

BabelNet Meaning Representation:

A Fully Semantic Formalism to Overcome Language Barriers

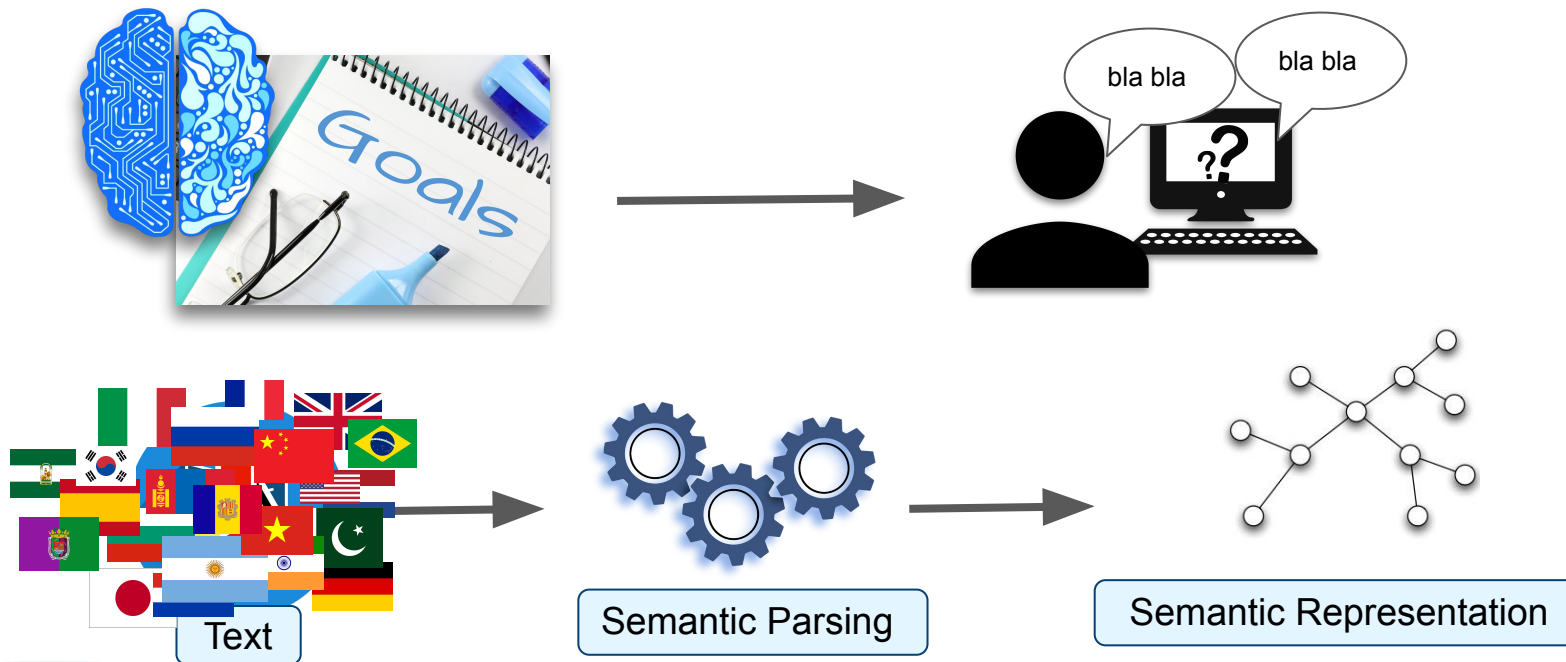
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Semantic Representations

