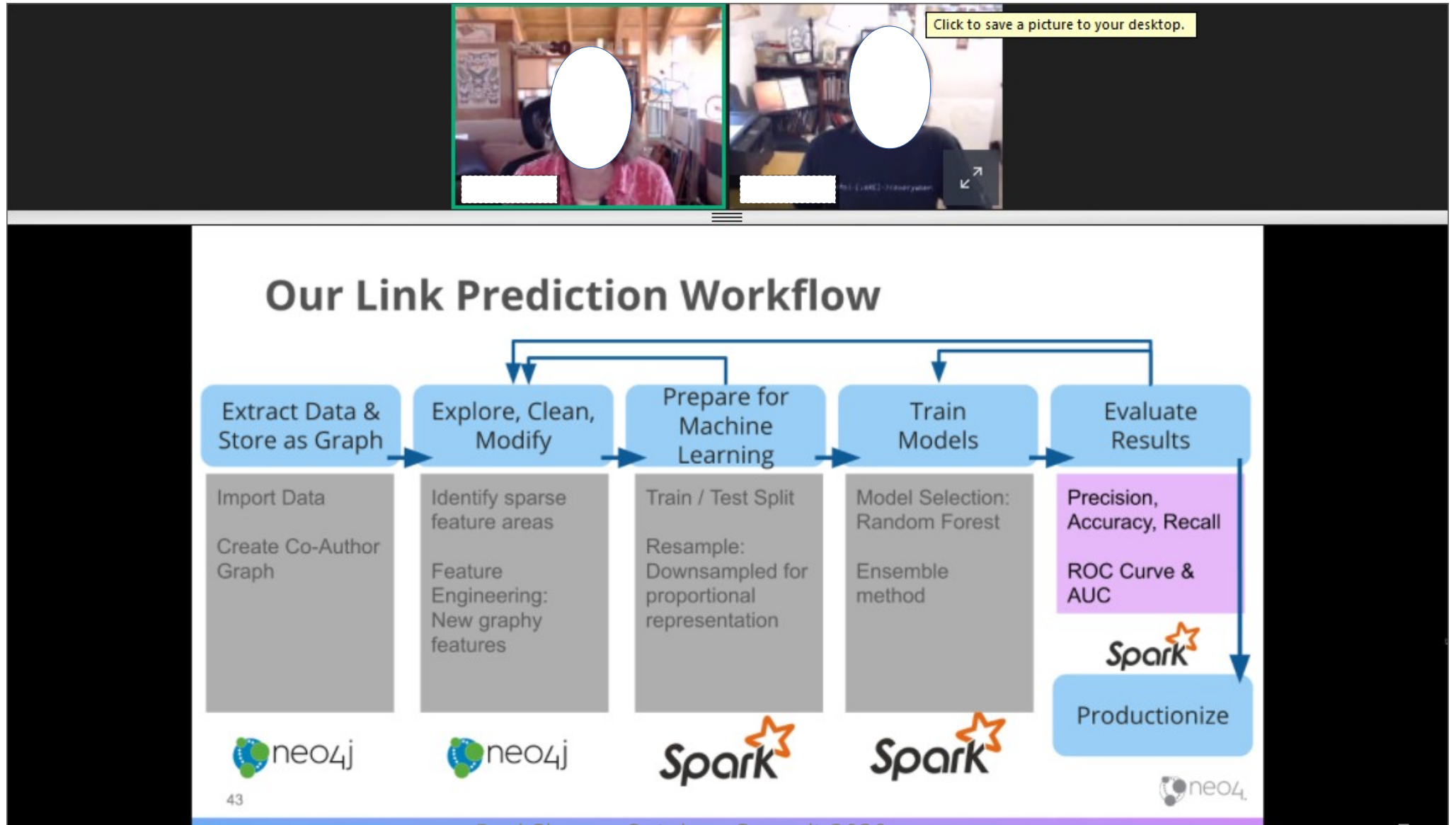
In a nutshell

- We haven't focused on ONE Global knowledge graph
- We have a framework for anyone to build their domain specific KGs
- Offered as a part of Watson Discovery Advisor and not Watson

