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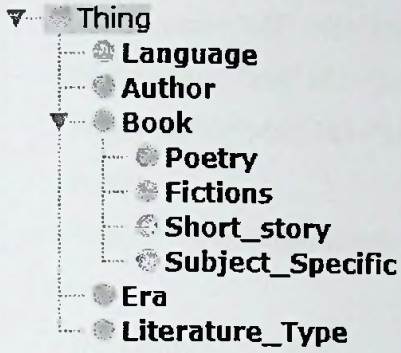
Appendix A – Resources of the system

Class Hierarchy of the Main ontology



Main Ontology of the system

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<!DOCTYPE Ontology [
    <!ENTITY xsd "http://www.w3.org/2001/XMLSchema#" >
    <!ENTITY xml "http://www.w3.org/XML/1998/namespace" >
    <!ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#" >
    <!ENTITY rdf "http://www.w3.org/1999/02/22-rdf-syntax-ns#" >
]>
<Ontology xmlns="http://www.w3.org/2002/07/owl#"
    xml:base="http://www.semanticweb.org/dakshi/ontologies/2014/3/untitled-
ontology-5"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:xml="http://www.w3.org/XML/1998/namespace"
    ontologyIRI="http://www.semanticweb.org/dakshi/ontologies/2014/3/untitled-
ontology-5">
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</Declaration>
<Declaration>
  <Class IRI="#Book"/>
</Declaration>
<Declaration>
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</Declaration>
<Declaration>
  <Class IRI="#Short_story"/>
</Declaration>
<Declaration>
  <Class IRI="#Subject_Specific"/>
</Declaration>
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```

```
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  </Declaration>
  <Declaration>
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  </Declaration>
  <Declaration>
    <NamedIndividual
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  </Declaration>
  <Declaration>
    <NamedIndividual IRI="#Madolduwa"/>
  </Declaration>
  <Declaration>
    <NamedIndividual IRI="#Martin_Wickramasinghe"/>
  </Declaration>
  <Declaration>
    <NamedIndividual IRI="#Oliver_Twist"/>
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    <Class IRI="#Book"/>
  </SubClassOf>
  <SubClassOf>
    <Class IRI="#Short_story"/>
    <Class IRI="#Book"/>
  </SubClassOf>
  <SubClassOf>
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    <Class IRI="#Book"/>
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  <ClassAssertion>
    <Class IRI="#Author"/>
```

```
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    <ClassAssertion>
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    <ClassAssertion>
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        <IRI>#Madolduwa</IRI>
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```

Concept

```
<?xml version="1.0"?>
<!DOCTYPE Ontology [
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    <!ENTITY xml "http://www.w3.org/XML/1998/namespace" >
    <!ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#" >
    <!ENTITY rdf "http://www.w3.org/1999/02/22-rdf-syntax-ns#" >
]>
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    xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:xml="http://www.w3.org/XML/1998/namespace"
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ontology-2">
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    <Prefix name="rdfs" IRI="http://www.w3.org/2000/01/rdf-schema#"/>
    <Prefix name="xsd" IRI="http://www.w3.org/2001/XMLSchema#"/>
    <Prefix name="owl" IRI="http://www.w3.org/2002/07/owl#"/>
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    </Declaration>
    <Declaration>
        <Class IRI="#Book"/>
    </Declaration>
    <Declaration>
        <Class IRI="#Fiction"/>
    </Declaration>
    <Declaration>
```

```
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```

```
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    <AnnotationProperty abbreviatedIRI="rdfs:comment"/>
    <IRI>#wrote</IRI>
    <IRI>#Author</IRI>
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</Ontology>
```

Updated ontology

```
<?xml version="1.0"?>


<!DOCTYPE Ontology [
  <!ENTITY xsd "http://www.w3.org/2001/XMLSchema#" >
  <!ENTITY xml "http://www.w3.org/XML/1998/namespace" >
  <!ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#" >
  <!ENTITY rdf "http://www.w3.org/1999/02/22-rdf-syntax-ns#" >
]>


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ontology-5"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
```

```
    xmlns:xml="http://www.w3.org/XML/1998/namespace"
    ontologyIRI="http://www.semanticweb.org/dakshi/ontologies/2014/3/untitled-
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IRI="http://www.semanticweb.org/dakshi/ontologies/2014/3/untitled-ontology-
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    <Prefix name="rdfs" IRI="http://www.w3.org/2000/01/rdf-schema#"/>
    <Prefix                                          name="untitled-ontology-5"
IRI="http://www.semanticweb.org/dakshi/ontologies/2014/3/untitled-ontology-
5#"/>
    <Declaration>
        <Class IRI="#Author"/>
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    <Declaration>
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    <Declaration>
        <Class IRI="#Literature_Type"/>
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```

