

Discovering Implicit Knowledge with Unary Relations

Michael Glass and Alfio Gliozzo
 Knowledge Induction and Reasoning Group, IBM Research AI

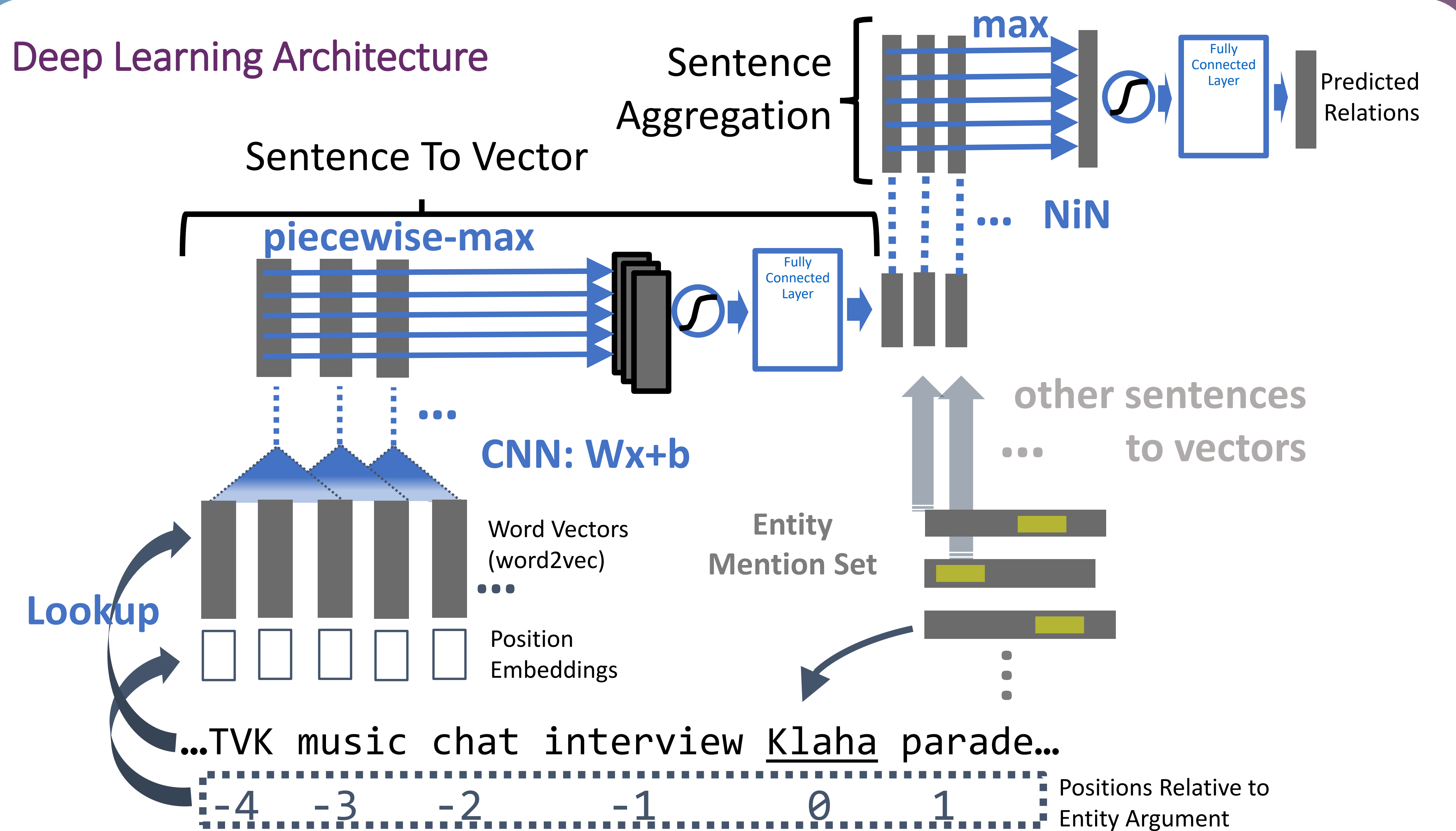
Unary Relations

Arg. 1	Relation	Arg. 2
Bionik Laboratories Corp	location	USA
Tanaka Properties LLC	location	USA
Aardvark IT Solutions Inc	location	USA
Sammy Usa Corp	location	USA
Qualcorp Inc	location	USA
Multinet Communications	location	Canada
Sundial Growers Inc	location	Canada
Catamaran Corp Ltd	location	India
Jeet Properties P Ltd	location	India
Stafford Funding Ltd	location	UK
Barking Cash And Carry	location	UK
Easedandy	location	UK