Discovery Service, also consumed internally by services solutions

- Clients In various sectors: –Banking and Finance–IT Services, Customer Service–Cyber Security
- Scientific Discovery: Life Science, Oil & Gas, Chemicals & Petro
- Defense –Space Exploration –Media and Entertainment

Ref NEO4J



Examples / References

- Entityembedding

<https://towardsdatascience.com/neural-network-embeddings-explained-4d028e6f0526>

- **Resources**

- [Google-Produced tutorial on embeddings](#)
- [TensorFlow Guide to Embeddings](#)
- [Book Recommendation System Using Embeddings](#)
- [Tutorial on Word Embeddings in Keras](#)

Ref: John Sowa on Graphs (with permissi

- <http://www.jfsowa.com/ikl/>
- Sowa, John F. (1984) Conceptual Structures: Information Processing in Mind and Machine, Addison-Wesley, Reading, MA.
- Sowa, John F., ed. (1992) Knowledge-Based Systems, Special Issue on Conceptual Graphs, vol. 5, no. 3, September 1992.
- Sowa, John F. (1999) Knowledge Representation: Logical, Philosophical, and Computational Foundations, Brooks/Cole Publishing Co., Pacific Grove, CA.

IKL, DOL, Ontology and KGs

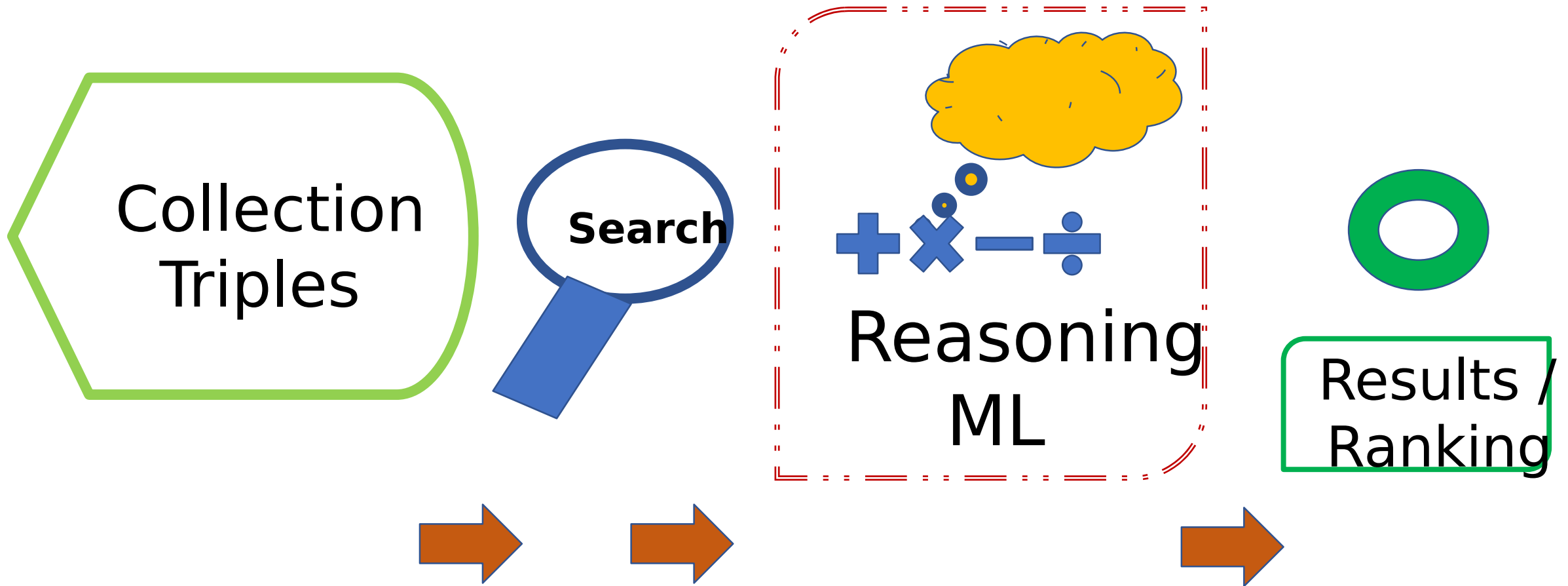
IKL

- The syntax of IKL is similar to that of the CLIF dialect of CL, but
- differs in some respects (it allows numerals and character strings to be used as operators,
- omits the guarded-quantifier syntax and introduces numerical quantifiers)
- Pat Hayes et al.
- <http://www.jfsowa.com/ikl/IKLspec.pdf>

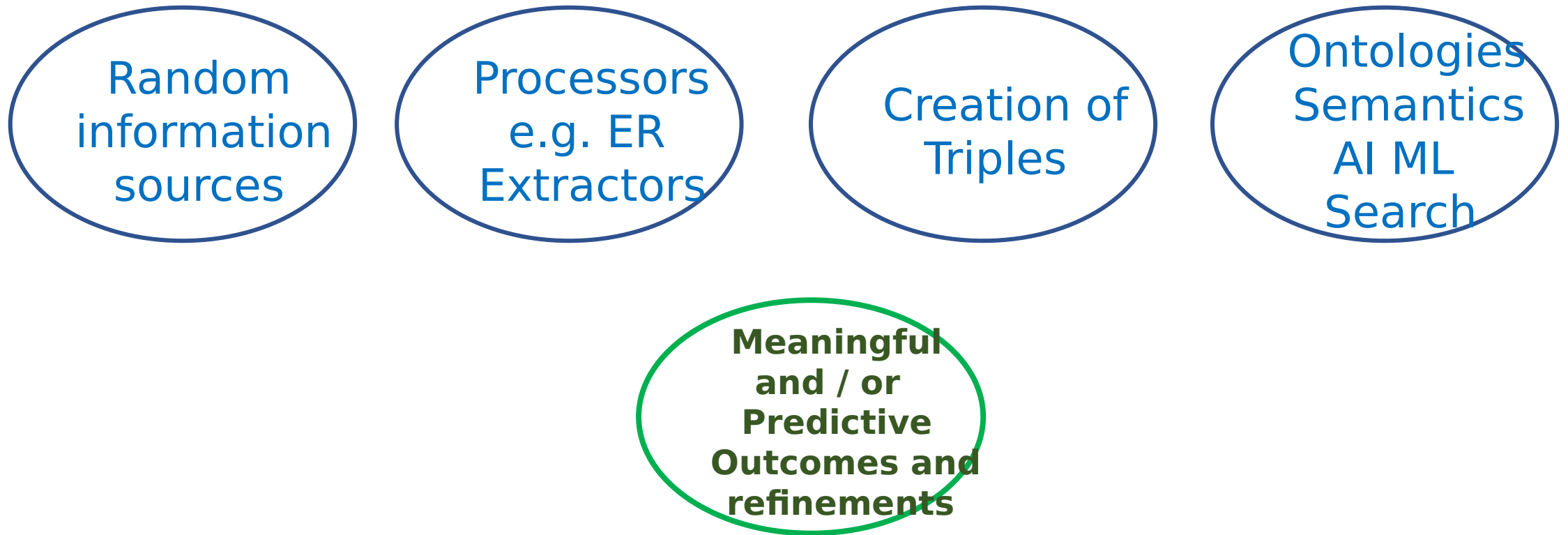
DOL

<https://www.omg.org/spec/DOL/1.0/PDF>

Knowledge Graphs Visualization attention



Knowledge Graphs and Ontologies



Another attempt –we will study other inp

Sources / Processors

- Text (NLP)
- Databases (SQL)
- Images (Classifiers)
- Audio (Phenomes)

Domains

- Overlap
- Schemas
- Common Vocabularies
- Triples Stores

Transformations

- Operators
- Ontologies (e.g. DOL?)
- Search
- Reasoning
- Refinements

Results

