BENAZIR BHUTTO SHAHEED UNIVERSITY

LYARI, KARACHI

DOMAIN:

KARACHI SOFTWARE HOUSES

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1) Tool Used:

In this Semantic Web project, I have used the facilities and utilities of the Protégé tool. It is an open source editor tool to develop complex as well as simple ontologies. These ontologies can help create smart and intelligent systems in this modern era.

2) Topic Inspiration:

The project topic is inspired by my own field, i.e. Software Development. As software house is the main component that supports my field, so making a system that would tell about the software houses in the city of Karachi shall be very helpful. For the recommendation of best software houses to the pass-out graduates, the system shall depict information due to these ontologies and relationships created in our system. This is the contribution in my own field due to which I got motivated to work on it.

3) Background Knowledge Of Topic:

As our topic is about software houses, so sharing some background about it is necessary in this report. First of all we shall look on what Software House is? What kind of work is done in it? Then we shall discuss some of its types and roles and a little history in the end.

Software House is a place or an organization where there is an activity of developing the software products. They also work on the distribution of these softwares to their clients. When talking about the goal of software house, it is simply as to fulfil the client's software requirement and this could vary definitely. Each of the methods in a software house's workflow requires a unique design process, distribution strategy, professional approach, development technique, and many other factors.

There are some types of software houses. Two major of them are Product-based Software House, and Service-based Software House. Product-based Software Houses aim to develop their own and unique products according to the client's need. Service-based Software Houses have their own importance. Businesses hire the service-based firms to deliver services such as specialized software development, counseling, and professional development teams.

The history tells us all that the first ever software company was built in the year 1955, namely Computer Usage Company. They used to develop hardware as well as software. Today, there are more than 1 million of Software Houses all across the globe. If we talk about Pakistan, there are more than 2000 different software companies contributing in the different sectors of Information Technology.

4) Previously Work Done On Selected Topic:

There is no such work done in the past specifically regarding the software house recommendation system. But, there is the ontological research on the software project management and software engineering. I tried to go unique in my project and this contribution shall aid for better.

5) Introduction:

In this project, I have made semantics of the software houses in the city of Karachi. I have fulfilled multiple phases (that shall be discussed in detail in the next section) for this purpose. For the overview, I have made classes of Software House, giving their names and different domains in individuals. After that, I have made ontological relations between these individuals in order to specify each of the software house present in our classes. Moreover, there is also some data about the software houses that where they're located and when were they built. All of the work is concluded in the form of triples, while giving object and data properties to define each and every relation and statement in a clear way. Let's move forward to our next section of Phases in our project.

6) Phases:

In my project, I have worked on 10 phases of making web semantics and ontological description of my domain. Here is the detail of each of them below:

i.   Classes and Subclasses:

Figure 01:

