



TECHNISCHE
UNIVERSITÄT
DARMSTADT



UKP Lab
Darmstadt, Germany

Building a Knowledge Base Question Answering Pipeline



Daniil Sorokin

@daniilmagpie 🖐️

<https://daniilsorokin.github.io>



London Data Science Journal Club
January 28, 2019

Me

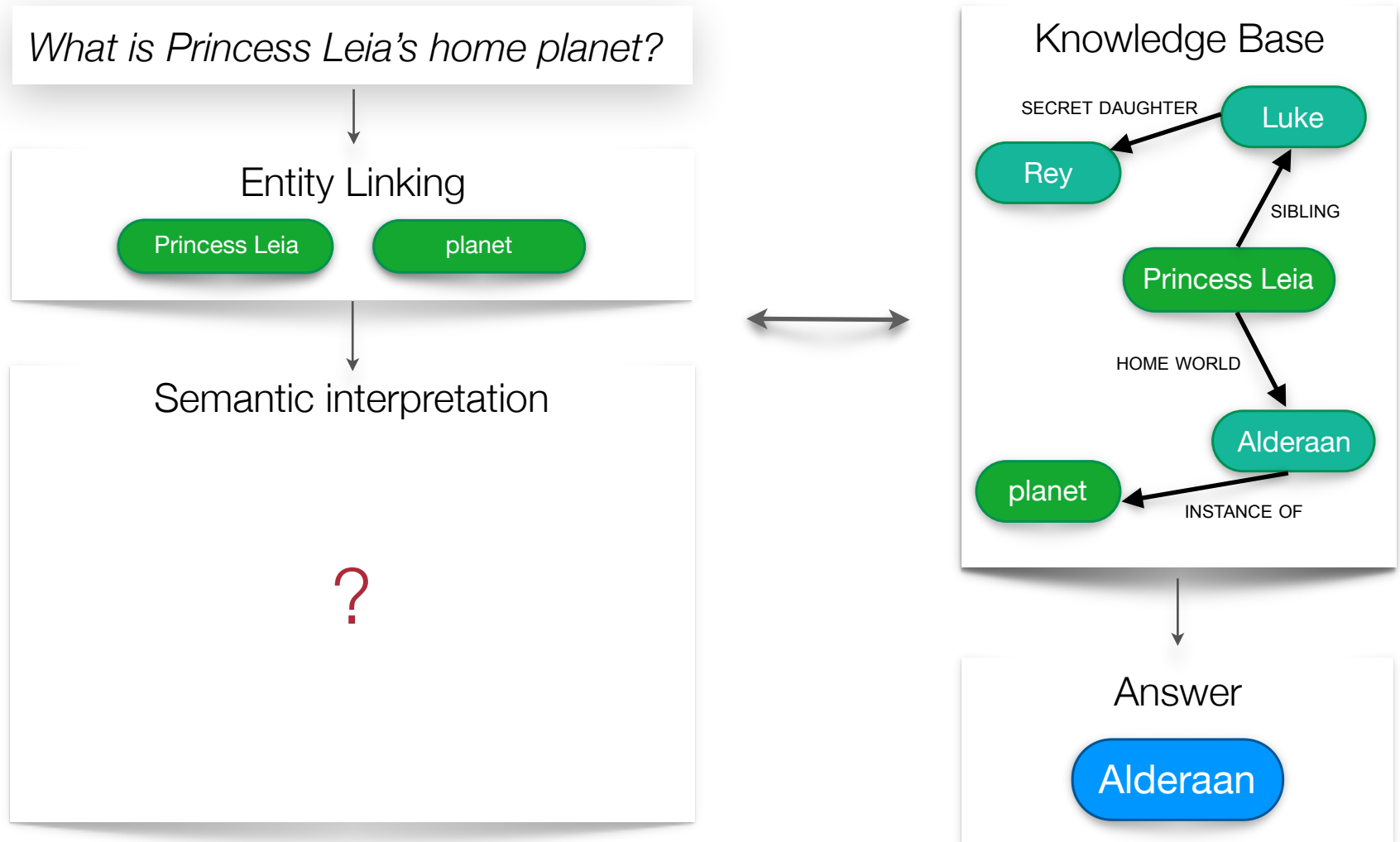
Bachelor in Applied
Linguistics
at St. Petersburg State
University, Russia
2011

Master in Computational
Linguistics
at University of Tübingen,
Germany, 2014

PhD in NLP
at the **UKP Lab**,
Darmstadt University of
Technology, Germany,
since 2015,
<http://ukp.tu-darmstadt.de>

Research intern at
Factmata, London
November 2018 -
January 2019,
<https://factmata.com>

Knowledge Base Question Answering



Knowledge Base

Knowledge Base

Princess Leia

English Not logged in Talk Contributions Create account Log in

Item Discussion Read View history Search Wikidata

Princess Leia (Q51797)

character in Star Wars [edit](#)

