Contents

1 Introduction

This document provide annotation guidelines for the QuickAnnotate annotation task.

2 Places, Paths and Spatial Entities

2.1 Places

The PLACE tag is used to annotate geographic entities and regions like *lakes* or *mountains* as well as administrative entities like *towns* or *countries*. This tag is predominantly inherited from SpatialML, but, for the purposes of this Pilot Annotation, PLACE tags will be manually annotated as follows.

E.g. Boston is north of New York(Color Unify)

2.1.1Place Extents

In general, places are referred to explicitly in language such that there is some textual extent that can be captured, i.e., consumed, with a PLACE markup tag. A place is generally a noun phrase (NP) and, in this Pilot Annotation, only the head nouns of NPs should be marked. Example (1) shows some extents that should be captured with the PLACE tag.

2.1.2 Place Attributes

The majority of attributes for the PLACE tag (shown in Table 1) are inherited from SpatialML.

Attribute	**Value**
Dimensionality	Point, Line, Area or Volume
Form	NAM or NOM
Elevation	a MEASURE ID
Mod	a spatially relevant modifier
DCL	TRUE or FALSE (default: FALSE)
countable	TRUE or FALSE

Cotinent	AF, AN, AI, AU, GO, LA, NA, PA or SA
country	
state	
Province	
CTV	CITY, TOWN OR VILLAGE
Gazref	
Latitude	
Longtitude	
Type	Water, Celestial, Civil, Country, Grid, Latlong, MTN, MTN, Postal Code, PostBox, PPL, PPLA, PPLC, Region, State or UTM

Table 1: PLACE Tag Attributes

Explanation :

E.g. I camped one night . . . in the small [townpl1] of [Monte Friopl2].

place (id=pl1, form=nom, mod="small")

place (id=pl2, form=nam)

2.2 Paths

The path tag captures locations where the focus is on the potential for traversal or the location functions as a boundary between regions. This includes common nouns like road, river, and border

as well as proper names like *Route 66* and *Kangamangus Highway*. The distinction between places and paths is not always clear-cut. Take for example the case of *river* in *follow the river* and *cross the river*. The first case clearly is a path, but one could argue that in the second case the traversal functionality is not accessed and therefore *river* could be annotated as a PLACE. While the inferences that can be made with both places and paths are actually identical, it is important for inter-annotator agreement to try to apply a diagnostic test to determine if a location should be tagged as a PLACE or a PATH.

One useful heuristic is the "*be-at/take*" test. That is, while you can *be at* a place or path location, you can only *take* or *follow* a path. In general, we are looking for consistency such that when an annotator comes across something like a *road*, which typically has the potential to be traversed or followed, the annotator need not consider whether that particular road is actually functioning more like a place in that particular context. For example, *roads, rivers, alleys, walls, stairways, shorelines, ridgelines* and *mountain ranges*, among other locations, should be consistently marked with the PATH tag since they all function as static paths or boundaries.

2.2.1 Path Extents

As with places, paths occur predominantly within noun phrases, and, consistent with the PLACE tag, only the head of the NP should be captured as the extent for the PATH tag. Note that the PATH tag is only used to capture static, non-stative paths. Stative paths and event-paths introduced by motion predicates are captured using the MOTION tag[2]. As an example, *trip* in *the **trip** from the parking lot to the beach* would not be tagged as a PATH, but *walkway* in *the **walkway** from the parking lot to the beach*, would.

2.2.2 Path Attributes

You will notice that the PATH tag attributes in Table 2 overlap with with the PLACE tag. The attributes specific to the PATH tag that annotators must consider, namely beginID, endID, and midIDs, are discussed in this section.

Attribute	Value
type	BODYOFWATER, MTS, ROAD
beginID	ID of a location/entity/event tag whose location is a bounding point for the PATH
endID	ID of a location/entity/event tag whose location is a bounding point for the PATH
midIDs	ID(s) list of midpoint locations
dimensionality	LINE, AREA or VOLUME
form	NAM or NOM
elevation	a MEASURE ID

mod	a spatially relevant modifier
countable	TRUE or FALSE

Excluding continuous loops, or rays with an individual bounding point, paths typically have discernible endpoints. However, the locations of a path's endpoints may not be explicit in the text. Example (3a) illustrates a PATH tag for which the endpoints happen to be explicit and Example (3b) shows a case where the endpoints are unspecified