Classes

As my domain is about Karachi Software Houses, so the main parent class that I have made is of Software House. It is further divided into subclasses which refer to Domains that software house possesses, its location in Karachi, and names of different software houses.
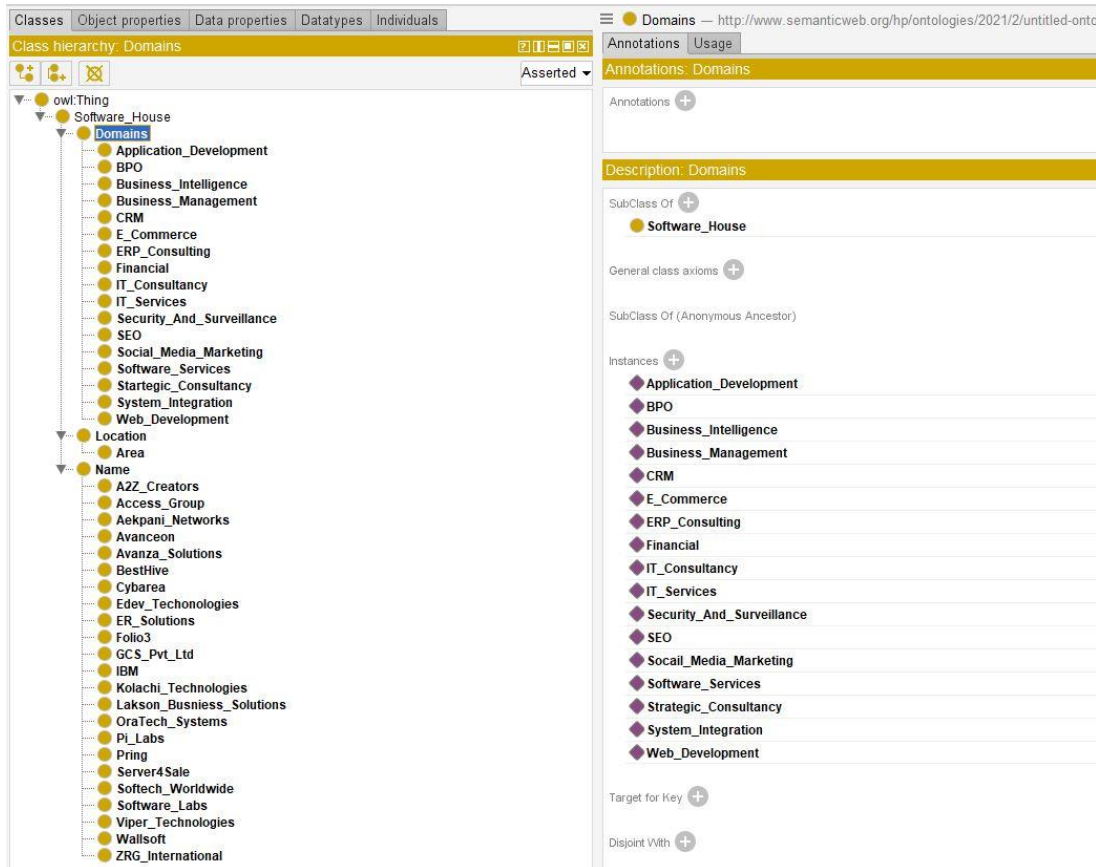

Figure 02:

Subclasses

For the subclasses further, I have added the domain names in a software house. These include subclasses like, Web Development, SEO, IT Consultancy, Business Intelligence, etc. For the subclasses of the "Name" class, I have added the names of software houses in Karachi. These include ER Solutions, Edev Technologies, Server4Sale, etc.
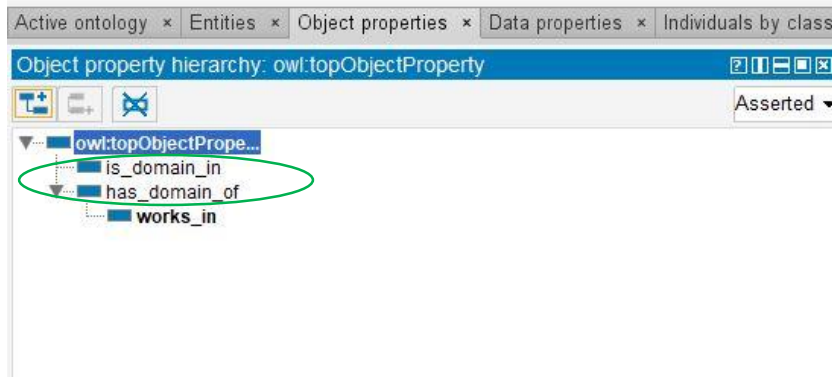
ii.   Object Properties:

Figure 03:

Object Properties

These are our object properties. They will help us define relation between domain and ranges / individuals. As we have software house names and their domains, we shall related them both with the help of properties, defining that which software house contains which domain.
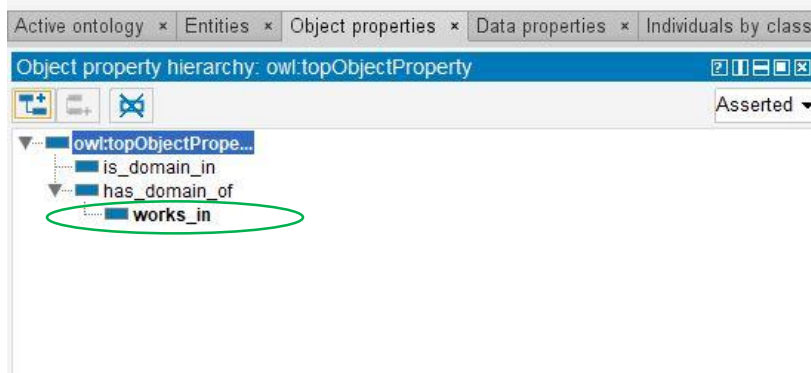
iii.   Object Sub-Properties:

Figure 04:

Object Sub-properties

An object property can carry sub-properties as well. These define the same meanings as the parent property depicts. Here we have a property as "has domain of", and its sub-property is "works in". So the relation will be the same as we want to describe that X software house has domain of / works in Y domain.
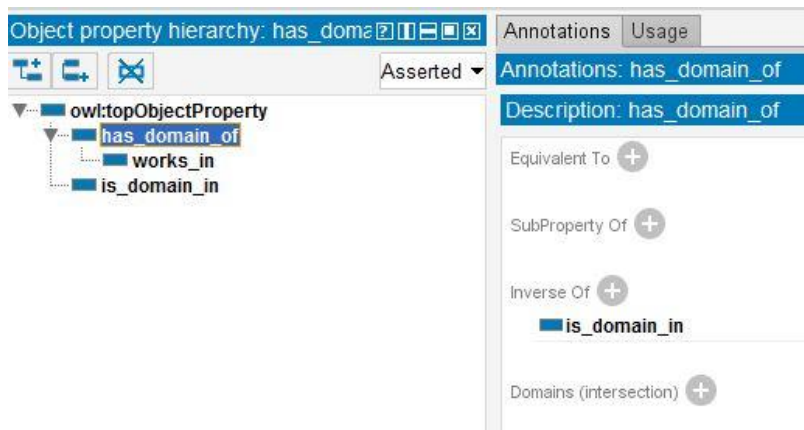
iv.   Inverse Object Properties:

Figure 05:

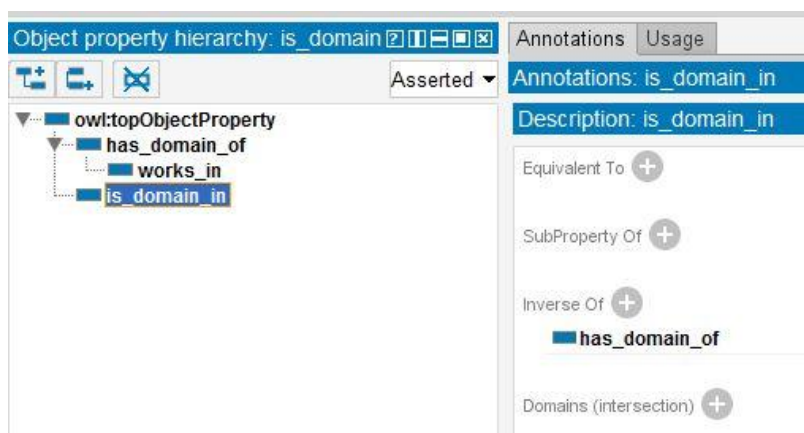Inverse Object Properties (1)

Figure 06:

Inverse Object Properties (2)

