



Technical Specification

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IAT/ML by Institute of Heritage Sciences (Incipit), Spanish National Research Council (CSIC) & University of Santiago de Compostela (USC)



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Introduction

IAT/ML is a methodology for the combined ontological, argumentation and agency analysis of discourse, based on Inference Anchoring Theory (IAT) and the ConML conceptual modelling language. This document provides a semi-formal and detailed description of the structural elements that compose IAT/ML, collectively called its metamodel.

A research-oriented description of the IAT/ML metamodel can be found in [2].

Architecture

The IAT/ML metamodel is organised around the following components:

- Context
- Ontology
- Argumentation
- Agency

Figure 1 depicts this architecture.

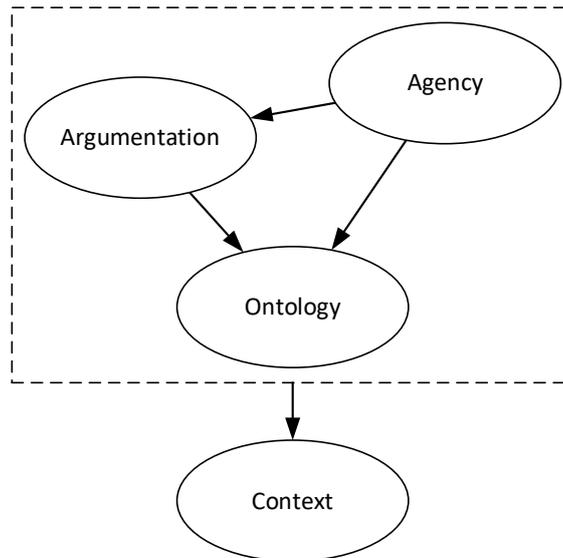


Figure 1. Overall architecture of the IAT/ML metamodel. Arrows express dependencies between components.

The Context component contains elements related to the situation being addressed through discourse analysis, in terms of issues, themes, positions and agents.

The Ontology component contains elements related to the ontology being referred to by the discourse, including ontology elements such as entities, facets and features.

The Argumentation component contains elements related to the argumentative structure of the discourse, including its locutions, transitions, propositions and argumentation relations such as inferences, conflicts and rephrases. Locutions are connected to ontology elements via denotations.

Finally, the Agency component contains elements related to the questions that you may ask the text as well as their responses and their parts.

The following sections provide a detailed description of the metamodel elements in each of these components.

Context Component

This component contains metamodel elements related to the context of your project. Please see Figure 2 for a diagram depicting the Context component.