2.3 Spatial Entities

Generally, anything that is spatially relevant but that does not fit into either the PLACE or PATH categories is considered to be a spatial entity. That is to say, a spatially relevant entity must be both located in real-space and participate in a link tag. In practice, moving objects and objects that have the potential to move are most commonly tagged as SPATIAL ENTITY. In both Examples (5a) and (5b), *car* should be marked as a SPATIAL ENTITY. In the first case, it is the mover in a motion event and, however in the second case, it behaves like a PLACE. Note, though, that it should still be annotated as a SPATIAL ENTITY since cars function as a form of transportation, regardless if they are mentioned in a context where they don't happen to be in motion. Spatial objects, such as buildings, which do not function as a mode of transportation, should normally be annotated with the PLACE tag, though they may seem to function like more like spatial entities in certain contexts. E.g., *tower* is annotated as a SPATIAL ENTITY in Example (5e), since it is participating as a mover in a motion event, rather than functioning like a PLACE.

e.g.

2.3.1 Spatial Extents

The same extent rules apply for SPATIAL ENTITY as do for PLACE and PATH. I.e., only the head of the NP should be captured as the extent.

2.3.2 Spatial Attributes

Because tagging something as a SPATIAL ENTITY is akin to treating it like a location, the SPATIAL ENTITY tag shares its attributes with the PLACE tag type. The list of SPATIAL ENTITY attributes is shown in Table 3.

Attribute	Value
type	FAC, VEHICLE, PERSON, DYNAMIC EVENT, . . .
dimensionality	POINT, LINE, AREA or VOLUME
form	NAM or NOM
mod	a spatially relevant modifier
countable	TRUE or FALSE

3 Event Path and Motion Events

3.1 Event Path

For the purposes of this task, non-motion events are taken to be a sub-species of event. The term "event" is borrowed directly from TimeML. It has the following definition: *Event* is used as a cover term for situations that *happen*, *occur*, *hold*, or *take place*. Events can be punctual (Example (10)) or last for a period of time (Example (11)).

Eg10 a. Ferdinand Magellan, a Portuguese explorer, first **reached** the islands in search of spices.

b. A fresh flow of lava, gas and debris **erupted** there Saturday.

Eg11a. 11,024 people, including local Aeta aborigines, **were evacuated** to 18 disaster relief cen- ters.

3.1.1 Event Path Extents

3.1.3 Event Path Attributes

When you encounter a spatially relevant event, tagging it with the NONMOTION_EVENT tag will generate an NONMOTION_EVENT ID that can then be used to relate the event to other tag elements. Since events are really the responsibility of TimeML, any inherited attributes are not necessary to discuss here, and are not the responsibility of annotators for this task. The attributes relevant to this task are the optional elevation and mod attributes, and the countable attribute, which are treated the same as for the location tags discussed in Sections 2.1.2, 2.2.2 and 2.3.2.

Note: The countable attribute for NONMOTION_EVENT should only be specified for instances of nominal events—for verbal forms, the countable attribute should be left unspecified.

3.2 Motion

A motion is a species of event that involves movement. Note that every MOTION tag will participate in a relation with whatever participates in the motion-event. That is to say, in creating a MOTION tag the annotator is also committing to creating at least one MOVELINK for that MOTION. Motion- events receive special attention in this task since they are inherently spatial. Motion-events come in three varieties:

1. Bare-Manner Motion: e.g., John walked.

3.2.1 Motion Extents

Table 5 shows the attributes for the motion tag. The id attribute is automatically generated, but the annotator should fill in values for the remaining attributes.

The motion type attribute refers to the distinction mentioned earlier in this section. Manner-of-motion events (those with the motion type value manner) are relatively rare in the corpus. In order to receive this value, there can be no indication of the source (starting location), goal (ending location), or mid-point locations of the event-path. path and compound motion-events are more common in the corpus.

motion tags of the path motion_type are those that have an explicit component of the path of motion evident in the text, but that have no indication of the manner in which the motion is performed. The sentences in Example include only path type motion-events.

3.2.2 Motion Attributes

Table 5 shows the attributes for the MOTION tag. The id attribute is automatically generated, but the annotator should fill in values for the remaining attributes.

The motion type attribute refers to the distinction mentioned earlier in this section. Manner- of-motion events (those with the motion type value MANNER) are relatively rare in the corpus. In order to receive this value, there can be no indication of the source (starting location), goal (ending location), or mid-point locations of the event-path. PATH and COMPOUND motion-events are more common in the corpus.