Inverse Object property refers to that property that replaces the domain and range with each other in a statement. Here, we have an object property as "has domain of", we make statement X software house has domain of Y. If we see the inverse object property, it says "is domain in", i.e. Y is domain in X software house.
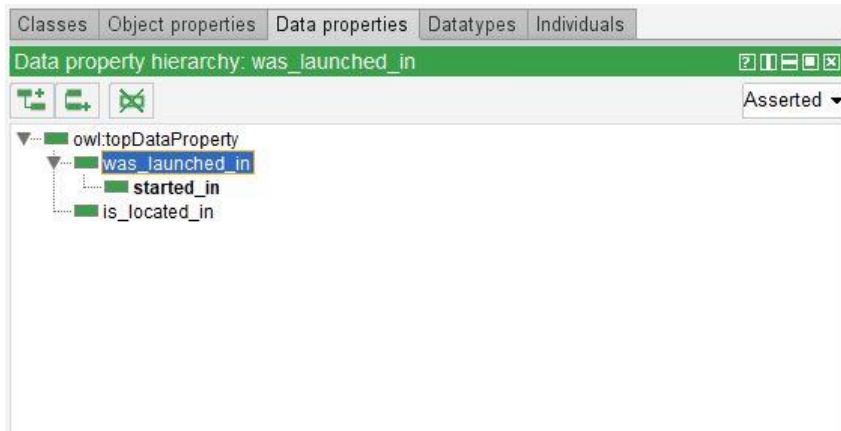
v. Data Properties:

Data properties define about some domain or an individual. Here we have the data properties for our software houses that will describe about their launch date and location.
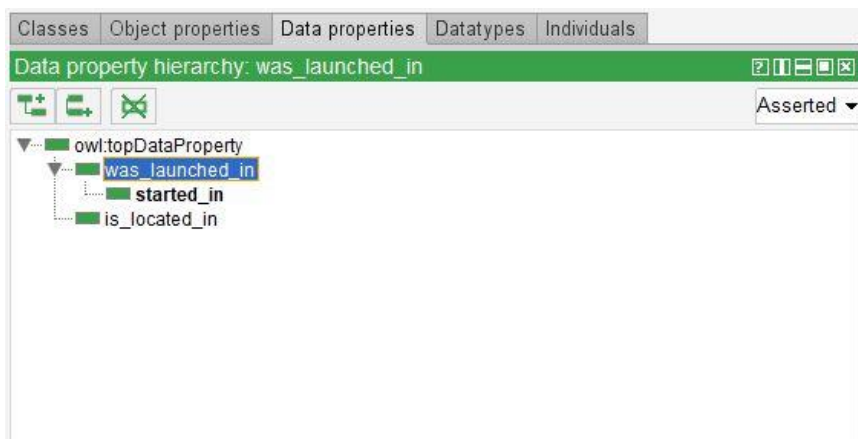
vi. Data Sub-Properties:

Alike Object properties, the Data properties may also have sub-properties that could work in place of their parent property. Here, we have a property as "was launched in", and its sub-property "started in" implies the same meanings.
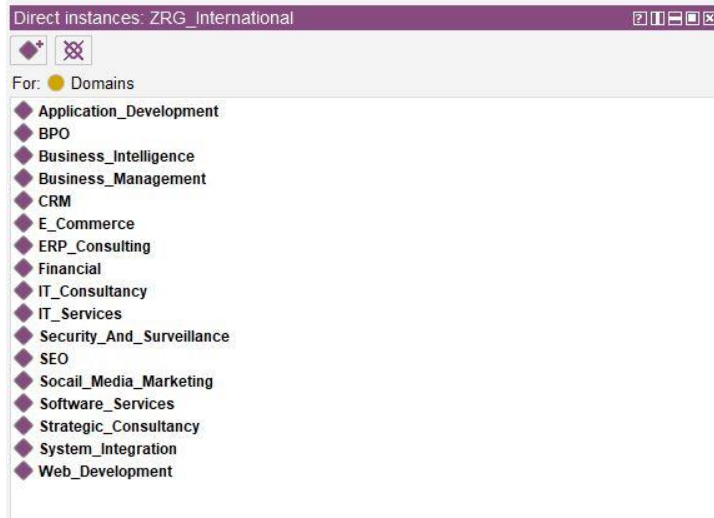
vii. Individuals:

Figure 09: Individuals (1)

