Refining Implicit Argument Annotation for UCCA

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What Are and Why Implicit Arguments?

- Large neural language models cannot achieve human-analogous natural language understanding (Bender and Koller, 2020).

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- Large neural language models cannot achieve human-analogous natural language understanding (Bender and Koller, 2020).

- Implicit argument: argument that does not explicitly show up in an event.

“Just take the money!”

Related Work

- **Implicit Argument Typology**
  - FrameNet (Ruppenhofer et al., 2006): CNI, DNI, INI.
  - Lyngfelt (2012): DNI, INI, GNI, ISNA.
  - O'Gorman (2019): Script-inferrable, Salient/recent, Deictic, Remembered Roles, Bridging, Genre-based, Type-identifiable, Generic, Cataphoric, Low-information, Iterated Events

Related Work

- **Implicit Argument Datasets for NLP**
  - SemEval-2010 Task 10 (Ruppenhofer et al., 2009)
  - Beyond NomBank (Gerber and Chai, 2010, 2012)
  - Multi-sentence AMR (O'Gorman et al., 2018)

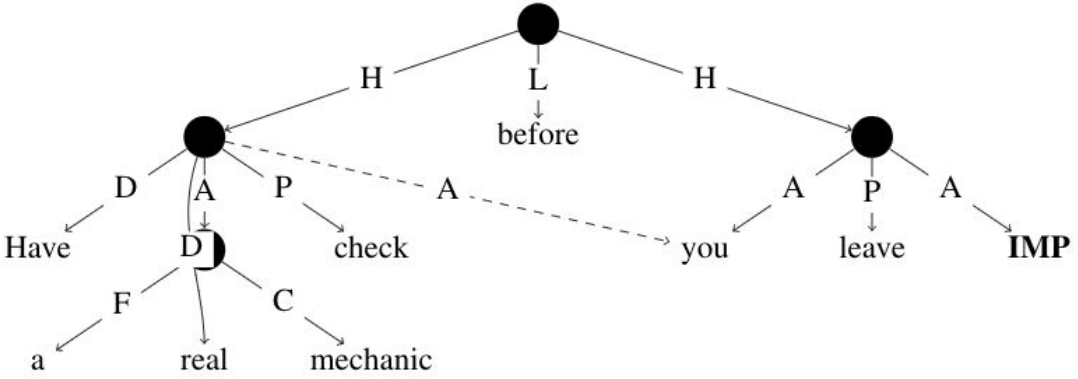
- **Implicit Arguments in Meaning Representations**
  - On UCCA's foundational layer (Abend and Rappoport, 2013)
    - English data annotated on Wiki, English Web Treebank (EWT)…
    - Also annotated on German, French, Hebrew.

Necessity of Our Work

- Current UCCA's implicit argument annotation is **coarse** and **language-specific**.
- No current implicit argument typology directly aligns with UCCA's design principles.
- There is no fine-grained implicit argument **open dataset** in NLP research.

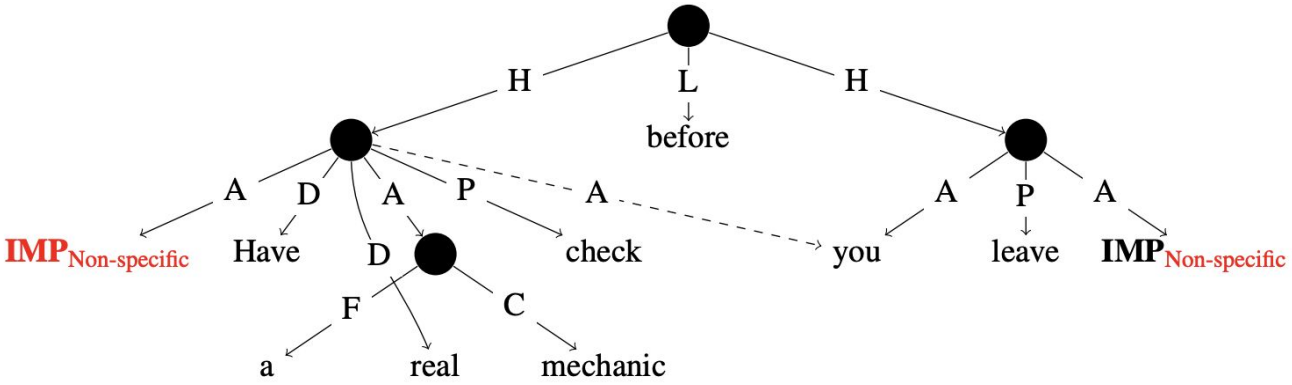
Universal Conceptual Cognitive Annotation (UCCA)

