Project Groups
Knowledge Graphs

Group: Data Science
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July 13, 2020
Motivation
One Minute on the Web

2020
This Is What Happens In An
Internet Minute

- 1,3 Million
  - 1.3 Million Logging In
- 19 Million
  - 19 Million Texts Sent
- 4.7 Million
  - 4.7 Million Videos Viewed
- 400,000
  - 400,000 Apps Downloaded
- 694,444
  - 694,444 Scrolling Instagram
- 194,444
  - 194,444 People Tweeting
- 1.6 Million
  - 1.6 Million Swipes
- 190 Million
  - 190 Million Emails Sent
- 1.2 Million
  - 1.2 Million Views
- 305
  - 305 Smart Speakers Shipped
- 1,400
  - 1,400 Downloads
- 59 Million
  - 59 Million Messages Sent
- 2.5 Million
  - 2.5 Million Snaps Created
- $1.1 Million
  - $1.1 Million Spent Online
- 764,000
  - 764,000 Hours Watched

Created By:
@LoriLewis
@OfficiallyChadd

VS

http://cliparting.com/
Motivation
Knowledge Graphs

https://www.w3.org/TR/rdf11-primer/
Motivation

Knowledge Graphs

Alice
http://example.org/alice@time

Bob
http://example.org/bob@time

The Mona Lisa
http://www.w3.org/ontology/foaf

Leonardo Da Vinci
http://example.org/resource/
Leonardo_da_Vinci

"Mona Lisa"

http://www.w3.org/TR/rdf11-primer/

La Joconde à Washington
http://data.europeana.eu/item/01802/243FA
8116308F4117925F17A3BB13C5F9MA42619

DICE Group (Data Science) Twitter @DiceResearch

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Motivation
Knowledge graph-based systems

Amazon Alexa, DICE, OKiS, Qanary, Treo, QAMEL, WD AQUA
Applications with Knowledge Graphs

Artificial Intelligence

1. Digital assistants
2. Explainable AI
3. Summarize or Explain KBs to non-experts
4. Create news automatically (automated journalism)
5. Summarize medical records
6. Generate technical manuals
7. Support the training of other NLP tasks
8. Generate product descriptions (Ebay)
9. ...
Section 1

Project group: Knowledge Graph Summarization – KGSUM
Summary

- **Problem**: Enormous amounts of data provided as graphs
- **Solution**: Graph Summarization - Noise elimination
- **Goal**: Reduction of Graph size - Definition of interestingness

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Fig. 1. Overview of our survey. Taxonomy of graph summarization algorithms based on the input type and the core employed technique; alternative approaches; applications; and open problems.
Section 2

Project group: Knowledge Graph Verbalization – KG2NL
Summary

- **Problem:** Lack of quality in generated entity text summaries
- **Solution:** Extend rules and templates or apply machine learning
- **Goal:** Improve the fluency of generated texts
KG2NL
Description Logics (OWL) on Knowledge Graphs

Summary

- **Problem:** Black-box ML models not explainable
- **Solution:** Generate explanation from DL in natural language
- **Goal:** Improve the adequacy and fluency of generated texts

Knowledge Graph

![Knowledge Graph Diagram]

Training Examples

- Angela Merkel: Politician
- Roger Federer: **not** Politician

**Is Michael Dreier a politician?**

- Neural network: 0.95, **no explanation**
- Rules: yes
- $\exists$ position.public office $\subseteq$ Politician

Natural Language

Everything that has a position as public office is a politician
Further information
KGSUM and KG2NL

Paper:

Github project:
- https://github.com/dice-group/LD2NL

Technologies:
- Java / Maven and Python
- SPARQL
- Machine Learning and Deep Learning
That’s all Folks!

Thank you!
Questions?

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