Leia Organa | Princess Leia Organa of Alderaan | General Organa | Princess Leah

[In more languages](#) [Configure](#)

Language	Label	Description	Also known as
English	Princess Leia	character in Star Wars	Leia Organa Princess Leia Organa of Alde... General Organa Princess Leah
French	Leia Organa	personnage de Star Wars	Princesse Leia
German	Leia Organa	Figur in Star Wars	Prinzessin Leia Prinzessin Leia Organa
Scots	Princess Leia	No description defined	

[All entered languages](#)

Statements

home world

Alderaan

[edit](#)

▼ 0 references

[+ add reference](#)

Naboo

[edit](#)

from fictional universe

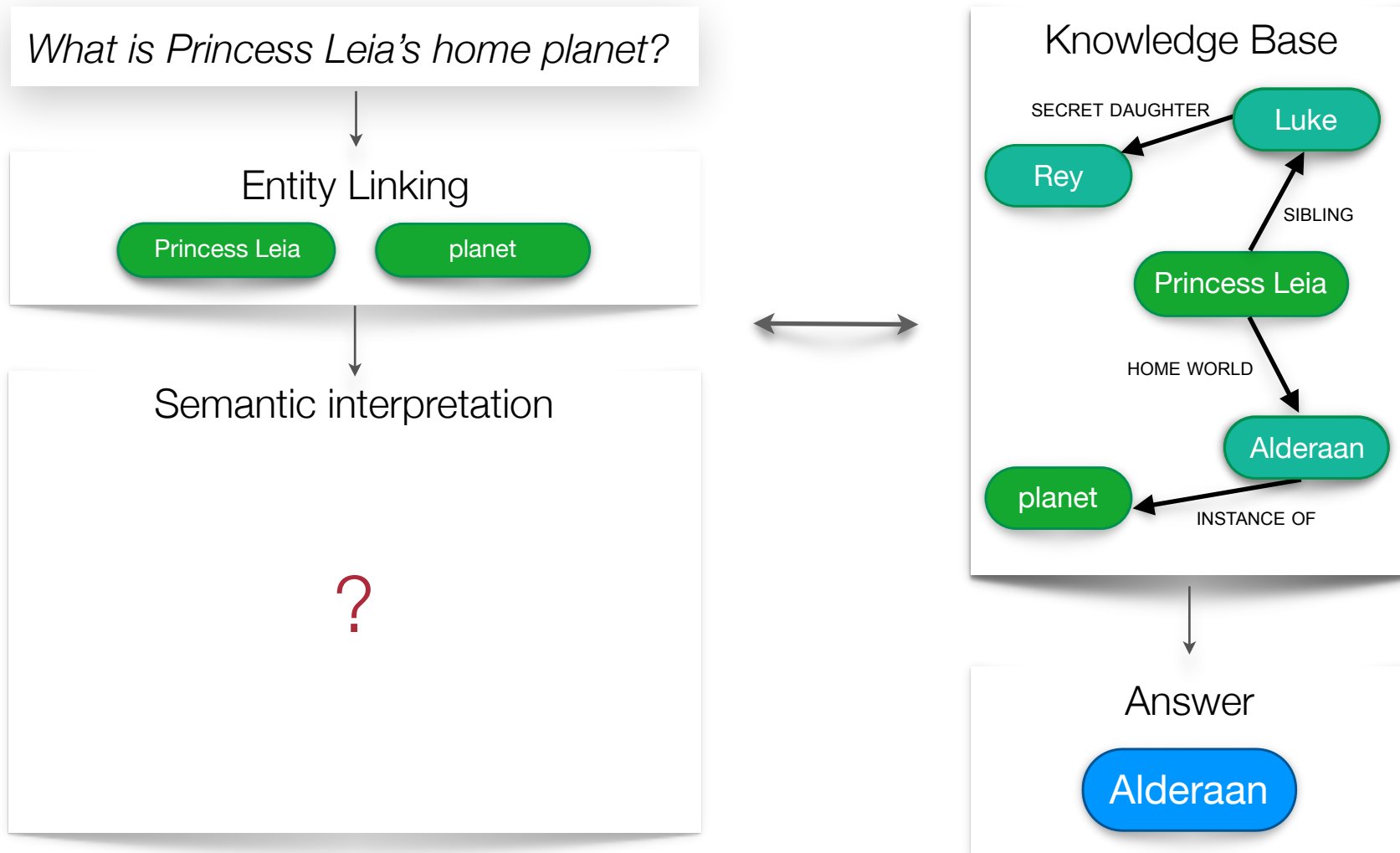
Star Wars expanded to other media

▼ 0 references

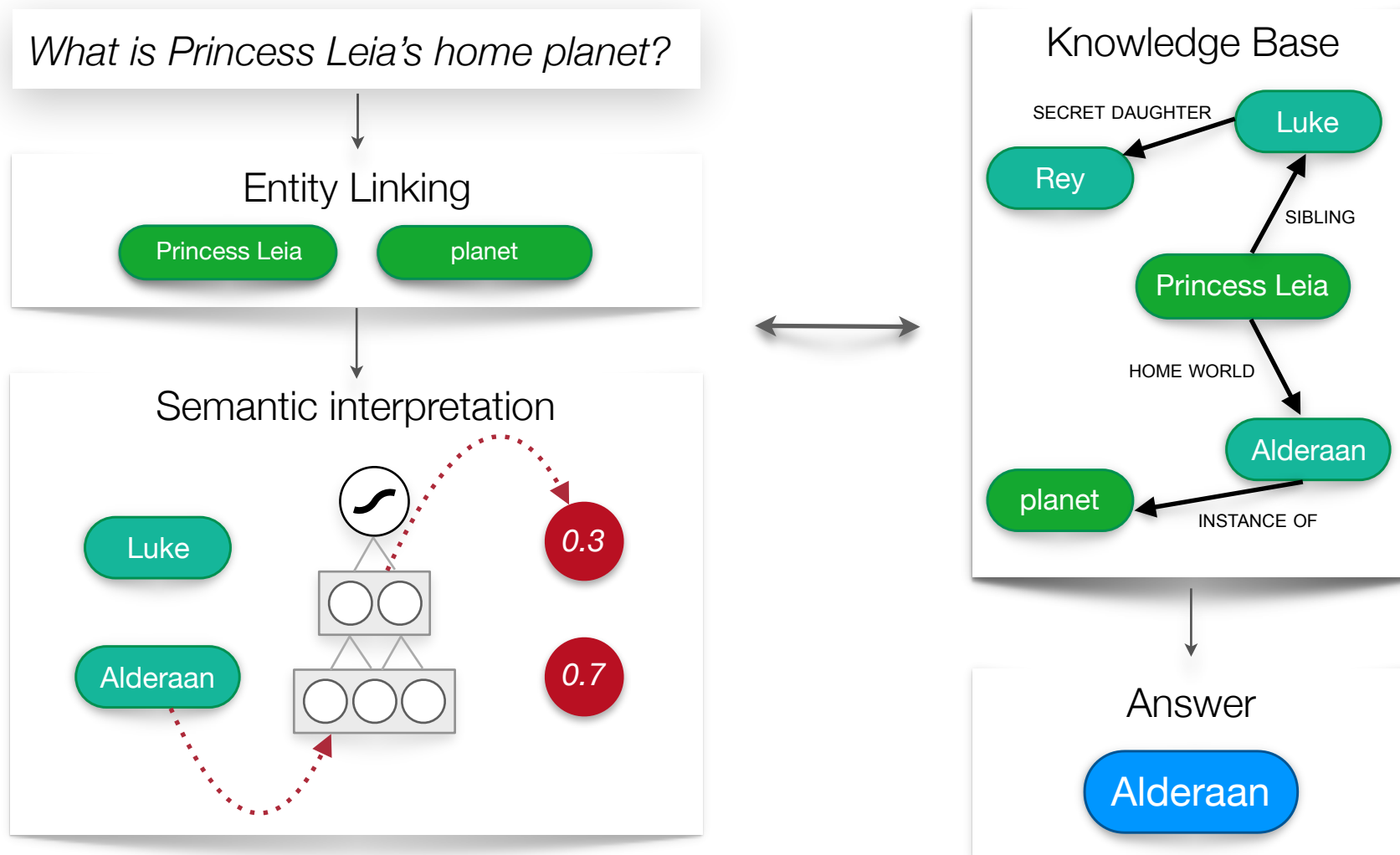
[+ add reference](#)

[+ add value](#)