Current UCCA:



Participant	A	Linker	L
Center	C	Connector	N
Adverbial	D	Process	P
Elaborator	E	Quantifier	Q
Function	F	Relator	R
Ground	G	State	S
Parellel Scene	H	Time	T

Refined UCCA:



Proposing a Fine-grained Implicit Argument Typology

Examples:

1. Delivery$_P$ is$_F$ [lightning$_E$ fast$_C$]$_D$ $IMP_{Genre-based}$ $IMP_{Non-specific}$!
2. [Great$_D$ service$_P$ $IMP_{Genre-based}$ $IMP_{Generic}$]$_H$ and$_L$ [awesome$_S$ prices$_A$]$_H$.

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Proposing a Fine-grained Implicit Argument Typology

O'Gorman 2019	Definite	Indefinite	Edge Cases	UCCA's Implicit Refinement
Salient/recent	✓			✗
Remember Roles	✓			✗
Script-inferrable	✓			✗
Deictic	✓			Deictic
Cataphoric		✓		✗
Low-information		✓		Non-specific
Iterated Events		✓		Iterated-set
Bridging			✓	✗
Genre-based			✓	Genre-based
Generic			✓	Generic
Type-Identifiable			✓	Type-Identifiable

Proposing a Fine-grained Implicit Argument Typology

Main advantages:

1. Centers around semantic notion of **Scene**.
2. Focuses on **essential** implicit arguments.
3. Low annotation **ambiguity** and complexity.

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Reviewing and Refining UCCA

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Reviewing: adding missing implicit arguments in original EWT

	# Passages	# Passages w/ Implicit	# Sentences	# Sentences w/ Implicit	# Implicit (Valid)
Original	200 (out of 723)	103	306	111	153 (98)
Refined	200	116	393	221	**415 (385)**

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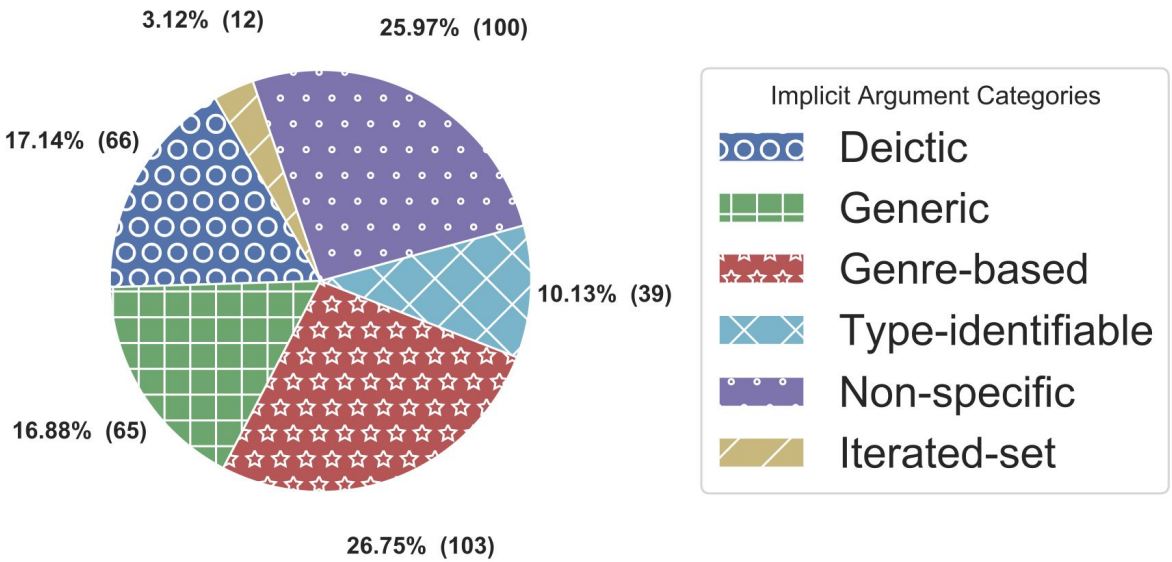
Refining: categorizing implicit arguments according to our fine-grained typology



Conclusion

Main Contributions:

- We proposed a fine-grained typology for implicit argument annotation.
- We provided a pilot dataset for conceptually rich annotation of implicit arguments.

Future Research:

- (Ongoing) **Validate** the dataset and re-assess the annotation scheme.
- (Ongoing) Design a **parser** for fine-grained implicit arguments.
- Extend to larger scale, more languages.

Thank you!

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