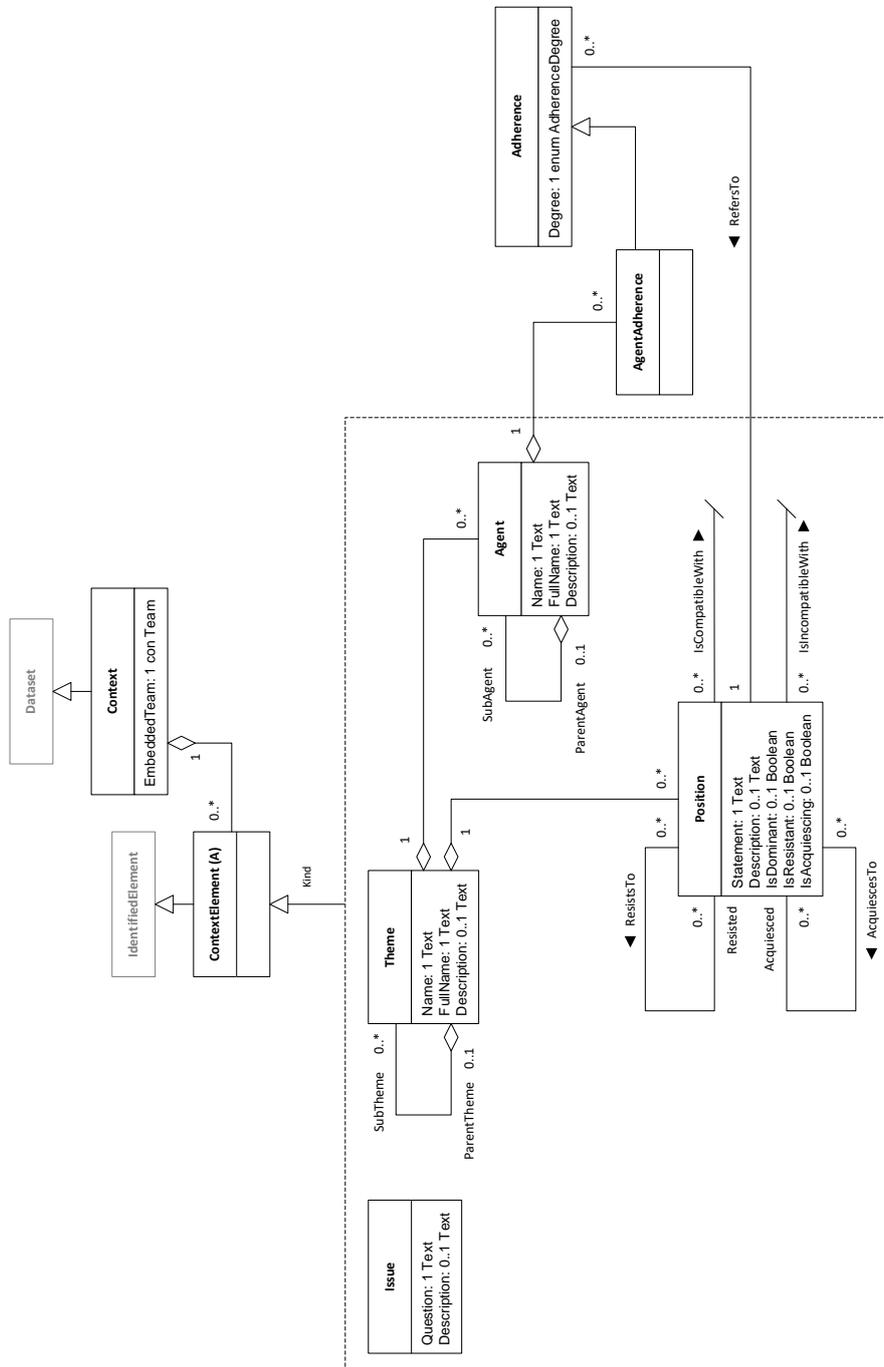


Figure 2. Section of the IAT/ML metamodel depicting the contents of the Context component.

Context

In IAT/ML, a context is *a representation of a situation being researched*.

The signature of a context is this:

Context(Name: 1 Text, Elements: 0 … n ContextElement)

Context Element

A context element is *an atomic element in a context*.

There are four kinds of context elements: issues, themes, positions and agents.

Issue

An issue is *a context element that represents a question or knowledge gap that you would like to fulfil*.

Issues are useful to represent research problems that you want to address through discourse analysis.

Theme

A theme is *a context element that represents a subject or idea to be investigated*.

Themes can have sub-themes, and be contained in parent themes.

The signature of a theme is this:

Theme(Name: 1 Text, ParentTheme: 0 … 1 Theme, SubThemes: 0 … n Theme)

Position

A position is *a context element that represents a well-known belief that is supported by some and attacked by others*.

Each position pertains to a theme, which is called its owner.

The signature of a position is this:

Position(Statement: 1 Text, OwnerTheme: 1 Theme)

Agent

An agent is *a context element that represents an individual or group that has a voice, or should have a voice, about some positions*.

Like position, each agent pertains to a theme, which is called its owner. And, like themes, agents can have sub-agents, and be contained in parent agents.

The signature of an agent is this:

*Agent(Name: 1 Text, OwnerTheme: 1 Theme, ParentAgent: 0 … 1 Agent,
SubAgents: 0 … n Agent)*

Ontology Component

This component contains metamodel elements related to the ontology referred to by the speakers. Please see Figure 3 for a diagram depicting the Ontology component.

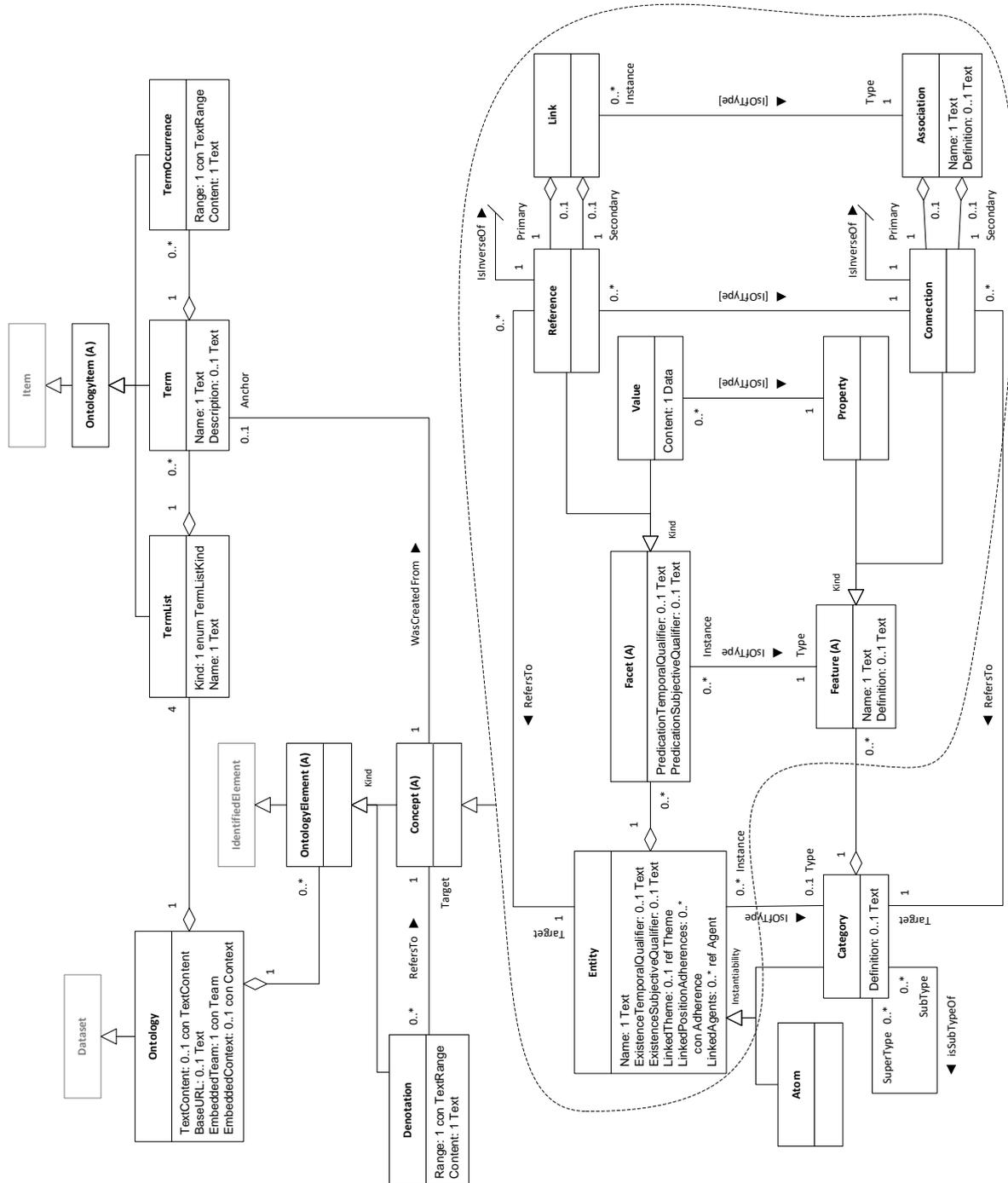


Figure 3. Section of the IAT/ML metamodel depicting the contents of the Ontology component.