MOTION tags of the PATH motion type are those that have an explicit component of the path of motion evident in the text, but that have no indication of the manner in which the motion is performed. The sentences in Example include only PATH type motion-events.

Attribute	**Value**
motion type	MANNER, PATH, COMPOUND
motion class	MOVE, MOVE EXTERNAL, MOVE INTERNAL, LEAVE, REACH, DETACH, HIT, FOLLOW, DEVIATE, CROSS
motion sense	LITERAL, FICTIVE, INTRINSIC CHANGE
mod	a spatially relevant modifier
countable	TRUE or FALSE

Motion Sense Value	**Examples**
LITERAL	*John biked, the ball rolled, the balloon rose*
FICTIVE	*the river ran, the road climbed, the mountains rose*
INTRINSIC CHANGE	*the glacier receded, the river rose, the balloon expanded*

Eg.

4 Spatial Signals and Measurements

4.1 Spatial Signals

A SPATIAL SIGNAL is a word that supplies information to a spatial link. For example, the spatial signals are highlighted in each of the sentences in Example (58).

(58) a. The cup is [ons1] the table.

b. Boston is [north ofs2] New York.

c. Danielle was headed [west-northwests3] at near 17 mph (28 kph).

d. The new skyscraper [ats4] 111 Huntington Avenue was completed in 2002, [directly acrosss5] the street from The Colonnade Hotel.

In general, spatial signals are prepositions or prepopistional phrases that reveal the particular relationship between two location tag elements, thereby helping the annotator decide what kind of links should be used and what the values for attributes in those links should be. Recall that MOTION SIGNAL tags and SPATIAL SIGNAL tags have different functions: spatial signal tags always supply information about topological or qualitative spatial relations between other elements, and MOTION SIGNAL tags capture information specifically about the path or manner of a motion- event.

4.1.1 Spatial Signal Extents

The extents for spatial signals are usually one word prepositions and are generally easy to spot. Example (59) illustrates some markable extents captured with the SPATIAL SIGNAL tag type.

4.1.2 Spatial Signal Attributes

Attribute	Value
cluster	identifies the sense of the preposition
semantic type	DIRECTIONAL, TOPOLOGICAL, DIR TOP

4.2 Measures

A MEASURE is a special kind of spatial signal that captures distances and dimensions and introduces a measure link (i.e., an MLINK11). MEASURE tags consist of a numerical component and a unit component as shown in Example (60a) through Example (60d), or consist of a relative measurement term such as in Example (60e).

4.2.1 Measure Extents

The extent for the MEASURE tag includes the numerical component and the unit component. The sentences in Example (60) each contain a MEASURE tag.

4.2.2 Measure Attributes

The attributes for the MEASURE tag are fairly straightforward as shown in Table 10. The value attribute should have a numerical value for the numerical component of the MEASURE. The unit of measurement should be stored in the unit attribute, as shown in Example (61).

Attribute	Value
value	number component
unit	measurement phrase component

5 Spatial Relationships

Thus far, all of the tags that have been discussed have involved tagging some spatially relevant span of text. The remainder of the tag types capture information about spatial relationships between those tagged elements. There are four link tag types. The link tags are:

1. QSLINK — qualitative spatial links;
2. OLINK — orientation information;
3. MOVELINK — movement links;
4. MLINK — defining the dimensions of a location.

5.1 qualitative spatial links

A qualitative spatial link captures the topological relationship between two spatial objects. For this reason, they are triggered by SPATIAL SIGNAL tags with a semantic type of either TOPOLOGICAL or DIR TOP. Topological information primarily refers to containment and connection relations between two regions. The possible relationships come from a field of research called Qualitative Spatial Reasoning (QSR), which primarily deals with how abstract objects relate. Since most of the spatial objects that are mentioned in natural language text are not abstract, however, QSR is generally

insufficient for fully capturing the intended relationship between the objects. For that reason, both qSLINK and OLINK tags may be required to fully capture spatial relationships.

For example, consider the sentence: The cup is on the table. The SPATIAL SIGNAL on in this sentence tells us that the cup is in direct contact with the table. This is topological information. However, a simple "direct contact" relationship does not say whether the cup is sitting on top of the table (the likely intended relationship) or if it is somehow clinging to the side of or hanging from beneath the table (not likely, but possible). To capture this aspect of the relationship, an OLINK is required. This is discussed in Section 5.2. For now, though, let us focus on qualitative spatial relation (QSR) based relationships.