These are individuals (different components of class) of the "Domain" class. We can clearly see that they are the names of different domains that a software house may have. We have created these individuals to make ontological statements through property assertions.
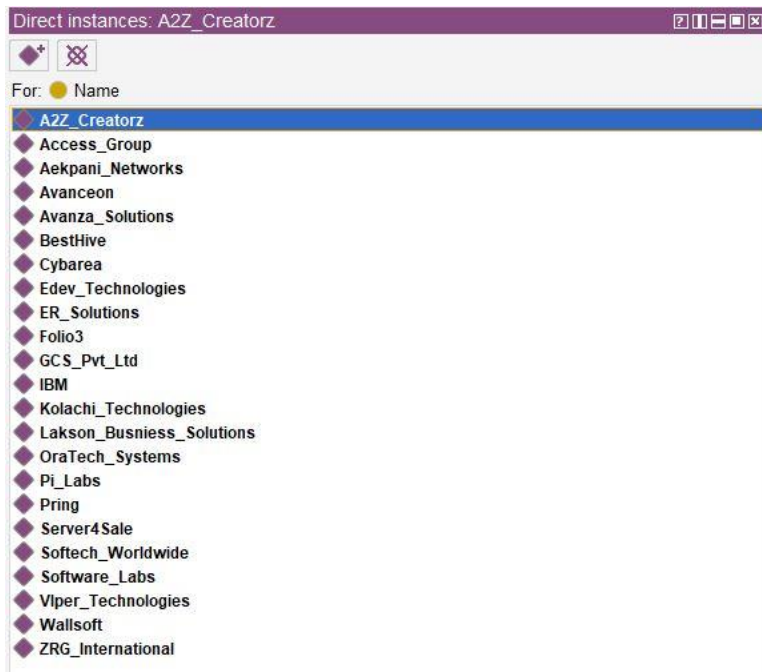

Figure 10: Individuals (2)

In the above figure, there are individuals for the "Name" class. These include different software houses names that are located in different areas of the Karachi city. We'll perform assertions from these individuals too.

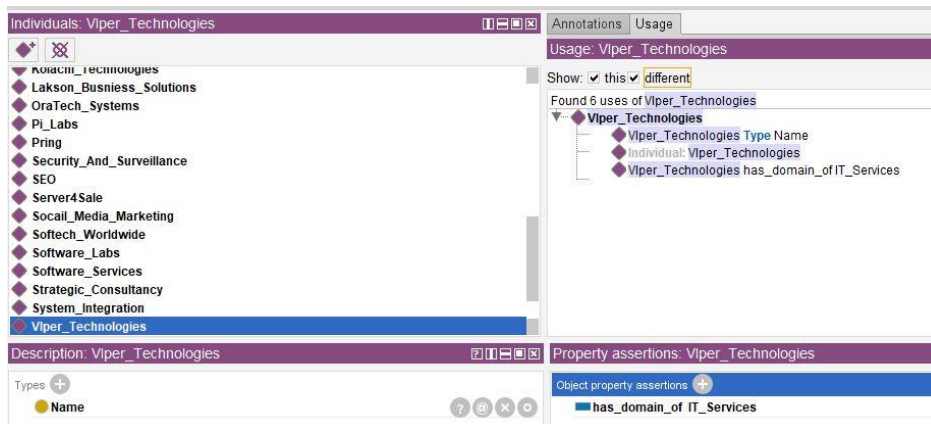## viii.   Object Property Assertions:

Figure 11:
Object Property Assertions (1)