Semantic Representations

A way to represent the meaning of human language



Semantic Representations

Main Formalisms



DRT

UCCA

AMR

PTG

UMR

EDS

UDS

Information
Extraction

Question
Answering

Machine
Translation

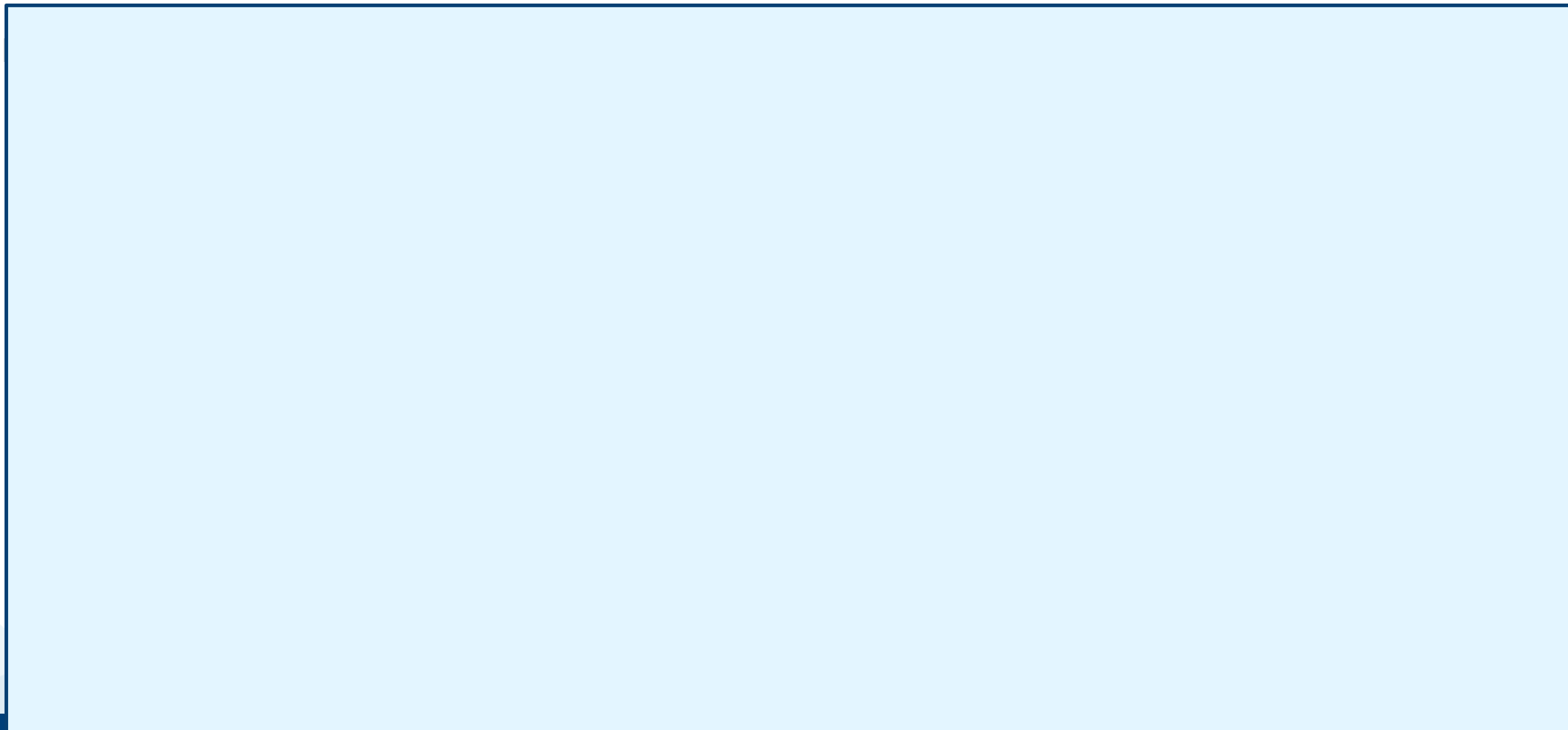
Human
Robot
Interaction

Text
Summarization

Abstract Meaning Representation

Abstract Meaning Representation

AMR as an interlingua

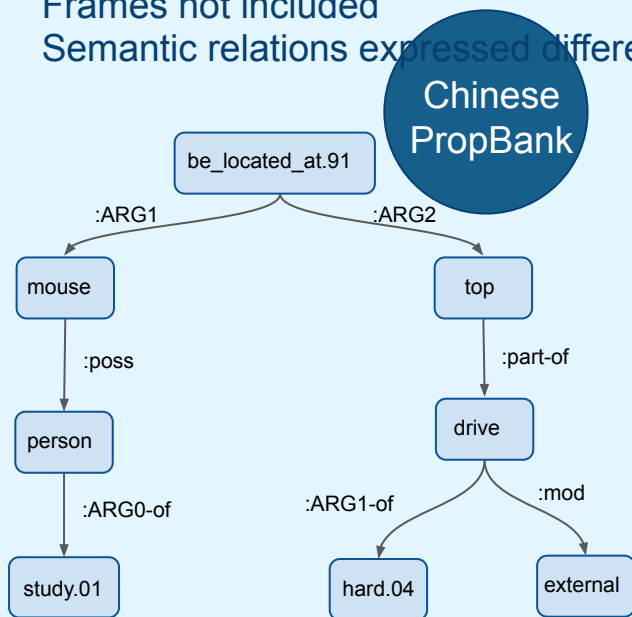


Abstract Meaning Representation

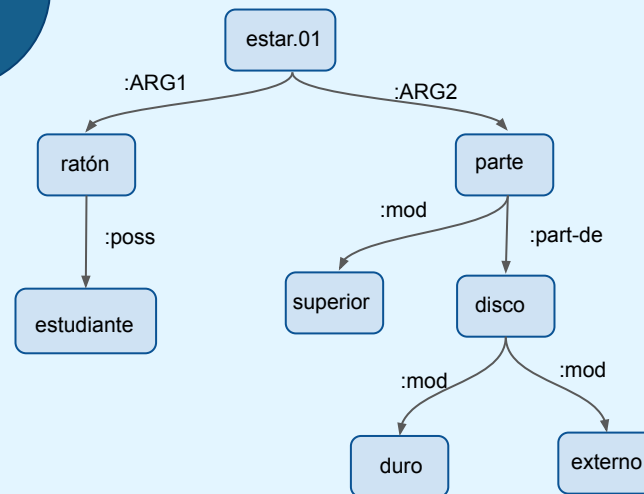
AMR as an interlingua

Could we go cross-lingual using language-specific PropBank-like ontologies?

- Frames not included
- Semantic relations expressed differently



AncoraNet



BabelNet Meaning Representation

BabelNet Meaning Representation

BMR Ingredients

Interlingua Representation:

- No more lexicon
- No more language-specific frame repositories



VerbAtlas

BabelNet Meaning Representation

BMR Ingredients - Babelnet

Interlingua Representation:

- No more lexicon
- No more language-specific frame re



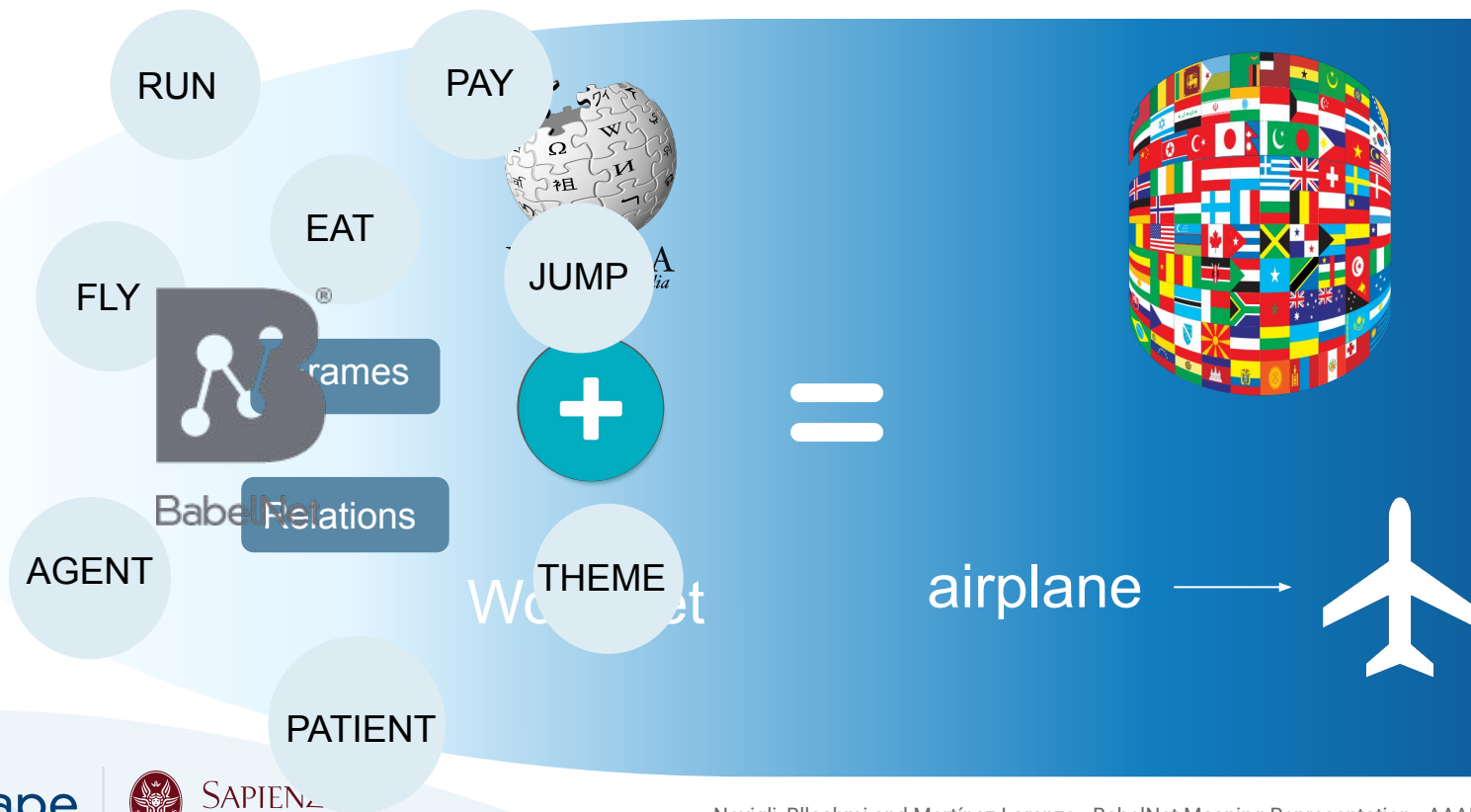
WordNet

airplane

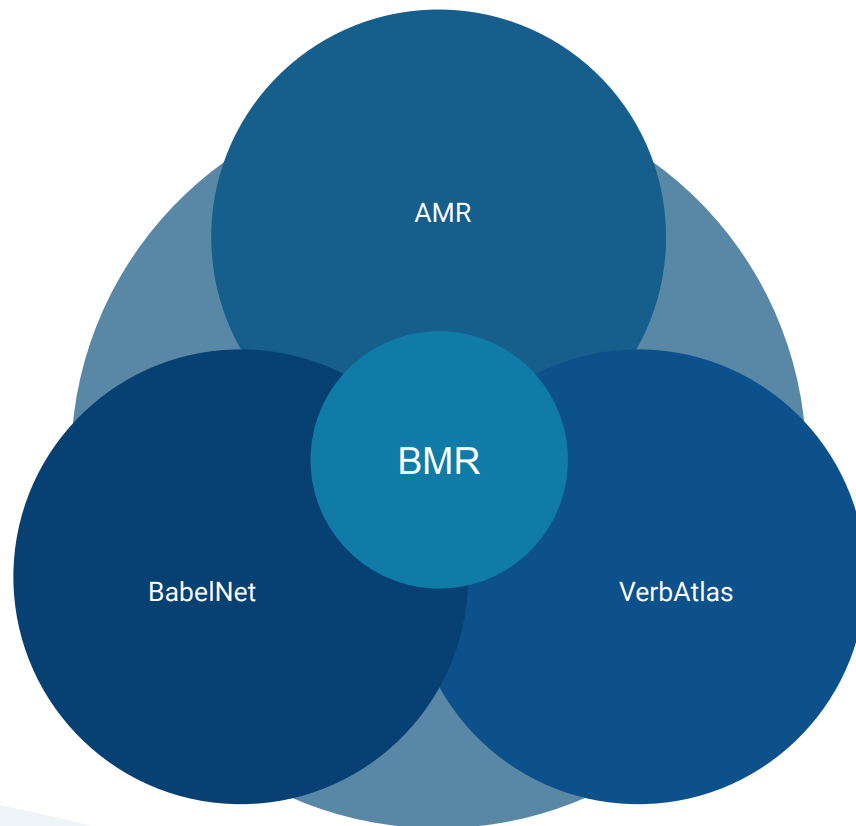


BabelNet Meaning Representation

BMR Ingredients - VerbAtlas



BabelNet Meaning Representation



BMR Graph

Example

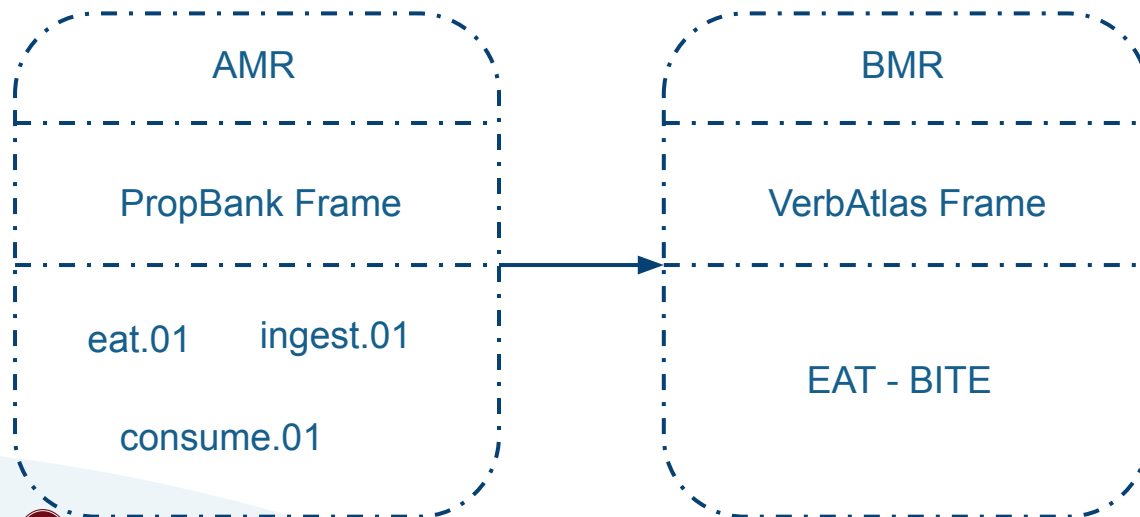
BMR structure:

- Directed acyclic graph
- Concepts connected by semantic relations

From AMR to BMR

Concepts

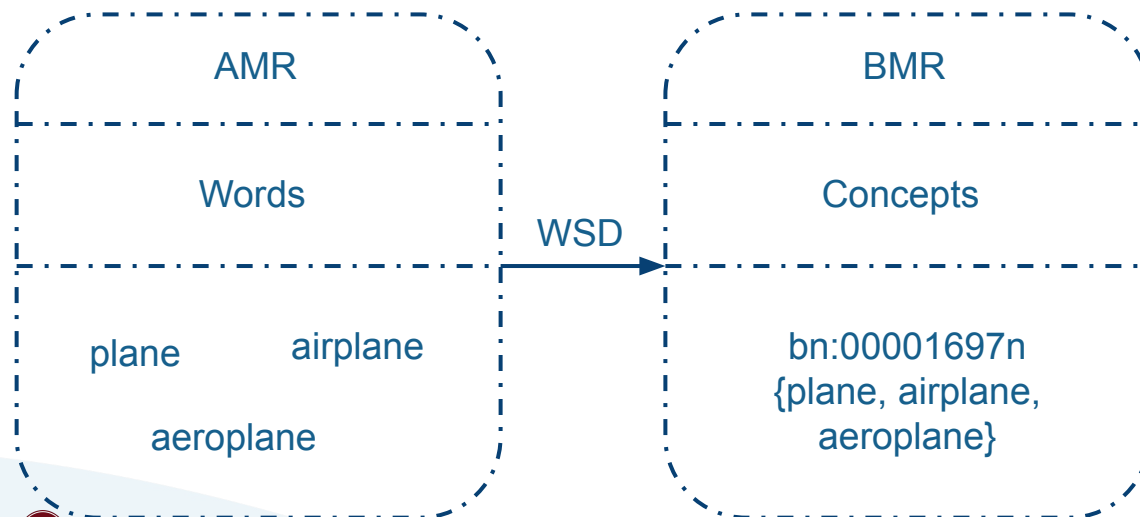
Replace lexical, language-specific symbols with fully semantic symbols nodes



From AMR to BMR

Concepts

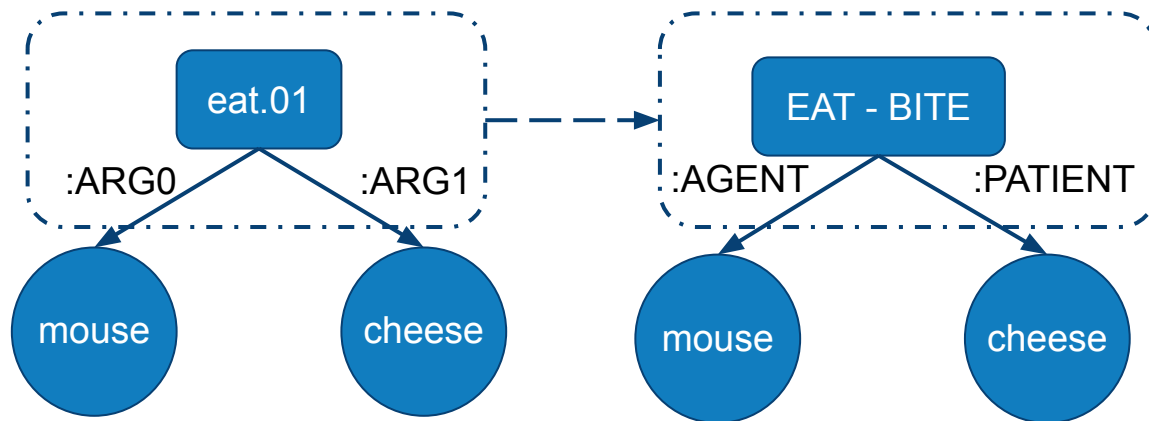
Replace lexical, language-specific symbols with fully semantic symbols nodes



From AMR to BMR

Semantic Relations

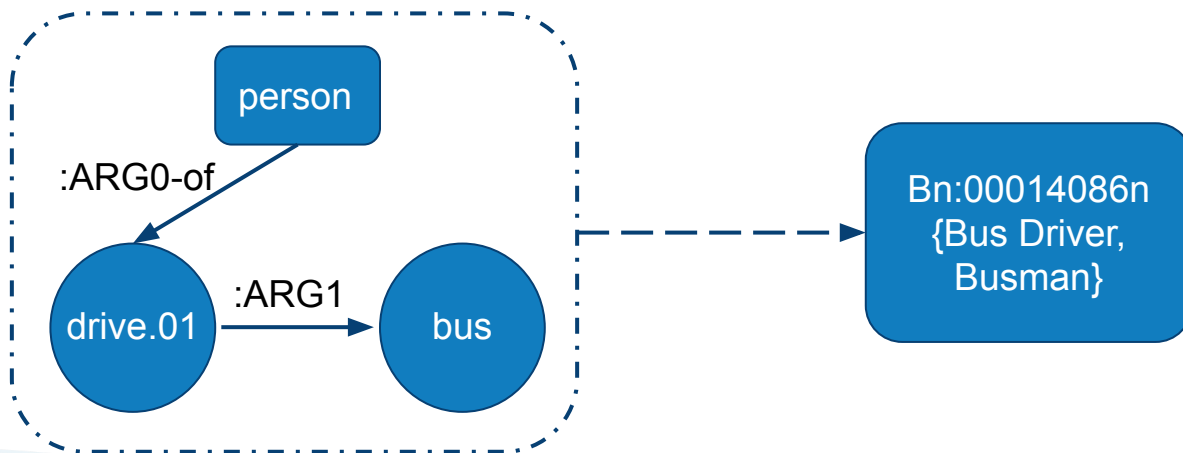
From resource- and language-specific lexical-semantic relations to cross-frame and language-independent semantic relations.