Ontology

In IAT/ML, an ontology is a representation of a collection of things in the world.

The signature of an ontology is this:

Ontology(Name: 1 Text, Elements: 0 .. n OntologyElement)

Ontology Element

An ontology element is *an atomic element in an ontology*.

Ontology elements in IAT/ML may work as proxies to elements in an external ontology expressed in an external and richer compatible language such as ConML [1].

There are three kinds of ontology elements: concepts and denotations.

Concept

A concept is *an ontology element that represents a thing in the world*.

There are five kinds of concepts: entities, facets, features, links and associations.

Entity

An entity is *a concept that represents an identity-bearing thing in the world*.

The signature of an entity is this:

Entity(Name: 1 Text, Type: 0 .. 1 Category, Facets: 0 .. n Facet)

Entities are organised in the metamodel according to a multi-level modelling scheme, so that high-order classification relationships are possible.

There are two kinds of entities: atoms and categories.

Atom

An atom is *an entity that represents a non-instantiable thing in the world*. Atoms are called urelements in set theory.

The signature of an atom is this:

Atom(Name: 1 Text, Type: 0 .. 1 Category, Facets: 0 .. n Facet)

Category

A category is *an entity that represents a class of things in the world*. Categories correspond to sets in set theory.

The signature of a category is this:

Category(Name: 1 Text, Type: 0 .. 1 Category, Facets: 0 .. n Facet, Features: 0 .. n Feature)

In addition, categories can be arranged in subtyping hierarchies.

Facet

A facet is *a concept that represents a predication on an entity in the world*.

The signature of a facet is this:

Facet(Owner: 1 Entity, Type: 1 Feature)

There are two kinds of facets: values and references.

Value

A value is *a facet corresponding to a quantity or quality of an entity.*

The signature of a value is this:

Value(Owner: 1 Entity, Type: 1 Property, Content: 1 Data)

Reference

A reference is *a facet corresponding to a directed relationship of an entity to another entity.*

The signature of a reference is this:

Reference(Owner: 1 Entity, Type: 1 Connection, Opposite: 1 Entity)

A reference is always part of one link.

Feature

A feature is *a concept that represents a type of predication on entities of a given category.*

The signature of a feature is this:

Feature(Owner: 1 Category)

There are two kinds of features: properties and connections.

Property

A property is *a feature corresponding to quantities or qualities of the entities of a given category.*

The signature of a property is this:

Property(Owner: 1 Category)

Connection

A connection is *a feature corresponding to directed relationships of entities of a given category to entities of another category.*

The signature of a connection is this:

Connection(Owner: 1 Category, Opposite: 1 Category)

A connection is always part of one association.

Link

A link is *a concept that represents a bidirectional relationship between two entities.*

A link is composed of two opposed references, one in each direction.

The signature of a link is this:

Link(Primary: 1 Reference, Secondary: 1 Reference)

Association

An association is *a concept corresponding to bidirectional relationships between entities of given categories.*

An association is composed of two opposed connections, one in each direction.

The signature of an association is this:

Association(Primary: 1 Connection, Secondary: 1 Connection)

Denotation

A denotation is *an ontology element that represents a semantic connection between some text content and a concept.*

The signature of a denotation is this:

Denotation(Content: 1 Text, Target: 1 Concept)

Argumentation Component

This component contains metamodel elements related to the argumentation as issued by speakers. Please see Figure 4 for a diagram depicting the Argumentation component.