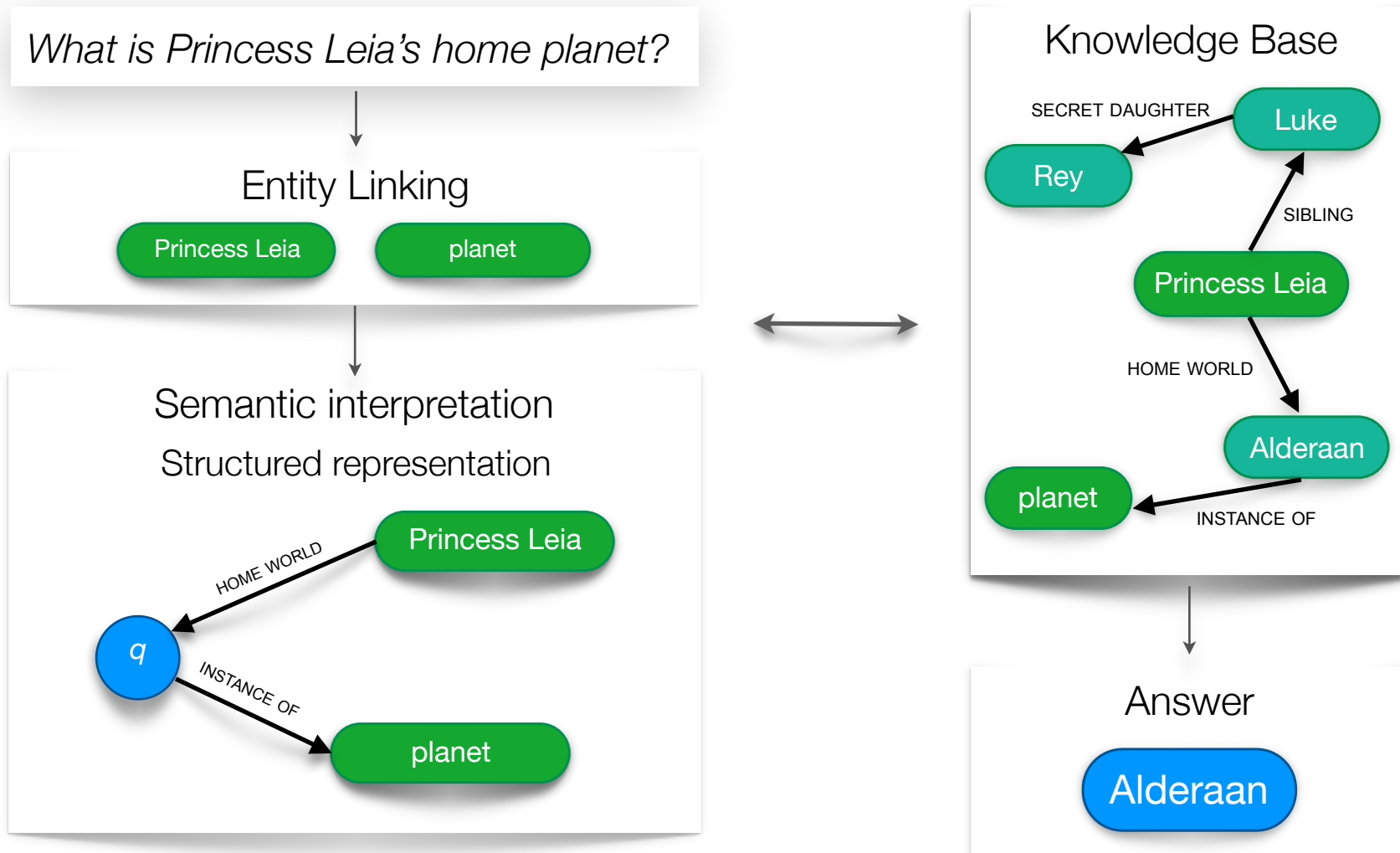
Knowledge Base Question Answering



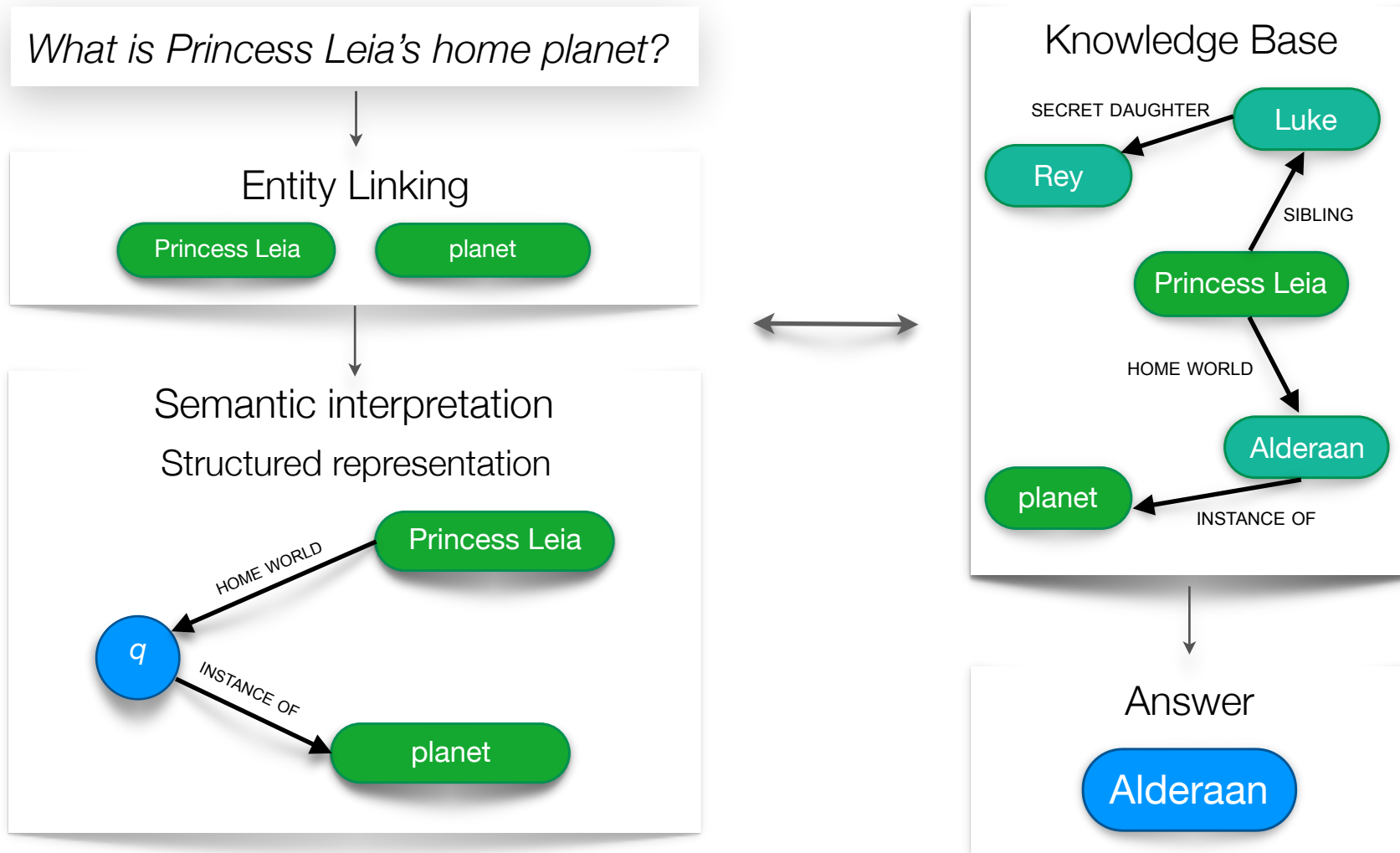
Knowledge Base Question Answering



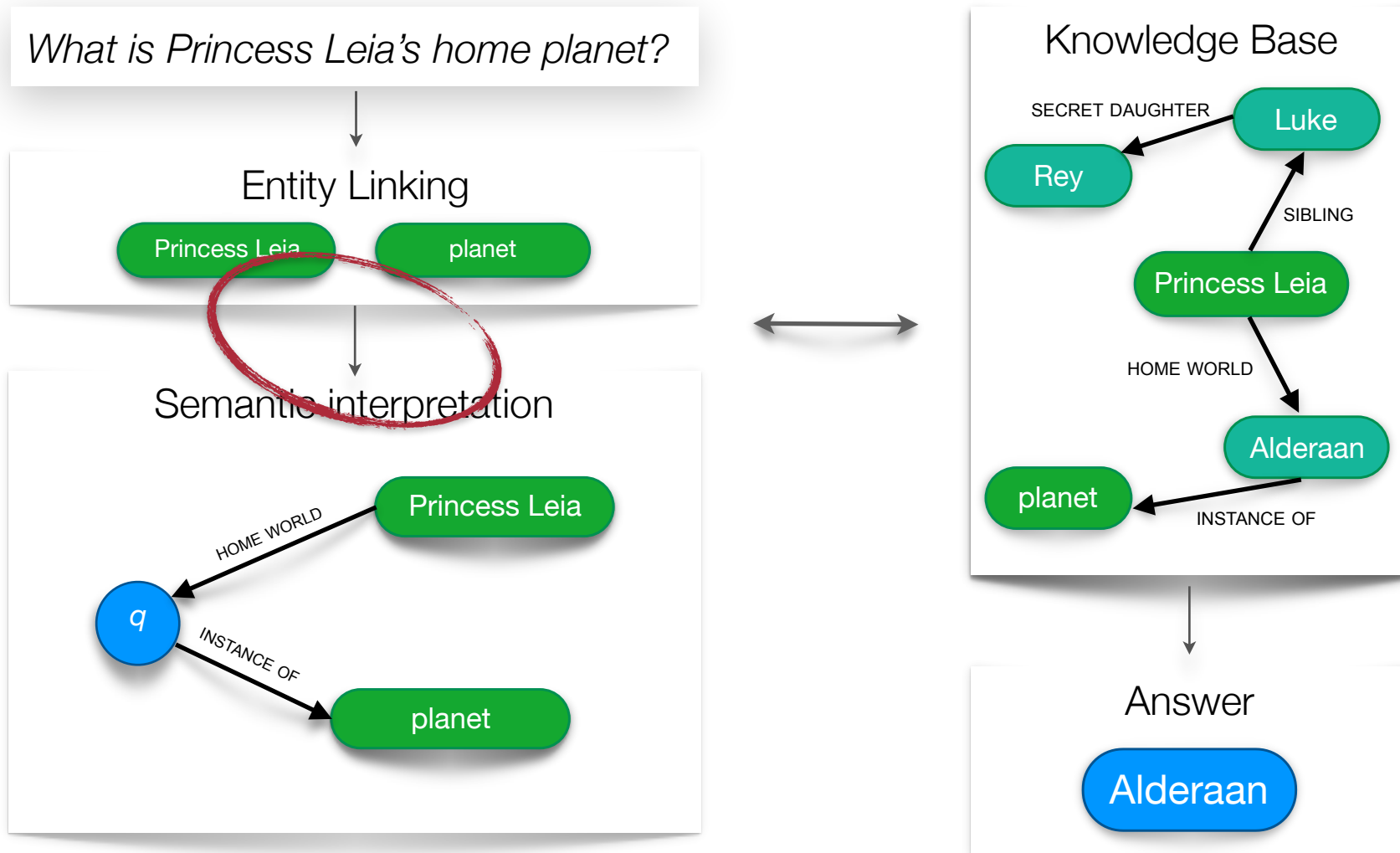
Knowledge Base Question Answering