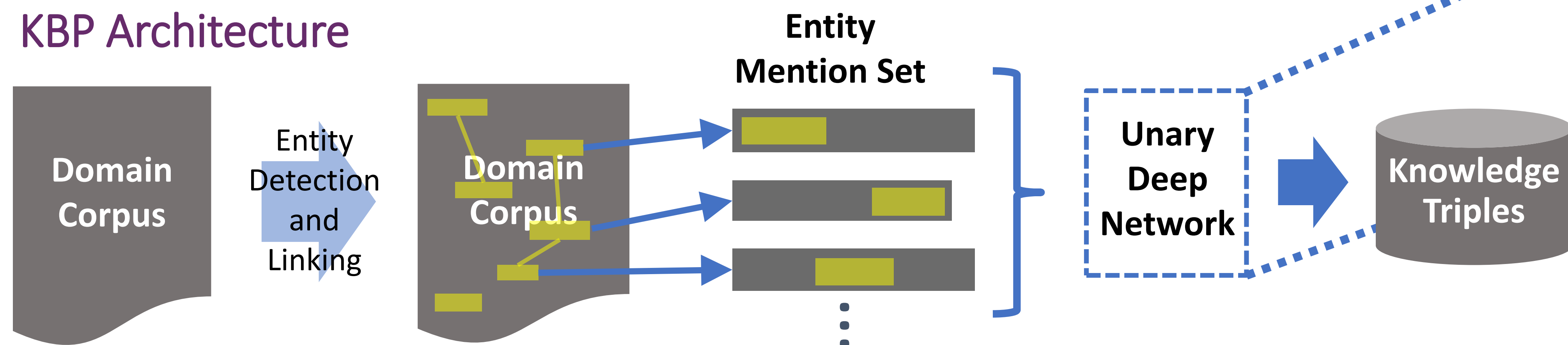
Create Unary Relations:
 One fixed argument, one filler argument

- X:location:USA**
 –Bionik Laboratories Corp, Tanaka Properties LLC, Aardvark IT Solutions Inc, Sammy Usa Corp, Qualcorp Inc, ...
 - X:location:Canada**
 –Multinet Communications Services Inc, Sundial Growers Inc, ...
 - X:location:India**
 –Jeet Properties P Ltd, Catamaran Corp Ltd, ...
 - X:location:UK**
 –Stafford Funding Ltd, Barking Cash And Carry, Easedandy, ...
- group by frequent argument