From AMR to BMR

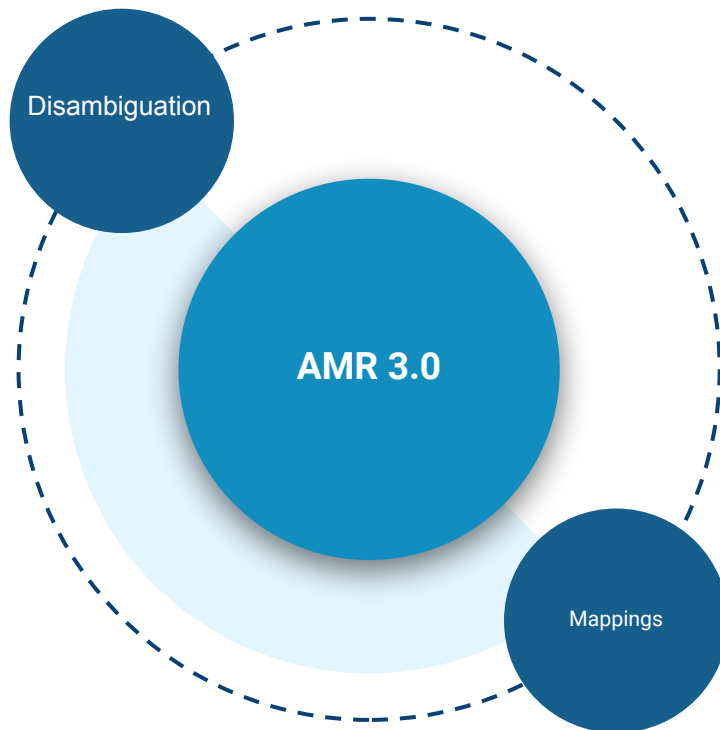
Semantic Relations

Replace such subgraphs with simpler, non-compositional meaning representations from BabelNet whenever these are available



Creating a training corpus

From AMR 3.0 to the BMR dataset



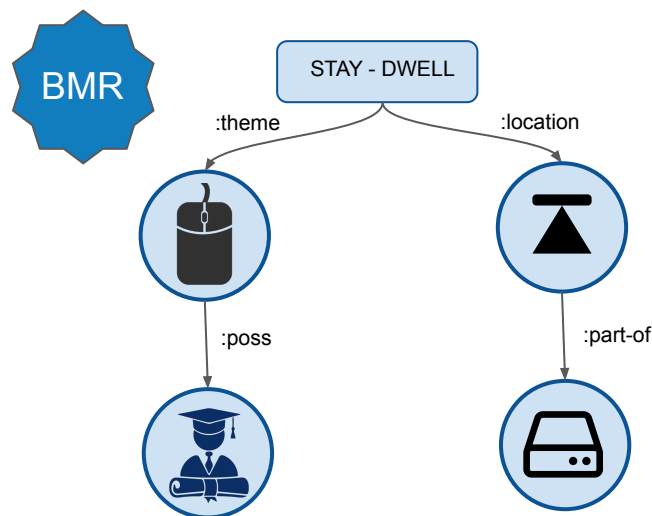
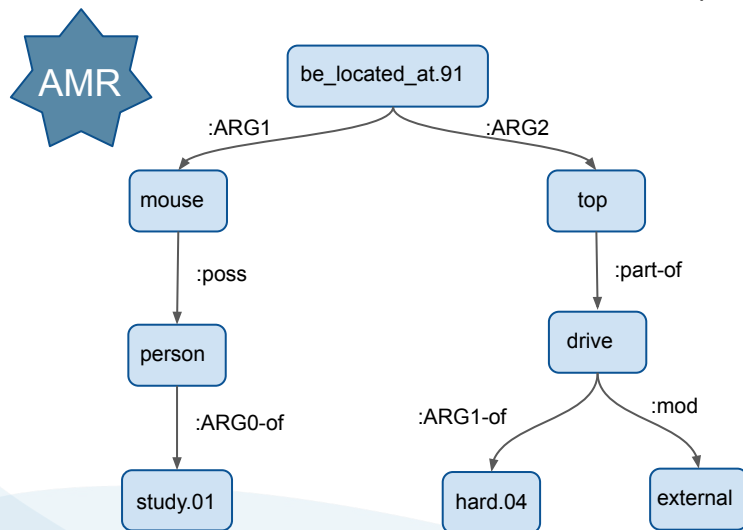
From AMR to BMR

Example

BMR structure:

- Directed acyclic graph
- Concepts connected by semantic relations

The student's mouse is on top of the external hard drive



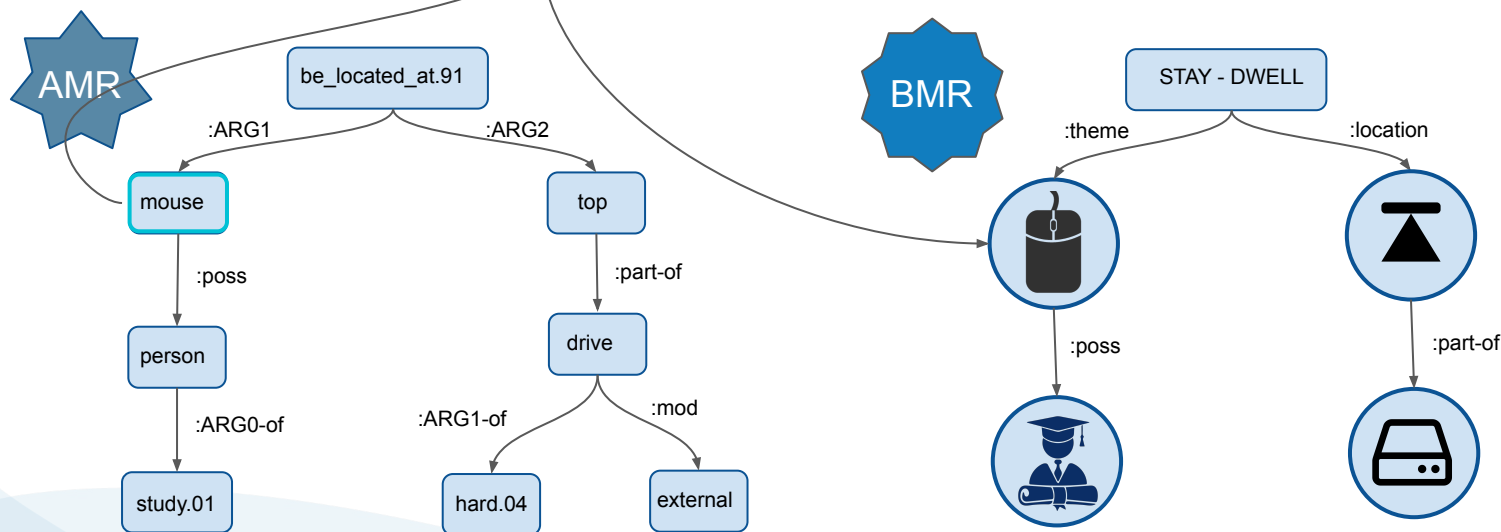
From AMR to BMR

From words to Concepts

- Lexico (WSD)

? ? Anima
? ?
Computer
Device ? Coward ?

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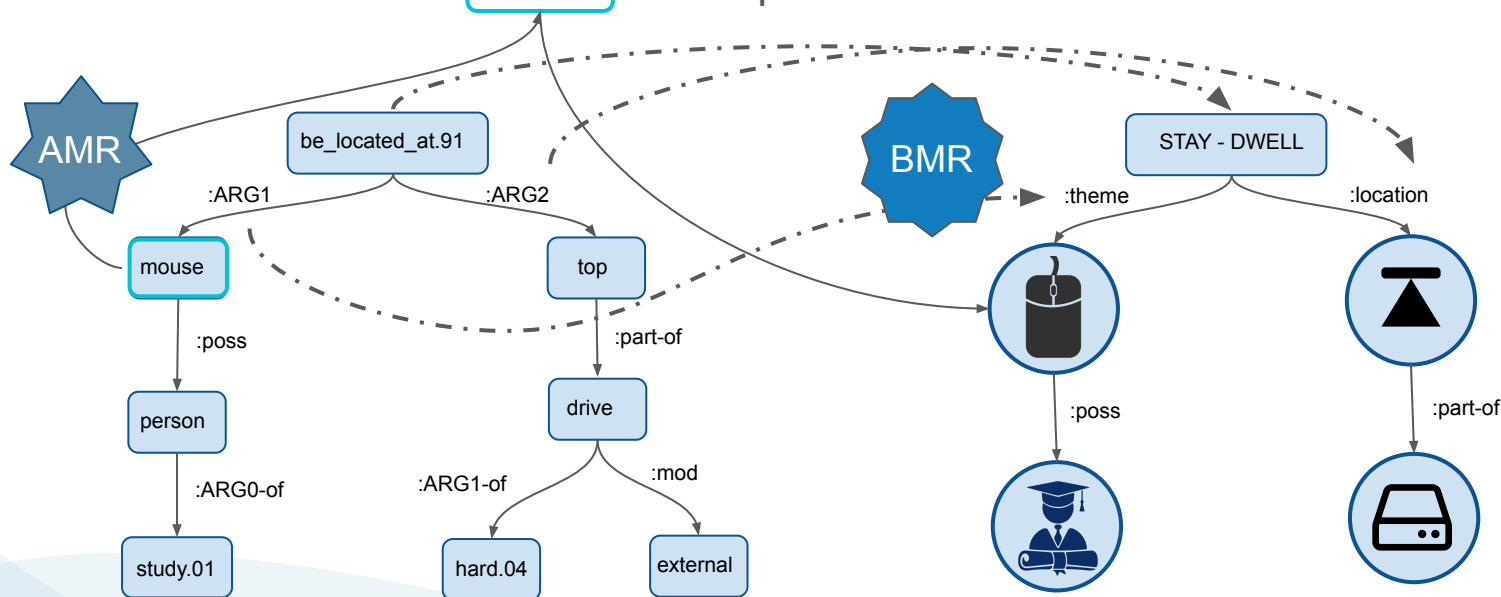


From AMR to BMR

From PropBank to VerbAtlas

- Moved from language-specific relations to cross-lingual semantic relations

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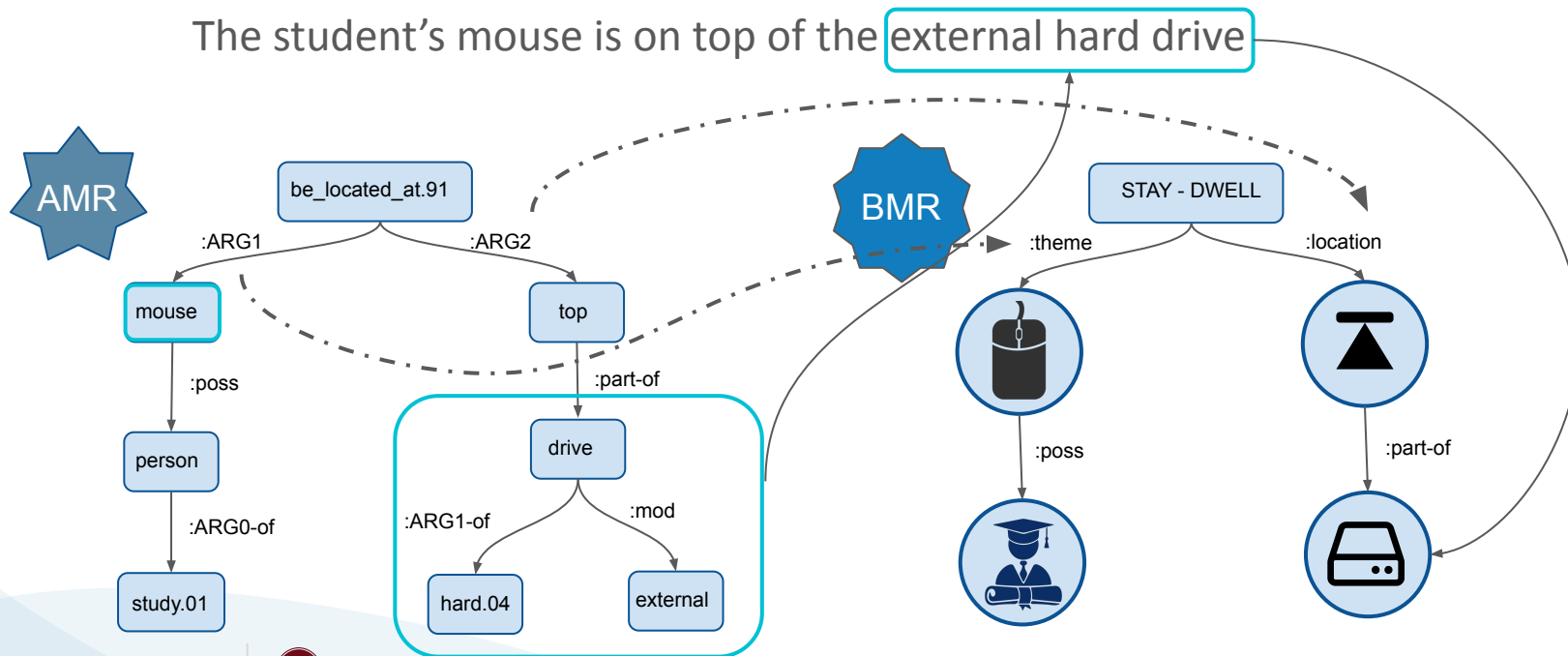