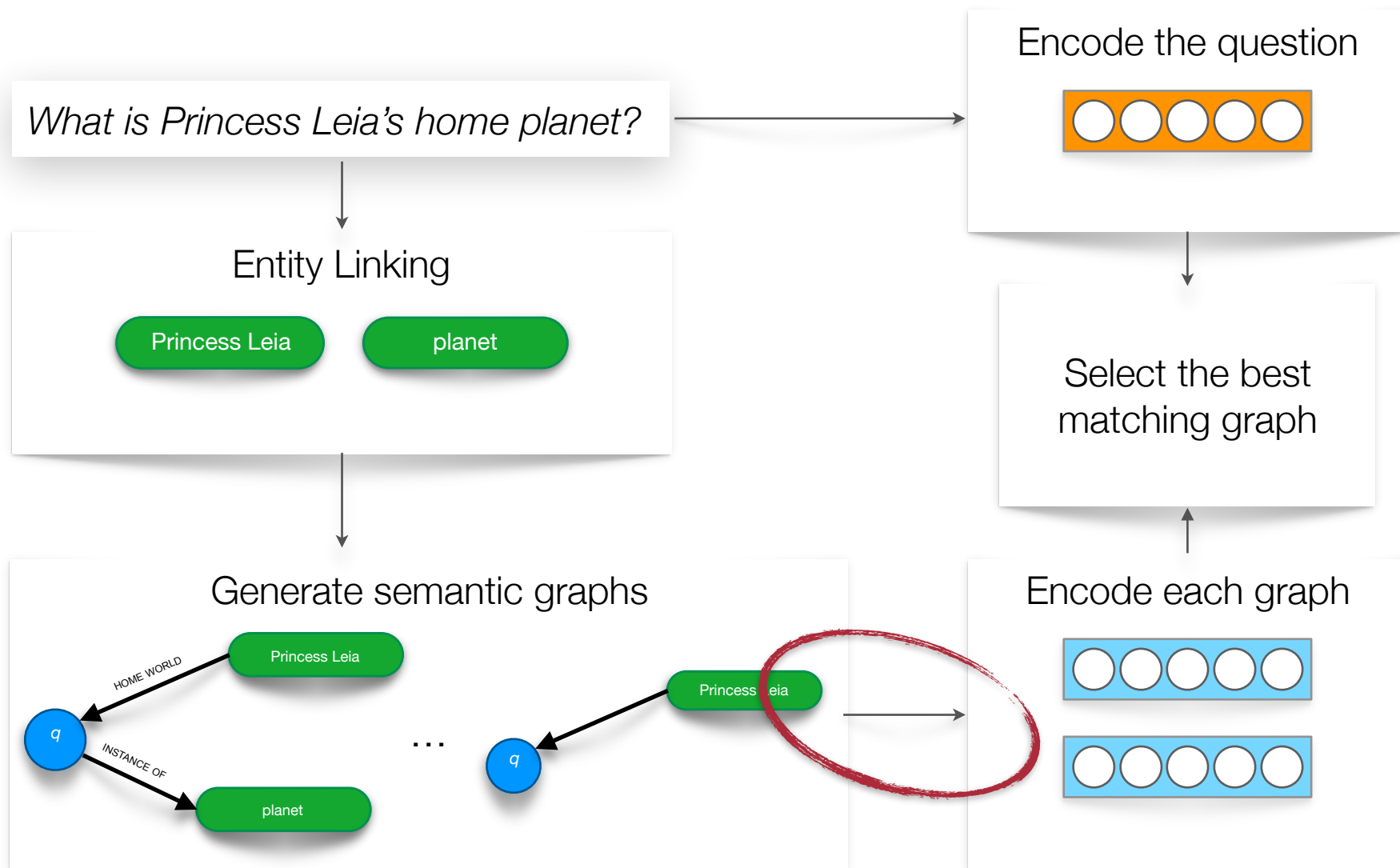
Knowledge Base Question Answering



Knowledge Base Question Answering



Representation Learning



Modeling the knowledge base graph and other graphs

1. Graph Convolutional Networks