Deep Learning Architecture

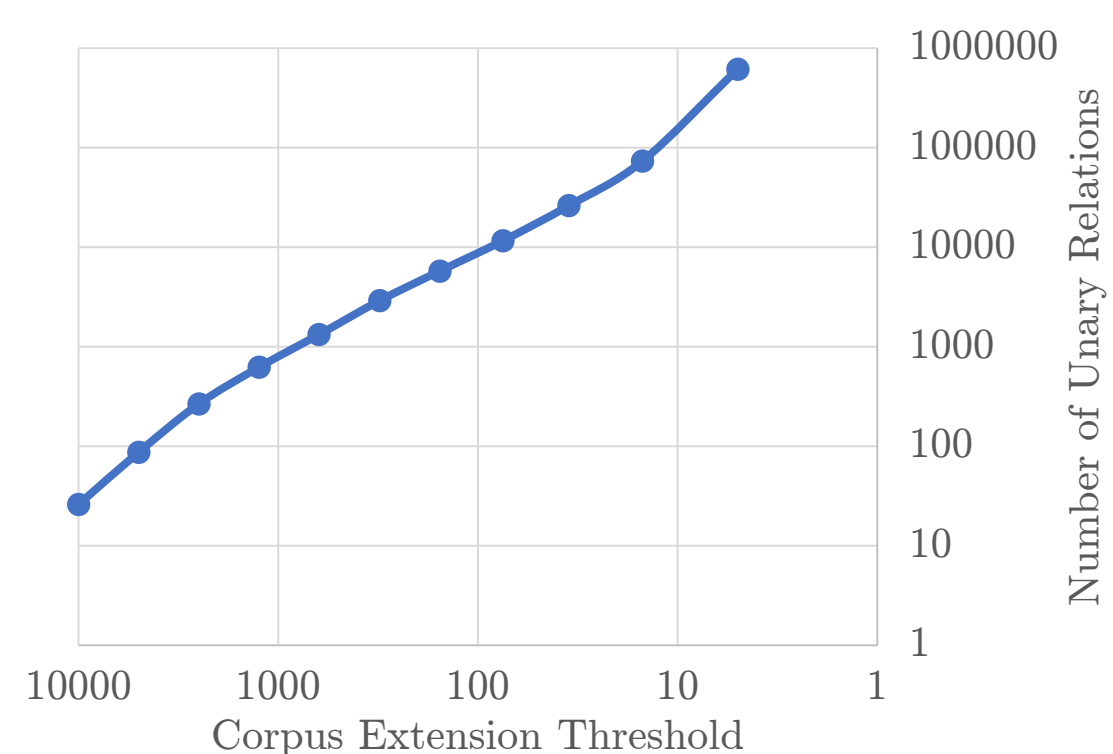


KBP Architecture

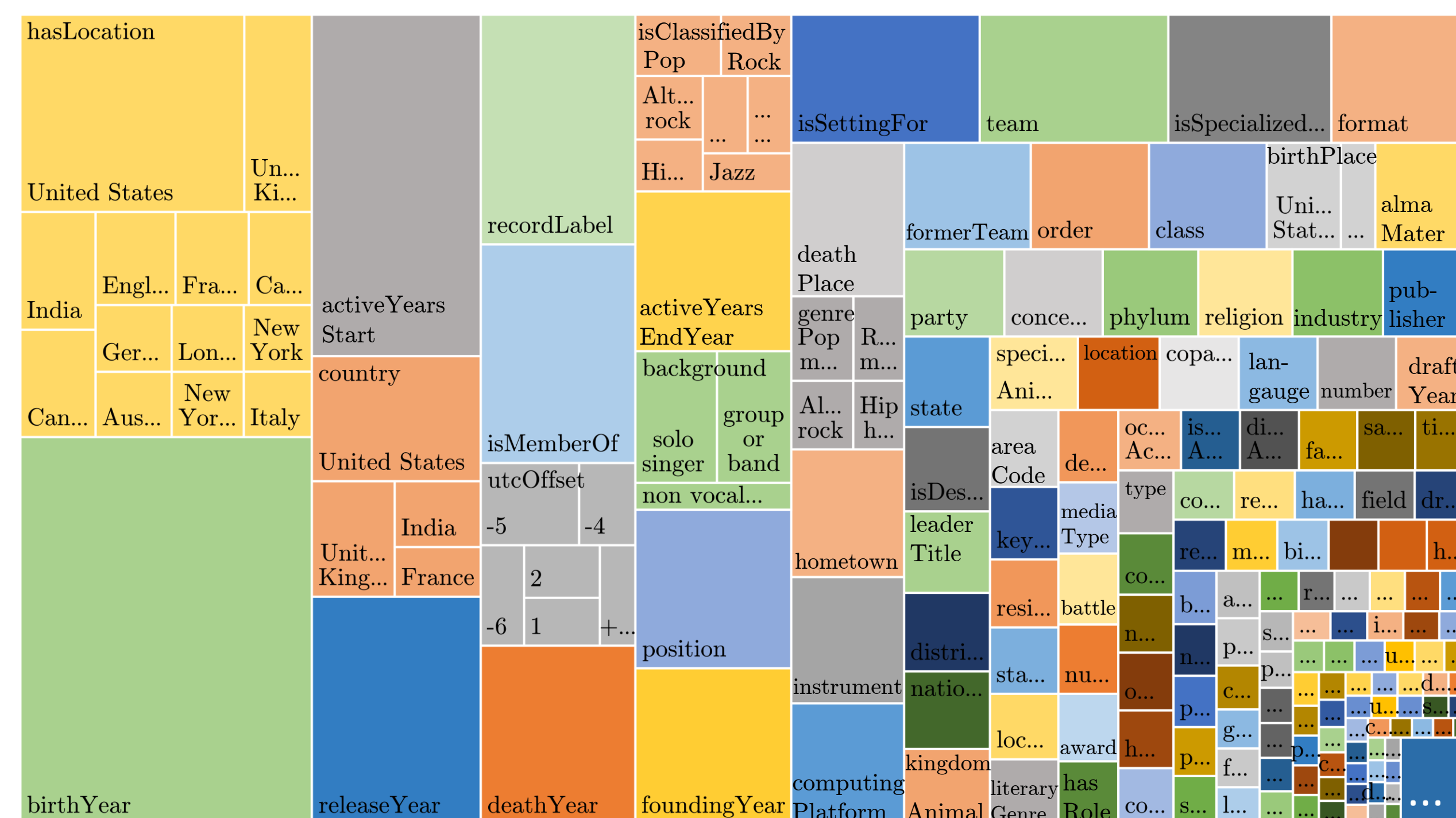


Dataset Statistics

Corpus Extension:
 Number of different filler arguments that occur in the corpus for a unary relation. The threshold on corpus extension trades off per-relation training data with diversity and number of relations.