From AMR to BMR

Multiword expressions

- Move from language-specific expressions to single abstract

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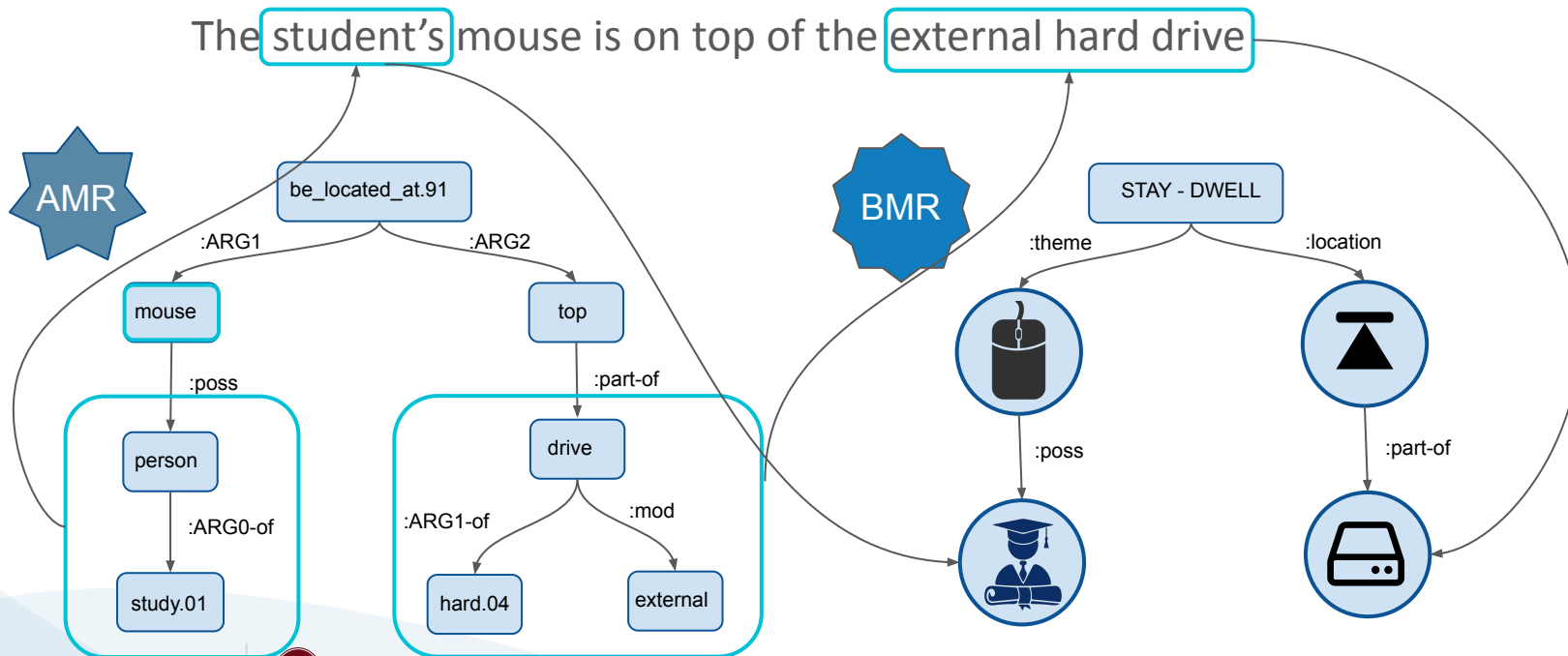