- Kipf and Welling (2017) – document classification
- Marcheggiani and Titov (2017) – encode syntax dependencies for SRL
- Schlichtkrull et al. (2018) – KB embeddings

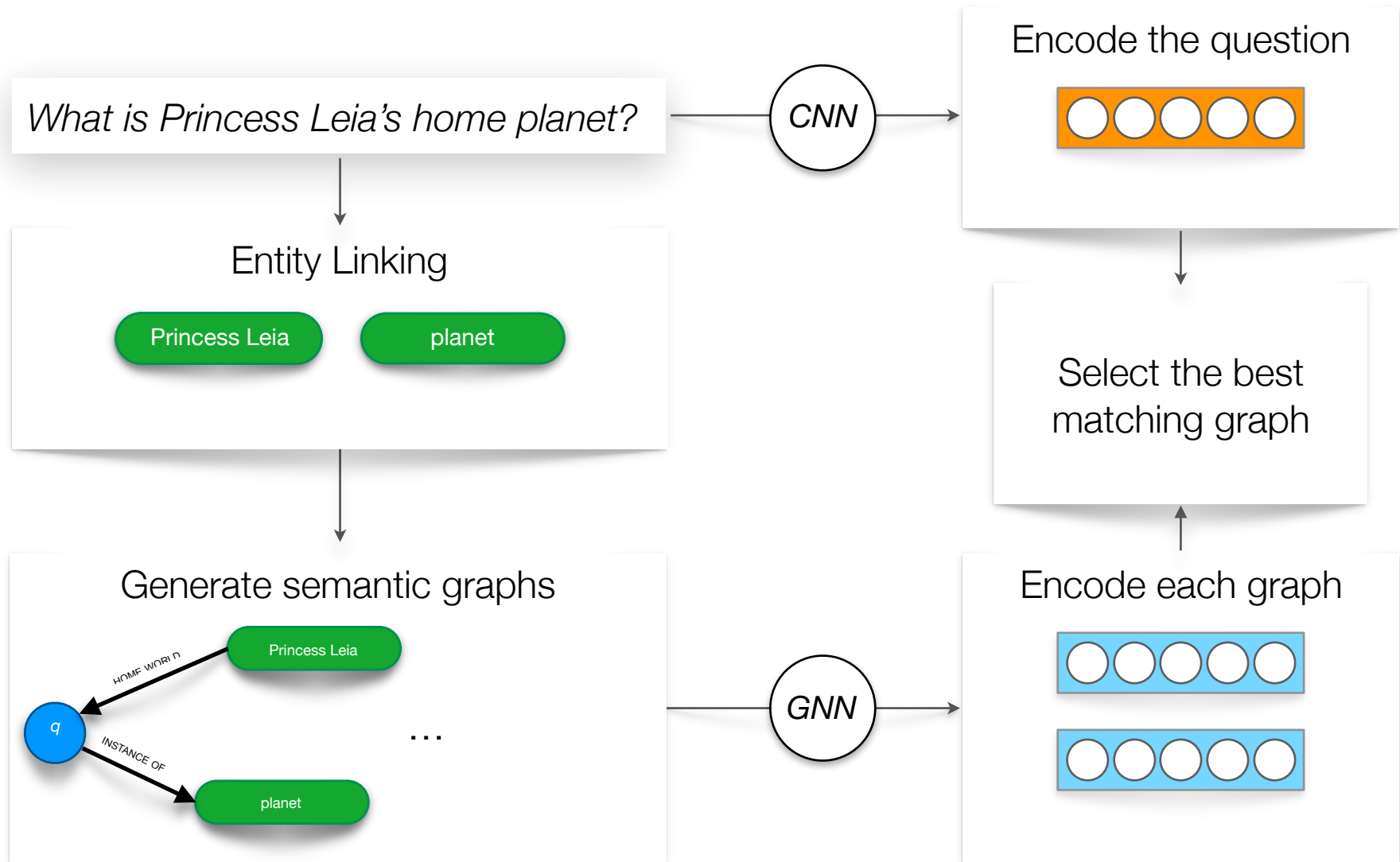
2. Gated Graph Neural Networks

- Scarselli et al. (2009) – Graph Neural Networks
- Li et al. (2016) – Gated variant
- Chen et al. (2018) – Structured Dialogue Policy
- Sun et al. (2018) – QA with Fusion of Knowledge Bases and Text