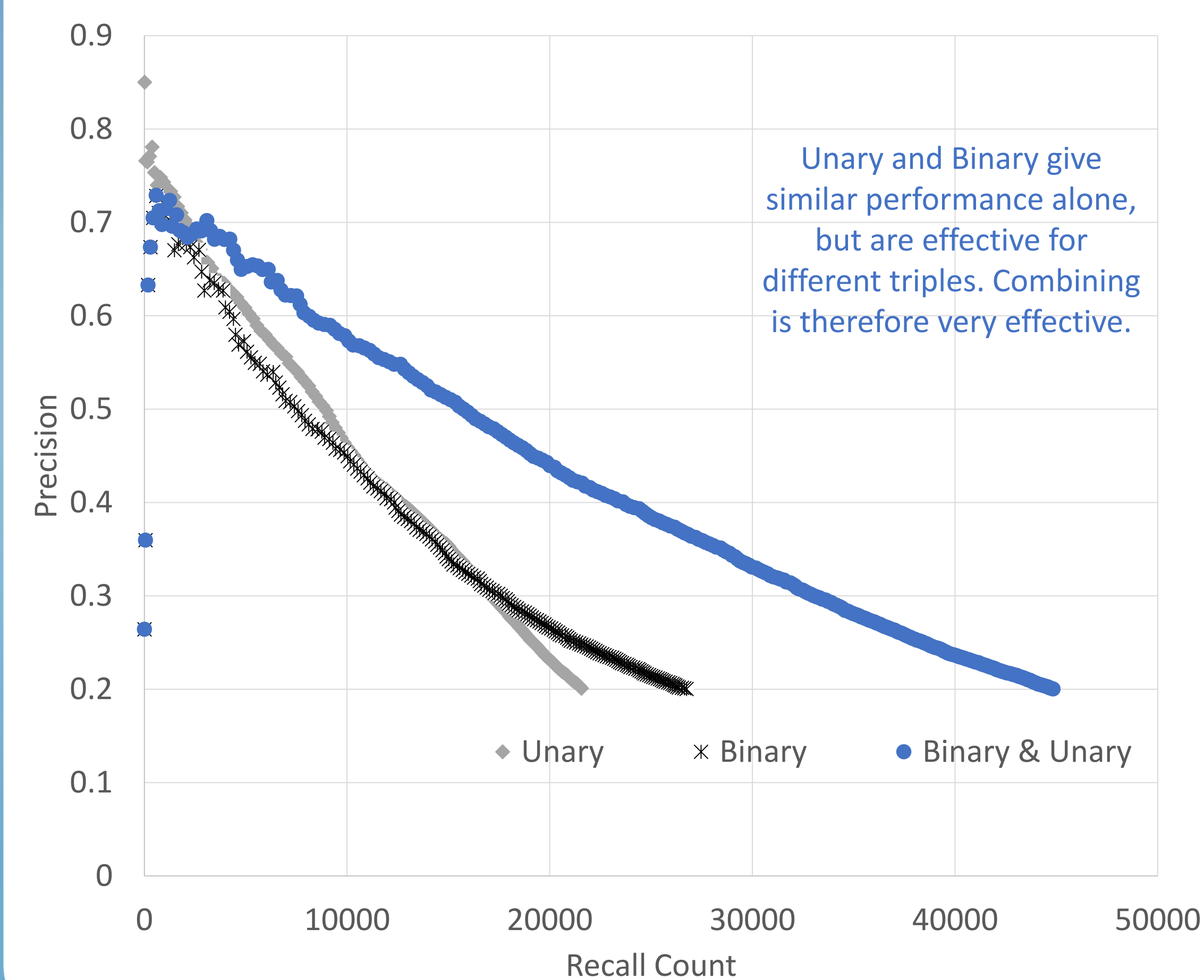


Unary Relation Types by Corpus Extension (threshold 1000)



Results

Precision-Recall Curve on CC-DBP



Saliency Maps: Words Relevant to Predicted Relation

X:background:SOLO_SINGER(Klaha)

tvk **music** chat interview **klaha** parade.

klaha tvk **music** chat OOV red scarf interview the tv - k folks did after **klaha** went solo.

X:hasLocation:CANADA(Cold_Lake_Provincial_Park)

located within 10 minutes of **cold lake** with quick access to OOV ridge ski hill, cold lake **provincial** park and french bay.

welcome to **cold lake provincial** park on average 4.00 pages are viewed each , by the estimated 959 daily visitors.