From AMR to BMR

Miscellanea

- Collapsing nodes that have the same expression to a single concept

The student's mouse is on top of the external hard drive



BMR

An interlingual abstraction

EN: English

the student's mouse is on top of the external hard drive

DE: German

die Maus des Schülers befindet sich oben auf der externen Festplatte

ES: Spanish

el ratón del estudiante está en la parte superior del disco duro portátil

IT: Italian

il mouse dello studente si trova sopra il disco rigido esterno

ZH: Chinese

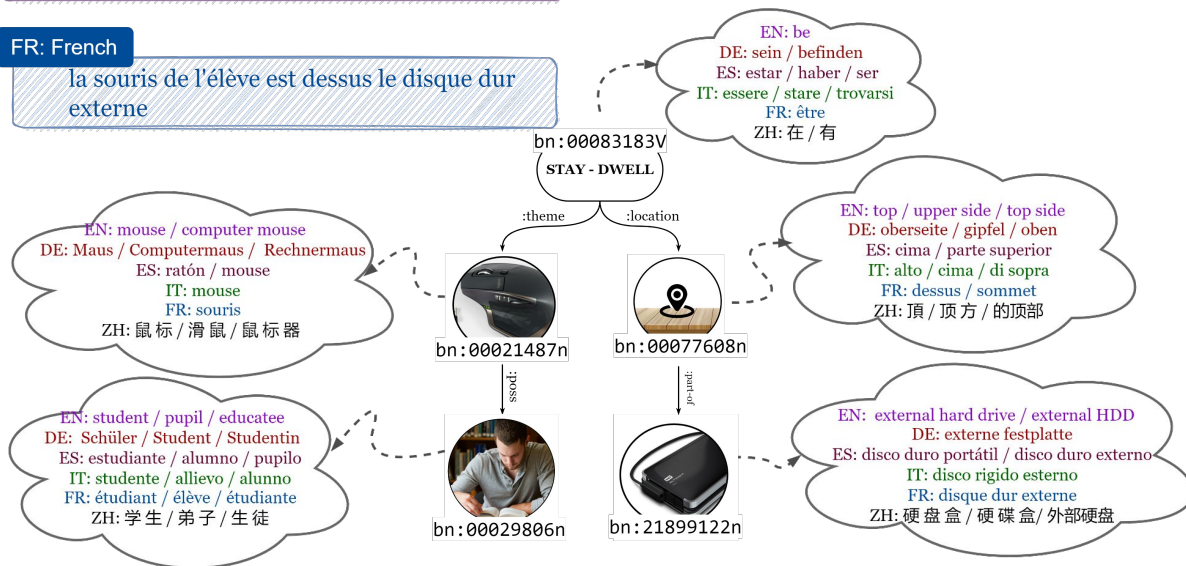
学生的鼠标在外部硬盘的顶部。

EN: English

the student's computer mouse is on the upper side of the external HDD

FR: French

la souris de l'élève est dessus le disque dur externe



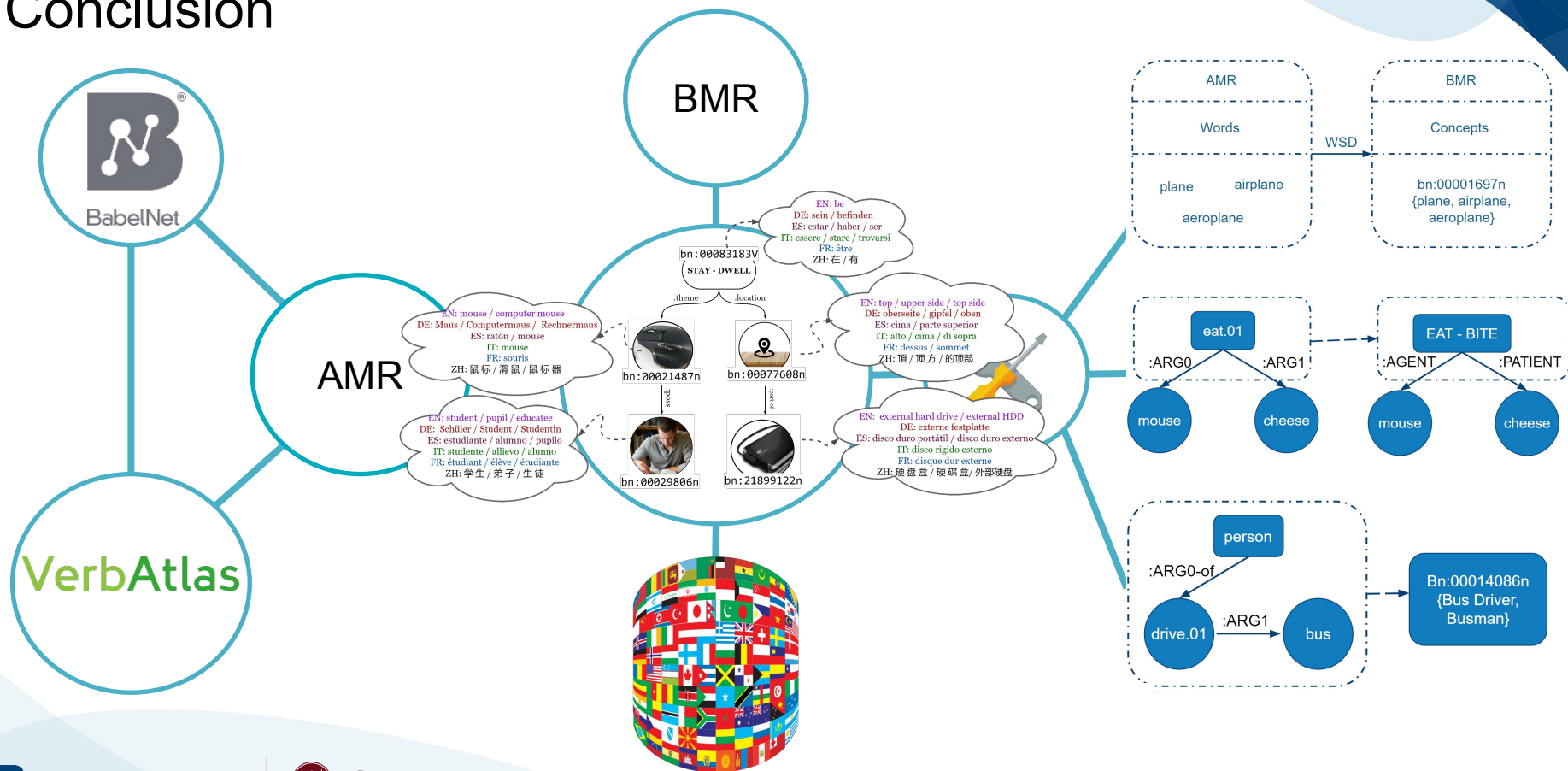
Scope of BMR

Scope of BMR

- Machine Translation (MT)
- Question Answering (QA)
- Dialogue
- Vision, Speech, and more
- Knowledge Representation

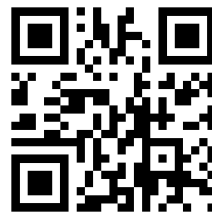
Conclusion

Conclusion



Thank you for your attention!

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