SpaceEvaluses the Region Connection Calculus (RCC) as the basis for its qualitative spatial relationships. RCC is concerned with how regions (spatial objects) are connected to each other. RCC8+, a variant of RCC8, which consists of 8 basic relations, is used as a basis for the possible relationships between regions. The RCC8 along with in and out will be referred to as RCC8+. Table 11 defines the different relationships that RCC8+captures and Figure 1 shows an abstract example of the RCC8 relations.

The objects participating in a spatial relation with one another are referred to by different labels, but for SpaceEval, the argument labels are identified as trajector or landmark. The trajector is the object being related to the landmark while the landmark is what the trajector is being related to. It is not a universal rule, but, often, the trajector is a movable object while the landmark tends to be more static. In the cup and table example above, the cup is the trajector while the table is the landmark. The next section includes several examples that should help clarify this distinction.

5.1.1 Qualitative Spatial Link Attributes

Attribute	Value
relType	DC, EC, PO, EQ, TPP, TPPi, NTPP, NTPPi, IN, OUT
trajector	ID of location/entity/event tag that is being related
landmark	ID of the location/entity/event tag that is being related to
trigger	ID of the spatial signal that triggered the link

5.2 Orientation Links

The OLINK tag covers those relationships that occur between two locations that are non-topological in nature. Orientation links essentially fill in the spatial relations that qSLINK tags cannot capture. This includes three different types of information based on the three frames of reference as follows:

1. **Absolute**: This frame of reference can be considered the "bird's eye" view.
2. **Intrinsic**: This frame of reference is used when some part of a spatial object has an intrinsic orientation such as a TV, which has an intrinsic front.
3. **Relative**: This frame of reference is used when the relationship being described depends on a particular entity's point of view.

5.2.1 Orientation Link Attributes

Attribute	Value
id	ol1, ol2, ol3, . . .
relType	ABOVE, BEHIND, NEXT TO, NORTH OF, . . .
trajector	ID of the location/entity/event tag that is being related
landmark	ID of the location/entity/event tag that is being related to
trigger	ID of the spatial signal that triggered the link
frame type	ABSOLUTE, INTRINSIC, RELATIVE
referencePt	cardinal direction, ground entity, viewer entity
projective	TRUE, FALSE

5.3 Movement Links

The MOVELINK tag connects motion-events with mover-participants. The other attributes of the MOVELINK tag are then used to specify any evident information about components of the event- path as well as any motion signals. MOVELINK tags are always introduced by a triggering MOTION tag. Therefore, whenever an annotator tags an extent with the MOTION tag, they are committing to also creating a corresponding MOVELINK. The annotation for the MOVELINK depends on the motion type of the MOTION (i.e., MANNER, PATH, or COMPOUND). A bare-manner motion verb (e.g., David cycles seriously) still triggers a MOVELINK, though most of the attributes will be underspecified since there is no evident event-path information. At the other extereme, it's possible for PATH or COMPOUND type motions to make use of the full range of MOVELINK attributes.

5.3.1Movement Link Attributes

Attribute	Value
id	mvl1, mvl2, mvl3, . . .
trigger	ID of a MOTION that triggered the link

source	ID of a location/entity/event tag at the beginning of the event-path
goal	ID of a location/entity/event tag at the end of the event-path
midPoint	ID(s) of event-path midpoint location/entity/event tags
mover	ID of the locatin/entity/event tag whose location changes
ground	ID of a location/entity/event tag that the mover participant's motion is relative to
goal reached	TRUE, FALSE, UNCERTAIN
pathID	ID of a PATH tag that is identical to the event-path of the trigger MOTION
motion signalID	ID(s) of (an) MOTION SIGNAL tag(s) that contributes path or manner information to the trigger MOTION

5.4 MLINK -- Measure Links

The MLINK tag serves two purposes. First, it can be used to capture the distance between two locations as in The bone is two feet from the dog. Such relationships are commonly accompanied by a MEASURE extent, but this is not a requirement. For example, the phrase the hot dog stand near Macy's also introduces an MLINK since near is interpreted on a scale.