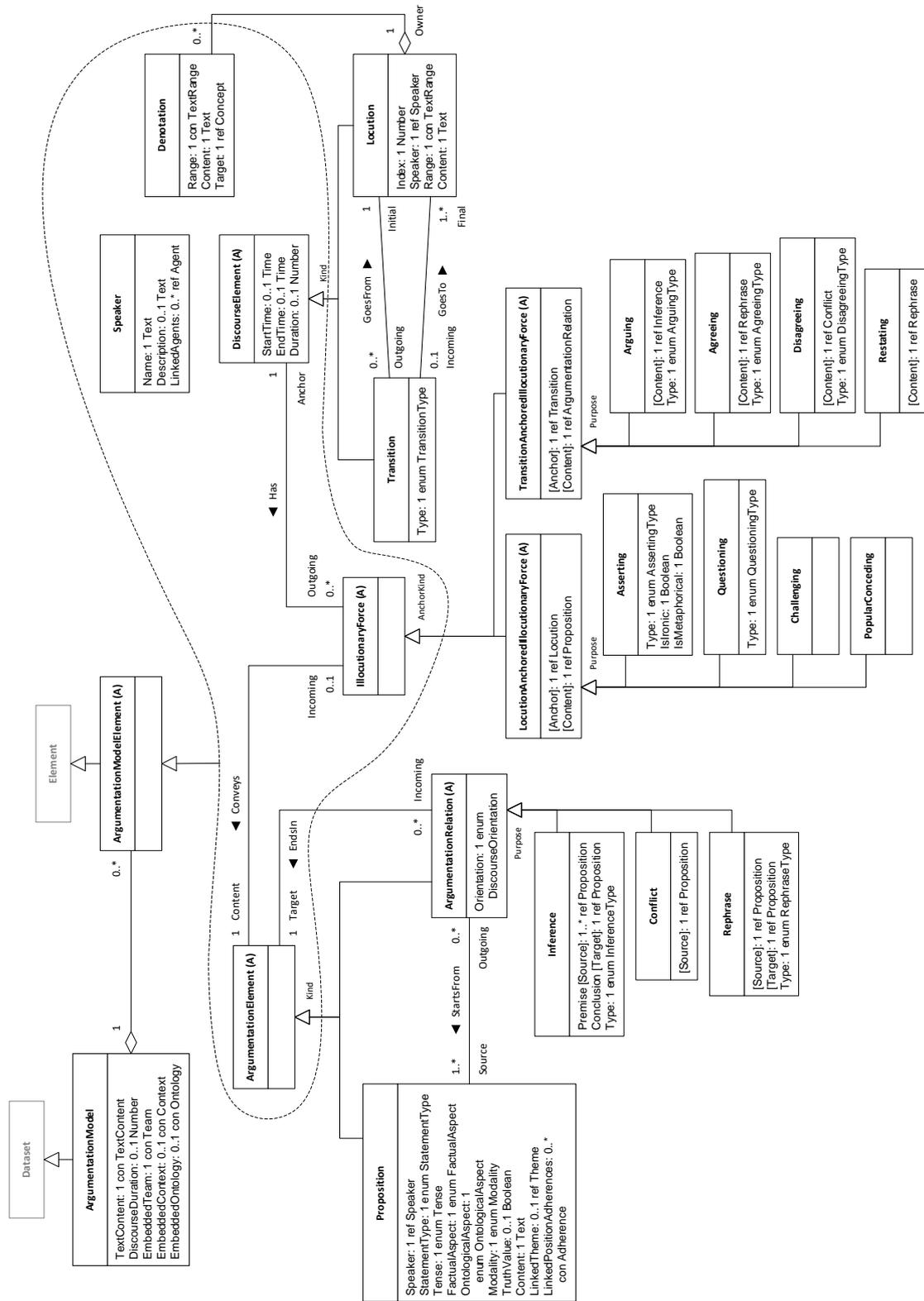


Figure 4. Section of the IAT/ML metamodel depicting the contents of the Argumentation component.

Argumentation Model

In IAT/ML, an argumentation model is *a representation of a discourse and its argumentation structure*.

The signature of an argumentation model is this:

ArgumentationModel(Name: 1 Text, Elements: 0 .. n ArgumentationElement)

Argumentation Model Element

An argumentation model element is *an atomic element in an argumentation model*.

There are five kinds of argumentation elements: speakers, discourse elements, denotations, argumentation elements and illocutionary forces.

Speaker

A speaker is *an argumentation model element corresponding to an individual or group who participates in a discourse*.

The signature of a speaker is this:

Speaker(Name: 1 Text)

At least one speaker is necessary for a discourse to exist.

Discourse Element

A discourse element is *an atomic segment of a discourse*.

The signature of a discourse element is this:

DiscourseElement(StartTime: 1 Time, EndTime: 1 Time)

Discourse elements within a discourse are strictly time-ordered, even in multi-speaker settings. Each discourse element has unique start and end timestamps that position it within the discourse.

There are two kinds of discourse elements: locutions and transitions.

Locution

A locution is *a discourse element representing an utterance made by a speaker during the discourse*.

The signature of a locution is this:

Locution(StartTime: 1 Time, EndTime: 1 Time, Speaker: 1 Speaker, Content: 1 Text)

Transition

A transition is *a discourse element representing a discursive relationship between locutions*.

Transitions show discursive dependencies. Transitions do not represent the chronological order of the discourse (which is given by timestamps) but must be compatible with it. Transitions provide the links that help the interpretation of a locution in relation to immediately related ones.

The signature of a transition is this:

Transition(Initial: 1 Locution, Final: 1 … n Locution)

Where:

$\forall f: Final, f.TimeStamp > Initial.TimeStamp$

Multiple transitions may share a common initial locution, but only one transition may arrive to any given final locution.

Subtypes

A transition may be of one of the following subtypes:

- **Adding:** the speaker continues talking by adding a new locution right after the previous one.
- **Alternating:** the speaker continues talking by offering an alternative locution to the previous one.
- **Contrasting:** the speaker continues talking by contrasting a new locution in relation to the previous one.
- **Embedding:** the speaker embeds a locution into another, by e.g. apposition.
- **Reporting:** the speaker reports a locution from another agent.
- **Turn Taking:** the speaker takes a turn right after the previous speaker.

Denotation

A denotation is *an argumentation model element that represents a semantic connection between some text content in a given locution and a concept in a related ontology.*

The signature of a denotation is this:

Denotation(Owner: 1 Locution, Content: 1 Text, Target: 1 Concept)

Denotations work as the “glue” that connects elements in the discourse to concepts in the associated ontology.

Argumentation Element

An argumentation element is *an atomic element in the argumentation structure of the discourse.*

There are two kinds of argumentation elements: propositions and argumentation relations.

Proposition

A proposition is *an argumentation element corresponding to a state of affairs about the world.*

Propositions are self-contained and do not include unresolved references (such as anaphoric or deictic elements), so that their truth value is stable and as independent of the context as possible.

The signature of a proposition is this:

Proposition(Speaker: 1 Speaker, Content: 1 Text)

Propositions are reconstructed by the analyst from locutions.

Propositions possess a number of properties through which they can be characterised, as described in the next sections.