The above figure shows the Object Property Assertion for a software house namely "Viper Technologies". We have used the "has domain of" object property to show that this particular software house has domain of IT Services.
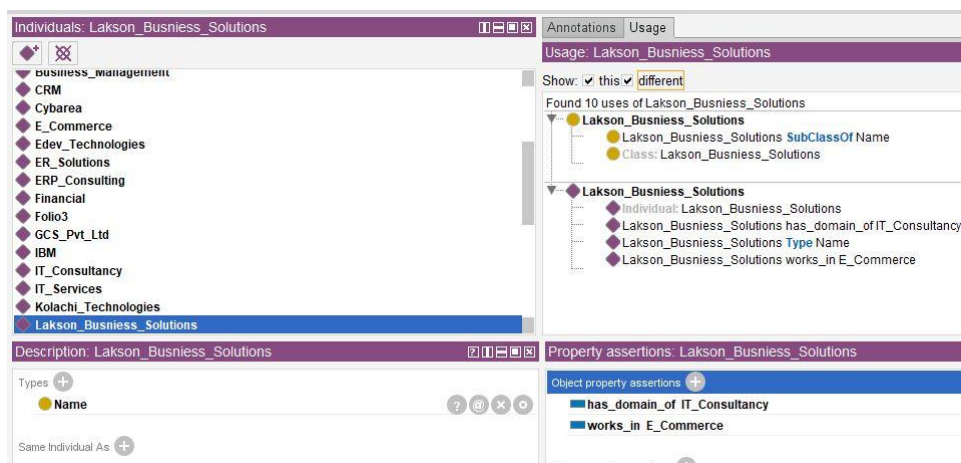

Figure 12:
Object Property Assertions (2)

Similarly as previous one, in this figure, we have applied assertions for a software house namely "Lackson Business Solutions". We have used two properties here, the one is "has domain of", and the second is its sub-property i.e. "works in". Both statements are giving us the same idea about the software house.
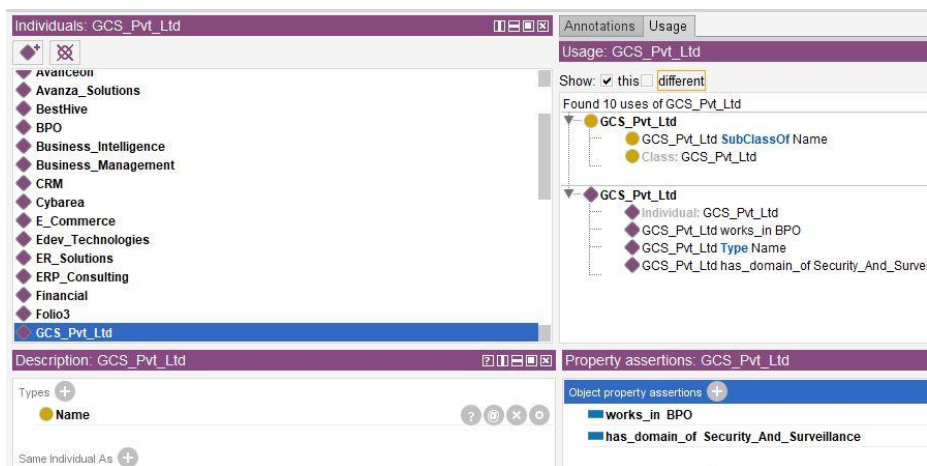
Figure 13:

Object Property Assertions (3)

Here in this figure, we have done the same thing as was done in the previous one. We have made two statements through object property assertion describing about the "GCS Pvt Ltd".

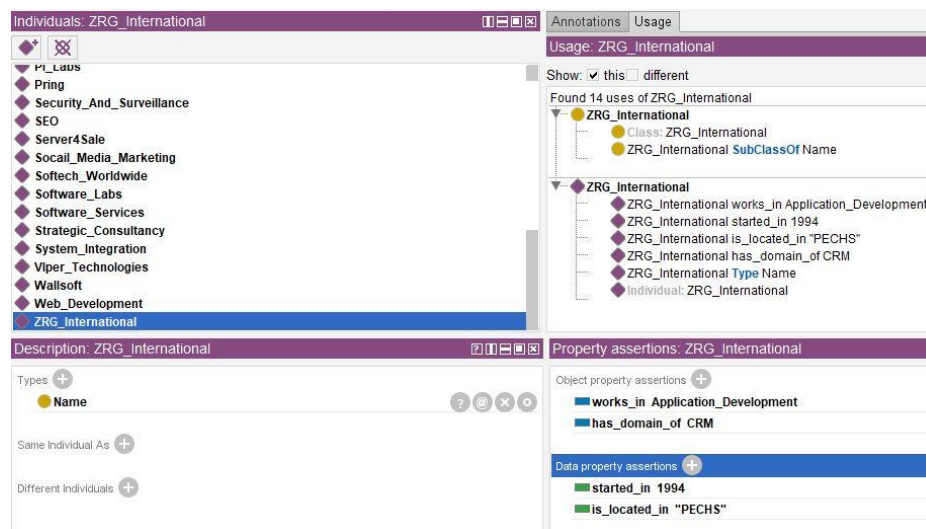## ix. Data Property Assertions:

Figure 14:

Data Property Assertions (1)

As we have our data properties as "started in" and "is located in", we have described some information about the software houses using them. In the above figure, the data property assertions for ZRG International software company states that it was started in 1994, and is located in PECHS.
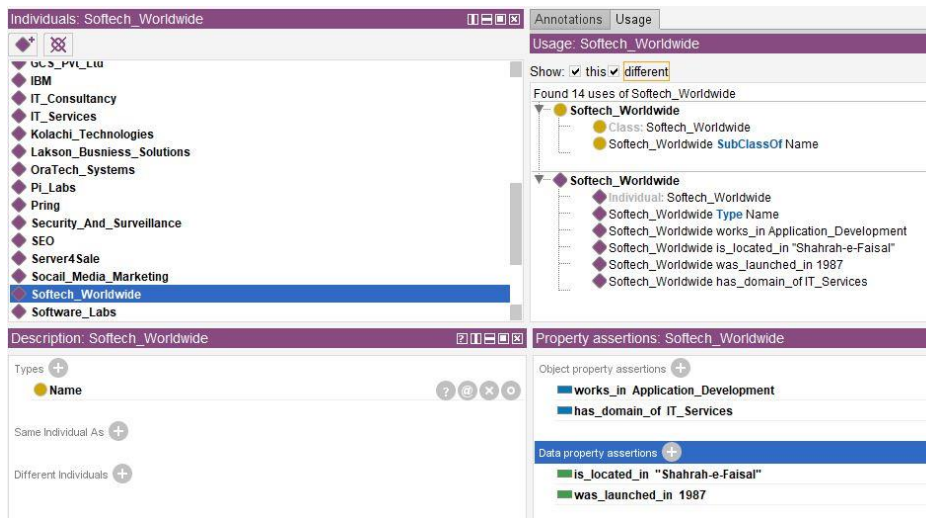
Figure 15:

Data Property Assertions (2)

In the above figure, we have put in our data property assertions for the Softech Worldwide Company. Statements define that it was launched in 1987 and is located in Shahrah-e-Faisal.
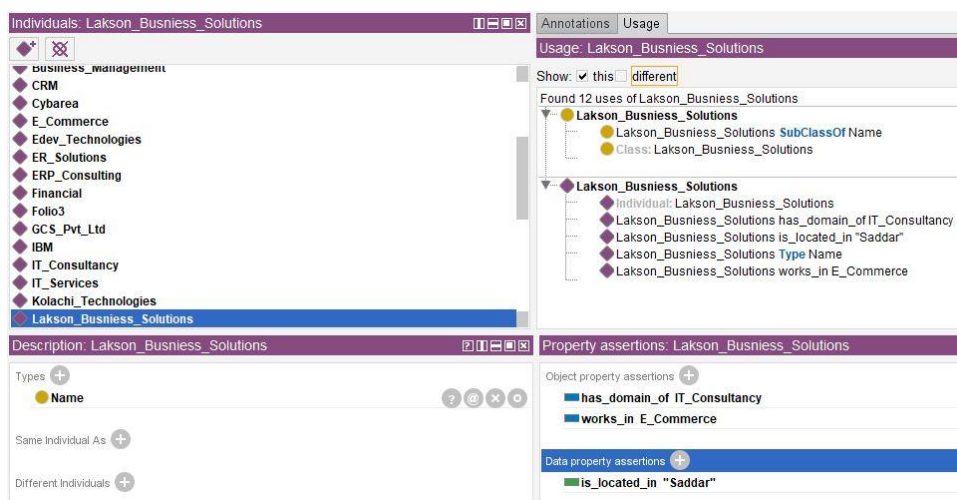

