New Testament Names: a Semantic Knowledge Base

Table of contents

1 Overview....2
2 Why Do We Need This?....3
2.1 OWL, the Semantic Web Language....3
3 What's It Good For?....3

1. Overview

NTN (for New Testament Names) is a semantic knowledge base describing each named thing in the New Testament, about 600 names in all. Each named thing (an *entity*) is categorized according to its *class*, including God, Jesus, individual men and women, groups of people, and locations. These entities are related to each other by *properties* that interconnect the entities into a web of information, all represented in a standardized language with formal semantics, and shared on the Web with URI's for others to use and extend. You can download it from this page.

NTN is *the first semantic Bible information available on the Web*, as far as i can tell (and i've looked). See below for what this claim really means. Of course, there are many wonderful websites with Bible texts, search tools, reference materials, maps, and the like, all designed around natural language for human readers. But they don't provide any standardization, which is essential to machine processing of the information. Some Bible providers (and blogs) are now using RDF as part of an RSS feed to provide e.g. a daily Bible verse: however, these are still primarily web services and text containers, with little semantic information or meta-data included. NTN, on the other hand, provides a reusable Web-based Bible resource for the Digital Age, a first step toward incorporating content from the New Testament into the Semantic Web.

Schematic of NTN classes and relationships

The main classes and properties that relate them to each other are illustrated above (omiting many details). The most important classes include:

- `Human`, as well as other kinds of `Agent` (God and other supernatural beings, whether real and malevolent (Satan) or supposed (Zeus, Artemis))
- `GeographicArea`, with sub-classes of `City`, `StateOrProvince`, `Island`, bodies of water, and a few other types
- `GroupOfPeople`, either defined by beliefs (Jews), ethnicity (Israelites, Samaritans), residence in a particular area (Galileans), or membership in political or religious organizations (Pharisees, Sadduccees)

Properties express the relationships between classes:

- `associate`, `spouseOf`, and `parentOf`/`childOf` are the main properties between `Human`s
- `member` expresses the relationship between a `Human` and a `GroupOfPeople`
- a `GeographicArea` can have a `subregion` (or be a `subregionOf`), and can be a `nativePlaceOf`, `residentPlaceOf`, or `visitedPlaceOf` a `Human`
- less-constrained properties like `occupation` and `description` are simple strings

Several other classes are either included to help the class organization, to maintain consistency with other ontologies, or to represent less frequent name classes: for example, `Character` (Alpha, Omega) and `Language` (Greek, Aramaic, Hebrew).

2. Why Do We Need This?

The purpose of NTN is to provide a standardized and sharable representation of *data*. So it's not intended for direct consumption by end-users, and it's not itself an application: instead, it provides a resuable knowledge base of Bible information that can provide a foundation for many different applications.

The W3C's Semantic Web home page is a great jumping-off point for information about the endeavor of bringing the Web up to the next level of usefulness by adding semantic meta-data. Ultimately, this work is just one tiny step in the direction of a complete conceptual annotation of the Scriptures, which is the grand vision of the Semantically-Annotated New Testament (SemANT). That's still a distant dream, but every bit of progress helps clarify the rest of the journey.

2.1. OWL, the Semantic Web Language

NTN is represented in OWL, the Ontology Web Language which was recently released as a W3C recommendation. OWL in turn is built on RDF, and expressed in XML. If you look at the NTN data with a text viewer, you'll see a dismaying number of angle brackets, pound signs, and other notation. While the file is technically readable text, it's not very understandable unless you know about OWL, RDF, and XML: it's really meant for processing by program. Most people will want to view it using special editors like Protege that understand OWL and provide a more friendly interface (be sure to get the OWL plug-in) . Here's a screenshot of (most of) the classes, and some of the instances of the Woman class, displayed in Protege. This (large) diagram shows the whole class structure.

3. What's It Good For?

Even though NTN isn't an end-user application, it's hard to see its value without some concrete examples. I soon hope to develop at least a few applications to show what you can do with it in the areas of:

> **Search:**
> There's no easy way to search for the names of Timothy's mother and grandmother, unless you already know them (though you can find them in a good Bible dictionary). There's no way whatsoever to easily understand who worked alongside Barnabas, or what cities they visited, other than undertaking an

exhaustive survey. But linking information together conceptually makes these kinds of searches possible.

Visualization:

Geographic data is particularly appropriate for visualizations: where were the people Paul addressed, and what routes did his co-workers travel?

Social Networks (who knew who):

Graphing social networks can reveal patterns of relationships that are otherwise obscured in textual descriptions

Beyond software applications, the process of making knowledge explicit provides an important benefit to our overall understanding. Often it's only when we attempt to formalize our knowledge that we discover the areas where our understanding is still implicit or incomplete.