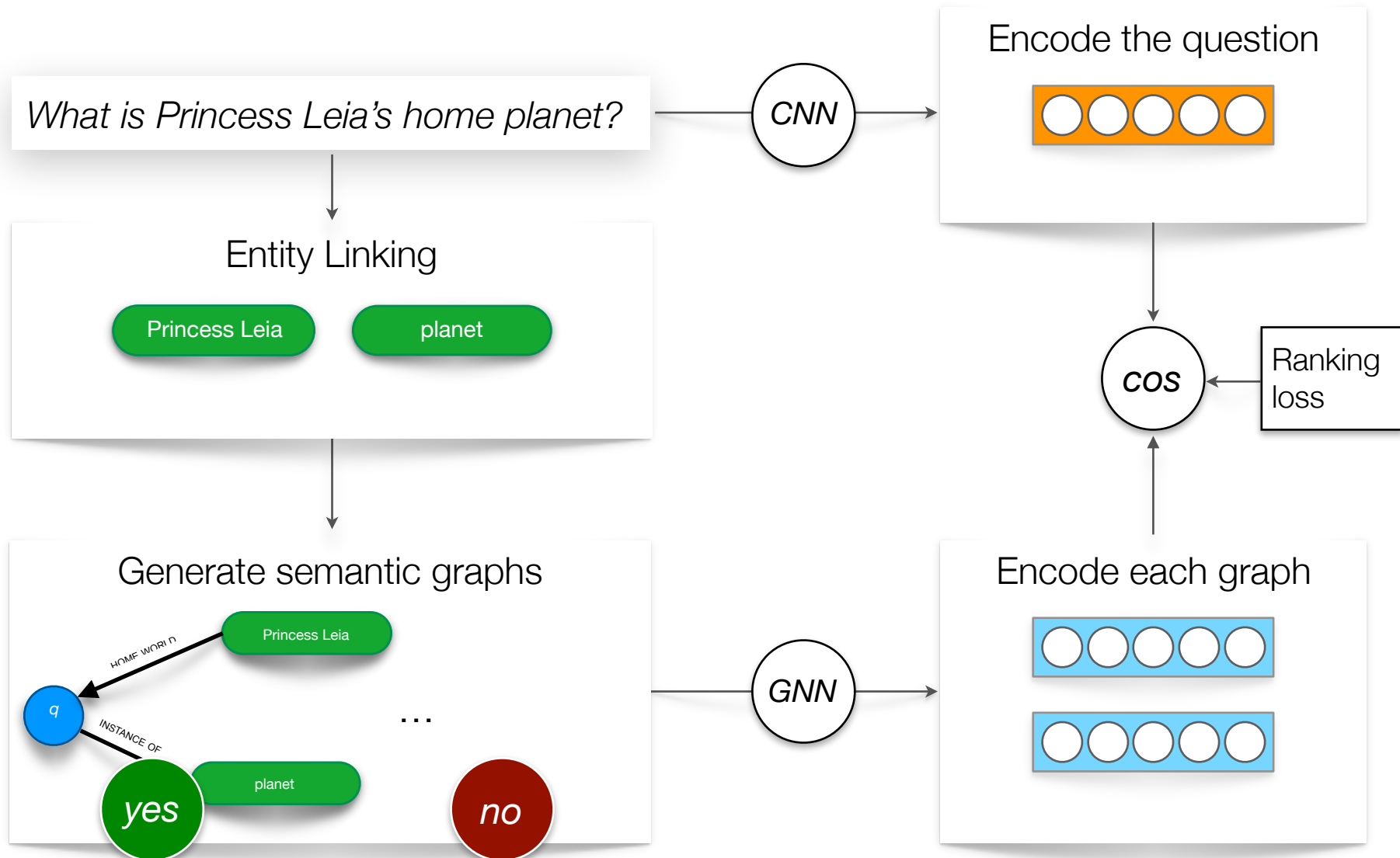
3. Battaglia et al. (2018) – Relational inductive biases, deep learning, and graph networks

The Graph Neural Network models all
aspects of the semantic graph
representation

Question Answering Pipeline – Representation Learning



Question Answering Pipeline – Representation Learning



Demo and code <https://github.com/UKPLab/coling2018-graph-neural-networks-question-answering>

Knowledge base question answering

Your question

Who played Luke Skywalker in Star Wars?

Answer

Follow up?

- <https://daniilsorokin.github.io>  slides
- sorokin@ukp.informatik.tu-darmstadt.de
- @daniilmagpie
- COLING'18 Paper: <http://aclweb.org/anthology/C18-1280>