Figure 16:

Data Property Assertions (3)

Here, we have asserted data property for the software house namely "Lackson Business Solutions". The statement shows that it is located in Saddar.
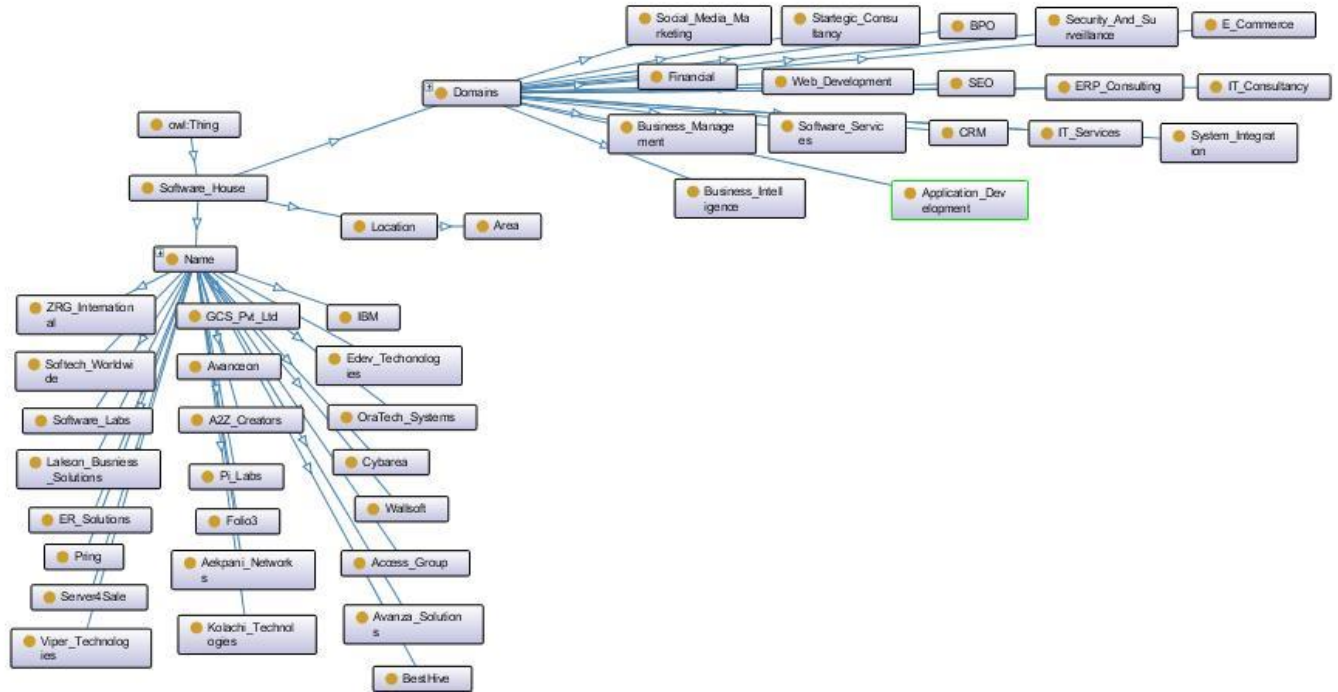
x. OntoGraf:

Figure 17:

OntoGraf

7) Conclusion:

In this short web semantics project, we described the domain of Software Houses and worked specifically regarding the companies in the city of Karachi. We have applied different elements of Protégé that fulfil to create an ontological background for the software house domain It was a brief contribution towards this domain and there is more to do in the future.