Statement Type

The statement type of a proposition describes what kinds of values it involves. Table 1 shows the available options.

Name	Definition
Fact	The proposition is free from values that are not shared by everyone in the group. Example: <i>“My car is white”, “I have a headache”</i> .
Value	The proposition involves values beyond those that are shared by everyone in the group, such as values of some group members (but not all) or values of external agents. Example: <i>“The Beatles are the best band ever”</i> .

Table 1. Statement types of propositions.

Factual Aspect

The factual aspect of a proposition describes the kind of fact that it describes. Table 2 shows the available options.

Name	Definition
Static	The proposition expresses a state rather than a change.
Existence	The proposition expresses that an entity exists, such as <i>“There is a cat”</i> .
Identity	The proposition expresses that two references point at the same entity, such as <i>“That woman is my sister”</i> .
Predication	The proposition expresses that an entity has a property.
Attribution	The proposition expresses that an entity has a quality, such as <i>“That house is tall”</i> or <i>“Houses are comfortable”</i> .
Relation	The proposition expresses that an entity is related to another entity, such as <i>“That house belongs to my sister”</i> or <i>“People can own houses”</i> .
Classification	The proposition expresses that an entity is an instance of a given category, such as <i>“That is a house”</i> .
Subsumption	The proposition expresses that a category is subsumed by another category, such as <i>“Houses are buildings”</i> .
Dynamic	The proposition expresses a change rather than a state.
Activity	The proposition expresses that an entity carries out an action with no necessary end, such as <i>“The man is running”</i> .
Telic	The proposition expresses that an entity carries out an action with a necessary end.
Accomplishment	The proposition expresses that an entity carries out an action ending after a given duration, such as <i>“We painted the wall”</i> .
Achievement	The proposition expresses that an entity carries out an action that occurs instantaneously, such as <i>“She arrived at the hotel”</i> .

Table 2. Factual aspects of propositions.

Ontological Aspect

The ontological aspect of a proposition describes its ontological domain (logical, physical or social) plus a related aspect (impossible, possible, necessary or contingent). Table 3 shows the available options.

Name	Definition
Logically impossible	The proposition expresses something that is impossible according to the rules of logic. Example: <i>“This is a round square”</i> .
Logically possible	The proposition expresses something that is possible according to the rules of logic.
Logically necessary	The proposition expresses something that is necessary according to the rules of logic. Example: <i>“This triangle has three sides”</i> . Logically necessity implies physical and social necessity.

Name	Definition
Logically contingent	The proposition expresses something that is contingent (may or may not be) according to the rules of logic.
Physically impossible	The proposition expresses something that is impossible according to the rules of the physical world. Example: <i>“Objects fall upwards”</i> .
Physically possible	The proposition expresses something that is possible according to the rules of the physical world.
Physically necessary	The proposition expresses something that is necessary according to the rules of the physical world. Example: <i>“Every person has a mother and a father”</i> . Physical necessity implies social necessity.
Physically contingent	The proposition expresses something that is contingent (may or may not be) according to the rules of the physical world.
Socially impossible	The proposition expresses something that is impossible according to the rules of society. Example: <i>“This car costs 2 €”</i> .
Socially possible	The proposition expresses something that is possible according to the rules of society.
Socially necessary	The proposition expresses something that is necessary according to the rules of society. Example: <i>“Children go to school”</i> .
Socially contingent	The proposition expresses something that is contingent (may or may not be) according to the rules of society. Example: <i>“Some people get married”</i> .

Table 3. Ontological aspects of propositions.

Three additional properties can be derived from a proposition’s ontological aspect:

- **Derived Logical Aspect**, which describes the possibility, impossibility, necessity or contingency of a proposition within the logical domain.
- **Derived Physical Aspect**, which describes the possibility, impossibility, necessity or contingency of a proposition within the physical domain.
- **Derived Social Aspect**, which describes the possibility, impossibility, necessity or contingency of a proposition within the social domain.

Table 4 describes the values of these derived variables depending on the value of a proposition’s ontological aspect.

Ontological aspect	Derived Logical Aspect	Derived Physical Aspect	Derived Social Aspect
Logically impossible	Impossible	Impossible	Impossible
Logically possible	Possible	(undefined)	(undefined)
Logically necessary	Necessary	Necessary	Necessary
Logically contingent	Contingent	(undefined)	(undefined)
Physically impossible	(undefined)	Impossible	Impossible
Physically possible	Possible	Possible	(undefined)
Physically necessary	Possible	Necessary	Necessary
Physically contingent	Possible	Contingent	(undefined)
Socially impossible	(undefined)	(undefined)	Impossible
Socially possible	Possible	Possible	Possible
Socially necessary	Possible	Possible	Necessary
Socially contingent	Possible	Possible	Contingent

Table 4. Values for variables derived from ontological aspect.

In Table 4, note that some values of ontological aspect do not allow to obtain some derived values, as indicated by the text “(undefined)”. Also, note that possibility is inherited “upwards” (from more specific to more general domains) whereas impossibility is inherited “downwards”.

Modality

The modality of a proposition describes the kind of content that it conveys. Table 5 shows the available options.