In addition to relating two spatial objects, measure links can also be used to describe the dimensions of a single object. Locations, spatial entities, and even events possess spatial dimensions that may be captured by an MLINK tag. A typical case where the MLINK tag is used is when the length dimension of a location is described as in The football field is 100 yards long. Note, however, that the MLINK tag can also capture dimensions of motion-events as in I rode 30 miles (Examples (68b) and (68c)). In such a case the MLINK is actually specifying a dimension of the event-path introduced by the MOTION.

5.4.1 Measure Link Attributes

Attribute	Value
id	ml1, ml2, ml3, . . .
trajector	ID of a location/entity/event tag
landmark	ID of the related location/entity/event tag
relType	DISTANCE, LENGTH, WIDTH, HEIGHT, or GENERAL DIMENSION
val	NEAR, FAR, TALLER, SHORTER, or ID of a MEASURE tag
endPoint1	ID of a location/entity/event tag at one end of a stative-path
endPoint2	ID of a location/entity/event tag at the other end of a stative-path

6 Phased Approach for the Pilot Annotation

This section outlines a phased approach for conducting the annotation. In this approach there will be tow annotation phases: one for extent tags and one for link tags. In Phase 1, annotators will tag PLACE, PATH, SPATIAL ENTITY, NONMOTION EVENT,

MOTION SIGNAL, NONMOTION EVENT, MEASURE, and SPATIAL SIGNAL extents. In this phase, annotators will also create any non-consuming tags in anticipation of links that will require them. Then a round of adjudication for the extent tags will be performed. Subsequently, in Phase 2, annotators will create all MOVELINK, MLINK, OLINK, and QSLINK tags. A final round of adjudication will be performed for the link tags after Phase 2.

6.1 Outline of Phases

- Extents Annotation

– Phase 1

1. Places
2. Paths
3. Spatial Entities
4. Motions
5. Motion Signals
6. Events
7. Measures
8. Spatial Signals

- Extents Adjudication
- Links Annotation

– Phase 2

1. Movement Links
2. Measure Links
3. Orientation Links
4. Qualitative Spatial Links

- Links Adjudication

This phased approach is intended to divide the annotation into sub-tasks. Due to interdepen- dencies in the sub-tasks, Phase 2 must be built on top of Phase 1. This division of the annotation and adjudication task anticipates multiple annotators and adjudicators working on the phases in- dependently, but also, importantly, is intended to ensure that annotators will never be creating links between unadjudicated extent tags.

While the phases are somewhat independent, there are a few dependency caveats. The follow- ing list provides recommendations and exceptions to the order as outlined previously.

- All Phase 2 annotations must be built on top of Phase 1. After a Phase 2 annotation is complete, the resulting annotation ought to include all tags from Phases 1 and 2, combined.

- Phase 2 annotations must be built on top of an adjudicated set of extent tags, thus a Phase 2 annotation will be created on top of a file containing a locked set of extent tags. After the links for Phase 2 have been created, the resulting annotation will be complete, pending the final adjudication of the link tags.

- In the case that a MEASURE tag ID would be used to fill an elevation attribute for an extent tag created in Phase 1, then it is recommended that annotators create the measure tag immediately so that the elevation may be filled concurrently.

- Non-consuming tags16 should be created in anticipation of their participation of any links. For example, in the event that an annotator creates a MOTION tag in Phase 1, and a non- consuming tag would ultimately participate in the MOVELINK triggered by that MOTION—as is often the case with the CROSS motion class, for example—then the non-consuming tag should be created at the same time as the MOTION tag.

- This applies to spatial signals as well (e.g., across). If a SPATIAL SIGNAL tag annotated in Phase 1 would trigger an OLINK or qSLINK in which a non-consuming location tag would participate then that non-consuming tag should be created at the same time as the SPATIAL SIGNAL if it was not already created in Phase 1.

- Similarly, if a non-consuming tag would ultimately participate in an MLINK then the non- consuming tag should be created at the same time as the MEASURE tag which would trigger the MLINK.

7 Annotation Examples

8 U or Annotation

The following pages include directions for using Mobile Annotator for annotation. In addition, the following guidelines should be followed for this Pilot Annotation.

1.For now, you should manually fill in the values for all link attributes, including those that come from Mobile Annotator 's from and to attributes.

2. If there is more than one comment in the comment field, separate them by semi-colons.

Techniques in Quick Annotator Annotation

I. Getting Started

All annotation for Quick Annotator will be done with browser an annotation tool written by…..

II. Using Quick Annotator

Add Some screenshots

...And that's it! You are now ready to tag extents and set up links, which covers all the annotation work needed for ISO-Space.