Name	Definition
Realis	The proposition expresses that something is, was or will be.
Indicative	The proposition expresses a fact about the world, thus representing it. It may refer to the past, present, or future. Example: <i>"My car is white"</i> .
Declarative	The proposition changes the world through language. Example: <i>"I declare you husband and wife"</i> .
Irrealis	The proposition expresses what may or must be.
Epistemic	The proposition expresses what an agent believes.
Definitional	The proposition expands a term into its definition as agreed upon within the associated group (expanding definitional) or compresses a definition into a term (compressing definitional). Example: <i>"This is a triangle, so it must have three sides"</i> . Definitional propositions require an additional proposition that acts as context, consisting of a reference to the expanded term (for expanding definitional propositions) or to the definition itself (for the compressing definitional propositions).
Noetic	The proposition expresses a consequence of some reasoning. Example: <i>"Socrates must be mortal because he is human"</i> . Noetic propositions are conclusions, and thus require one or more additional propositions that act as premises, some or all of which may be implicit.
Presumptive	The proposition expresses an inferential consequence of adopting a commonly held belief. Example: <i>"Alice has been a dentist for 40 years; she must be quite an expert"</i> . Presumptive propositions are conclusions, and thus require one or more additional propositions that act as premises, some or all of which may be implicit, and at least one of them referring to commonly held belief. Also, note that presumptive propositions are inferential but not necessarily reasoned (i.e. they may not be conceptual and conscious).
Conditional	The proposition expresses the potential consequence of a past or unknown situation (the condition). Example: <i>"If it rains tomorrow, then we will cancel the field trip"</i> . Conditional propositions should not be mistaken with counterfactual constructions (e.g. <i>"If I had played that number, I would have won the prize"</i>), which do not have conditional modality and should be reconstructed as two separate propositions connected by an inference.
Interrogative	The proposition expresses a question, that is, a demand for information. Example: <i>"How old are you?"</i> , <i>"I wonder how old you are"</i> . Interrogative propositions are often formulated in the interrogative mood.
Deontic	The proposition expresses a state of the world that an agent thinks should be.
Commissive	The proposition expresses a commitment by the speaker. Example: <i>"I will help you with your homework"</i> .
Directive	The proposition expresses a command or request by the speaker. Example: <i>"Come with me"</i> , <i>"You must try"</i> , <i>"Please, pardon me"</i> . Directive propositions demand a specific action or response in a given time frame, and are often formulated in the imperative mood.
Suggestive	The proposition expresses a suggestion or recommendation by the speaker. Example: <i>"You shouldn't smoke so much"</i> . Suggestive propositions do not demand a specific action or response in a given time frame.
Volitive	The proposition expresses a wish or desire by the speaker. Example: <i>"If only I were rich!"</i> .

Table 5. Modalities of propositions.

Tense

The tense of a proposition refers to when in time the proposition is referring to. Usually, this coincides with the grammatical tense of the main verb in the proposition. Table 6 shows the available options.

Name	Definition
Past	The proposition expresses a state of affairs in the past.
Present	The proposition expresses a state of affairs in the present.
Future	The proposition expresses a state of affairs in the future.
Atemporal	The proposition expresses a state of affairs that is atemporal, like a law or pattern. Example: <i>"Babies are born after nine months"</i> .

Table 6. Tenses of propositions.

Truth Value

The truth value of a proposition indicates whether it is true, false or indeterminate. Table 7 shows the available options.

Name	Definition
True	The proposition is true. Example: <i>"This triangle has three sides"</i> .
False	The proposition is false. Example: <i>"This triangle has four sides"</i> .
Indeterminate	The proposition is neither true nor false. Example: <i>"They should build more roads"</i> .

Table 7. Truth values of propositions.

Argumentation Relation

An argumentation relation is *an argumentation element corresponding to a pragmatic connection between two or more argumentation elements so that some of them are argumentally dependent on others*.

The signature of an argumentation relation is this:

$$\textit{ArgumentationRelation}(\textit{Sources}: 1 \cdots n \textit{ Proposition}, \\ \textit{Target}: 1 \textit{ ArgumentationElement})$$

Collections of related argumentation relations plus the associated propositions are called "argumentations", whereas "arguments" are subsets of these formed by propositions playing the roles of premises and conclusions plus connecting inferences.

There are three kinds of argumentation relations: inferences, conflicts and rephrases.

Inference

An inference is *an argumentation relation that indicates that one or more premise propositions are provided by a speaker to support a conclusion proposition*. All the involved premise propositions are implicitly connected via conjunction.

$$\textit{Inference}(\textit{Premises}: 1 \cdots n \textit{ Proposition}, \textit{Conclusion}: 1 \textit{ Proposition})$$

Inferences are anti-reflexive and anti-symmetric.

Patterns

Serial argument

$$\begin{aligned} & \text{SerialArgument}(ps: 3 \dots n \uparrow \text{Proposition}) \\ & \rightarrow \forall i: 1 \dots \#ps - 1, \text{Inference}(ps[i], ps[i + 1]) \end{aligned}$$

Convergent argument

$$\begin{aligned} & \text{ConvergentArgument}(pss: 2 \dots n \ 1 \dots n \ \text{Proposition}, c: 1 \ \text{Proposition}) \\ & \rightarrow \forall ps: pss, \text{Inference}(ps, c) \end{aligned}$$

Linked argument

$$\text{LinkedArgument}(ps: 2 \dots n \ \text{Proposition}, c: 1 \ \text{Proposition}) \rightarrow \text{Inference}(ps, c)$$

Divergent argument

$$\begin{aligned} & \text{DivergentArgument}(ps: 1 \dots n \ \text{Proposition}, cs: 2 \dots n \ \text{Proposition}) \\ & \rightarrow \forall c: cs, \text{Inference}(ps, c) \end{aligned}$$

Subtypes

An inference may be of one of the following subtypes, which have been adopted from [3], [4]:

- Circumstantial Ad Hominem
- Ethotic
- For Constitutive Rule Claims
- For Exceptional Case
- From Abduction
- From Alternatives
- From Analogy
- From Bias
- From Bias Ad Hominem
- From Cause to Effect
- From Classification
- From Classification Arbitrariness
- From Classification Vagueness
- From Commitment
- From Composition
- From Correlation to Cause
- From Danger Appeal
- From Definition to Classification
- From Distress
- From Division
- From Epistemic Ignorance
- From Evidence to Hypothesis
- From Example
- From Expert Opinion
- From Fear Appeal
- From Gradualism
- From Group Membership
- From Ignorance
- From Inconsistent Commitment
- From Interaction of Act and Person
- From Memory

- From Need for Help
- From Negative Consequences
- From Oppositions
- From Perception
- From Plea for Excuse
- From Popular Opinion
- From Popular Practice
- From Position to Know
- From Positive Consequences
- From Precedent
- From Rhetorical Oppositions
- From Rules
- From Sacrifice
- From Sign
- From Sunk Costs
- From Threat
- From Values
- From Waste
- From Witness Testimony
- Full Slippery Slope
- Generic Ad Hominem
- Practical Reasoning
- Practical Reasoning from Analogy
- Pragmatic Inconsistency
- Precedent Slippery Slope
- Slippery Slope
- Sorites Slippery Slope
- Two-Person Practical Reasoning
- Verbal Slippery Slope

Conflict

A conflict is *an argumentation relation that indicates that a source proposition provided by a speaker contradicts, disagrees or negates a target argumentation element.*

Conflict(Source: 1 Proposition, Target: 1 ArgumentationElement)

Conflicts are anti-reflexive. From a logic point of view, conflicts are symmetrical, that is:

Conflict(s, t) ⇔ Conflict(t, s)

However, from a discursive point of view, conflicts are related to the speaker's intention to produce a conflict, so that it does not make sense to have conflicts that flow "forward" in time, so no actual symmetry exists.

Patterns

Rebutting

Rebutting(s, t: 1 Proposition) → Conflict(s, t)

Undermining

*Undermining(s, t: 1 Proposition)
→ ∃p: Proposition, Conflict(s, p) ∧ Inference(p, t)*

Undercutting

Undercutting(*s*, *t*: 1 Proposition)
 $\rightarrow \exists p: \text{Proposition}, i: \text{Inference}, i(p, t) \wedge \text{Conflict}(s, i)$

Rephrase

A rephrase is an *argumentation relation* that indicates that a source proposition is provided by a speaker as a reformulation of a target proposition.

Rephrase(*Source*: 1 Proposition, *Target*: 1 Proposition)

Rephrases are anti-reflexive, symmetric in some cases (with opposite subtype) and transitive in some cases. See *Subtypes* below for detailed information.

Subtypes

A rephrase may be of one of the following subtypes.

- **Abstraction**: the speaker repeats the target proposition but raising the level of abstraction. This includes mechanisms such as generalisation, classification and composition.
- **Concretion**: the speaker repeats the target proposition but lowering the level of abstraction. This includes mechanisms such as specialisation, instantiation and decomposition.
- **Definition**: the speaker unpacks a term in the target proposition by describing its meaning.
- **Naming**: the speaker provides a term to name an idea in the target proposition.
- **Answer**: the speaker answers the question in the target proposition.
- **Agreement**: the speaker expresses agreement with the target proposition.
- **Change of Mind**: the speaker expresses a change of mind in relation to a part of the target proposition.
- **Repetition**: the speaker literally repeats the target proposition, or a part of it, for emphasis.
- **Paraphrasis**: the speaker repeats the target proposition by recasting it in different words that result in a mostly lexical or syntactic change, not that much rhetorical or pragmatic.
- **Reinterpretation**: the speaker reinterprets the target proposition by changing its contents but without frontally contradicting it. This includes mechanisms such as analogies, adding emotional nuance, straw man fallacies, etc.

Illocutionary Force

An illocutionary force is an *argumentation model element* corresponding to a connection between a discourse element and an argumentation element in terms of speaker intent.

The signature of an illocutionary force is this:

IllocutionaryForce(*Anchor*: 1 DiscourseElement,
Content: 1 ArgumentationElement)

There are two major kinds of illocutionary forces: locution-anchored and transition-anchored. Their signatures are these:

LocutionAnchoredIllocutionaryForce(*Anchor*: 1 Locution,
Content: 1 Proposition)

TransitionAnchoredIllocutionaryForce(*Anchor*: 1 Transition,

Content: 1 ArgumentationUnit)

There are multiple kinds of each of these.

Asserting

An asserting is *a locution-anchored illocutionary force indicating that the speaker produces an anchor locution in order to communicate that they believe a content proposition.*

Asserting(Anchor: 1 Locution, Content: 1 Proposition)

Subtypes

An asserting may be of one of the following subtypes.

- **Literal:** the speaker is making a literal assertion.
- **Questioning:** the speaker is asserting via a question.
- **Figurative:** the speaker is using figurative (non-literal) language to state something different to what they actually say.

Questioning

A questioning is *a locution-anchored illocutionary force indicating that the speaker produces an anchor locution in order to obtain new information.*

Questioning(Anchor: 1 Locution, Content: 1 Proposition)

Subtypes

A questioning may be of one of the following subtypes.

- **Pure:** the question seeks new information without providing a predefined answer.
- **Assertive:** the question seeks new information but provides a predefined answer.

Challenging

A challenging is *a locution-anchored illocutionary force indicating that the speaker produces an anchor locution in order to obtain a new proposition that works as a premise for a base proposition.*

Challenging(Anchor: 1 Locution, Content: 1 Proposition)

Popular Conceding

A popular conceding is *a locution-anchored illocutionary force indicating that the speaker produces an anchor locution in order to communicate that they believe a well-known and commonly accepted content proposition.*

PopularConceding(Anchor: 1 Locution, Content: 1 Proposition)

Arguing

An arguing is *a transition-anchored illocutionary force indicating that the speaker produces an anchor transition to support a content inference.*

Arguing(Anchor: 1 Transition, Content: 1 Inference)

Subtypes

An arguing may be of one of the following subtypes.

- **Factual:** the speaker is arguing from a fact.
- **Counterfactual:** the speaker is arguing from a potential situation that was not the case.

Agreeing

An agreeing is a transition-anchored illocutionary force indicating that the speaker produces an anchor transition to react affirmatively to a base proposition through a content rephrase.

Agreeing(Anchor: 1 Transition, Content: 1 Rephrase)

The base proposition to which the speaker is agreeing is given by the anchor transition's initial locution.

Subtypes

An agreeing may be of one of the following subtypes.

- **Full:** the speaker is agreeing fully, with no reservations.
- **Partial:** the speaker is agreeing partially.

Disagreeing

A disagreeing is a transition-anchored illocutionary force indicating that the speaker produces an anchor transition to react negatively to a base proposition through a content conflict.

Disagreeing(Anchor: 1 Transition, Content: 1 Conflict)

The base proposition the speaker is disagreeing with is given by the anchor transition's initial locution.

Subtypes

A disagreeing may be of one of the following subtypes.

- **Full:** the speaker is disagreeing fully, with no concessions.
- **Partial:** the speaker is disagreeing partially.

Restating

A restating is a transition-anchored illocutionary force indicating that the speaker produces an anchor transition to recast a base proposition through a content rephrase.

Restating(Anchor: 1 Transition, Content: 1 Rephrase)

The base proposition the speaker is restating is given by the anchor transition's initial locution.

Question Set

A question set is *a collection of questions that can be formulated on a discourse in order to discover the related agents' beliefs, desires and intentions.*

The signature of a question set is this:

QuestionSet(Name: 1 Text, Elements: 0 .. n QuestionSetElement)

Question Set Element

A question set element is *an atomic element in a question set.*

There are three kinds of question set elements: question groups, questions and entity lists.

Question Group

A question group is *a question set element that contains related questions.*

Question groups can have sub-groups, and be contained in parent groups.

The signature of a question group is this:

*QuestionGroup(Name: 1 Text, ParentGroup: 0 .. 1 QuestionGroup,
SubGroups: 0 .. n QuestionGroup)*

Question

A question is *a question set element in the form of a query posed to a discourse with the aim to help discover the beliefs, desires and intentions of the associated agents.*

A question always belongs to a particular question group.

The signature of a question is this:

Question(Wording: 1 Text, Group: 1 QuestionGroup)

Questions can be subject- or object-scoped to speakers, agents and entity lists. Please see the *IAT/ML Analysis Process Guidelines* and *IAT/ML Agency Patterns Guidelines* for additional details on how question scoping works.

There are four kinds of questions: text questions, itemised questions, option list questions, and agent questions.

Text Question

A text question is *a question that can be responded with a piece of free text.*

Itemised Question

A text question is *a question that can be responded with one or more brief text items.*

Option List Question

A text question is *a question that can be responded with one or more pre-defined items from an option list.*

Agent Question

A text question is a *question that can be responded with one or more references to agents in the associated context.*

Entity List

An entity list is a *question set element in the form of a thematic container for entities mentioned in the discourse.*

Entity lists work as object scopes for questions.

Agency Model

In IAT/ML, an agency model is a *representation of a discourse in terms of the beliefs, desires and intentions of the related agents.*

An agency model is always based on a particular question set.

The signature of an agency model is this:

AgencyModel(Name: 1 Text, QuestionSet: 1 QuestionSet, Elements: 0 .. n AgencyModelElement)

Agency Model Element

An ontology element is an *atomic element in an agency model.*

There are three kinds of agency model elements: speakers, entities and responses.

Speaker

A speaker is an *agency model element corresponding to an individual or group who participates in a discourse.*

The signature of a speaker is this:

Speaker(Name: 1 Text)

Entity

An entity is an *agency model element representing a thing mentioned in the discourse and having analytical relevance.*

An entity always belongs to an entity list of the associated question set.

The signature of an entity is this:

Entity(Name: 1 Text, Owner: 1 EntityList)

Response

A response is an *agency model element representing an answer to a particular question in the associated question set.*

The signature of a response is this:

Response(Target: 1 Question, Parts: 1 .. n ResponsePart)

A response contains one or more response parts, one for each combination of applicable speaker, agent and entity scopes as dictated by the associated question. Please see the *IAT/ML Analysis Process Guidelines* and *IAT/ML Agency Patterns Guidelines* for additional details on how response scoping works.

Response Part

A response part is *a portion of a response corresponding to a particular combination of scopes*.

The signature of a response part is this:

*ResponsePart(Owner: 1 Response, SubjectSpeakerScope: 0 .. 1 Speaker,
ObjectSpeakerScope: 0 .. 1 Speaker, ObjectAgentScope: 0 .. 1 Agent,
ObjectEntityScope: 0 .. n Entity)*

There are four kinds of response parts: text response parts, itemised response parts, option list response parts, and agent response parts.

Text Response Part

A text response part is *a response part that contains a piece of free text*.

Every text response part is owned by a response to a text question.

Itemised Response Part

An itemised response part is *a response part that contains one or more brief text items*.

Every itemised response part is owned by a response to an itemised question.

Option List Response Part

An option list response part is *a response part that contains one or more pre-defined items from an option list*.

Every option list response part is owned by a response to an option list question.

Agent Response Part

An agent response part is *a response part that contains one or more references to agents in the associated context*.

Every agent response part is owned by a response to an agent question.

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