```
    <Class IRI="#Subject_Specific"/>
  </Declaration>
  <Declaration>
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  </Declaration>
  <Declaration>
    <NamedIndividual IRI="#Charles_Dickens"/>
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  <Declaration>
    <NamedIndividual IRI="#Oliver_Twist"/>
  </Declaration>
  <SubClassOf>
    <Class IRI="#Fictions"/>
    <Class IRI="#Book"/>
  </SubClassOf>
  <SubClassOf>
    <Class IRI="#Short_story"/>
    <Class IRI="#Book"/>
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  <SubClassOf>
    <Class IRI="#Subject_Specific"/>
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```

```
    </SubClassOf>
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    </ClassAssertion>
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        <IRI>#Martin_Wickramasinghe</IRI>
        <IRI>#Madolduwa</IRI>
    </AnnotationAssertion>
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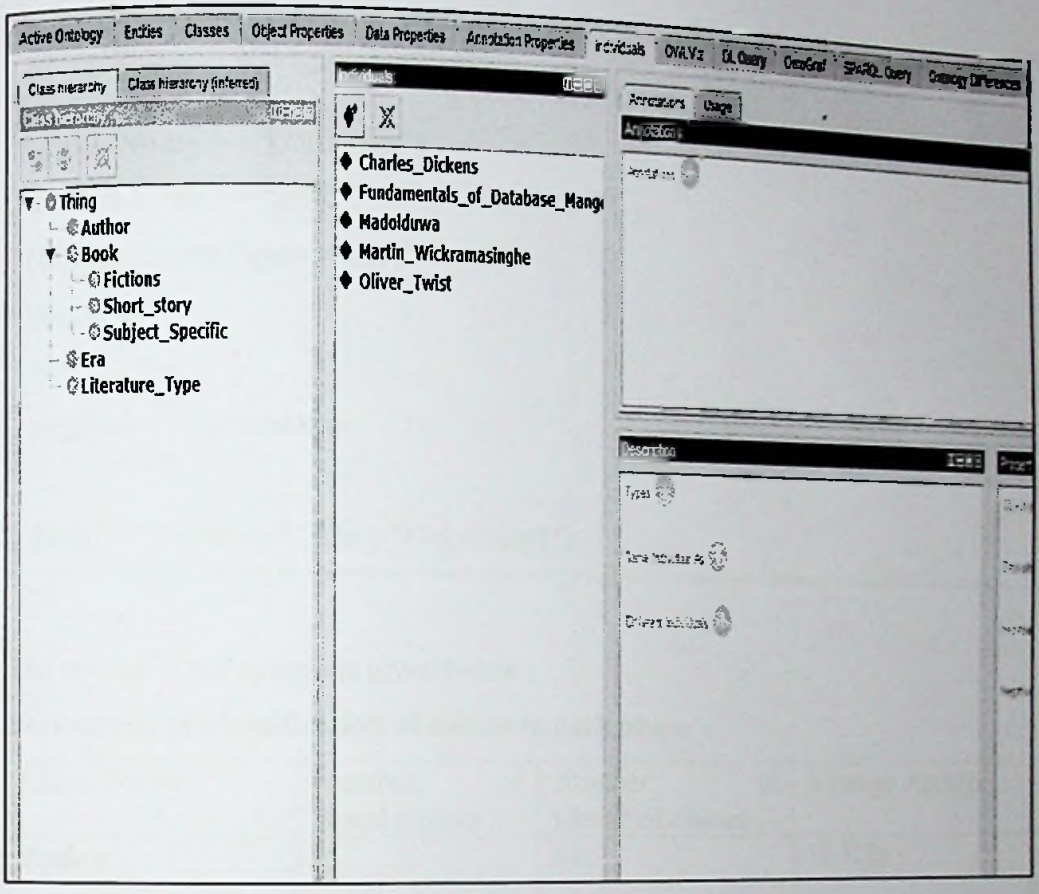
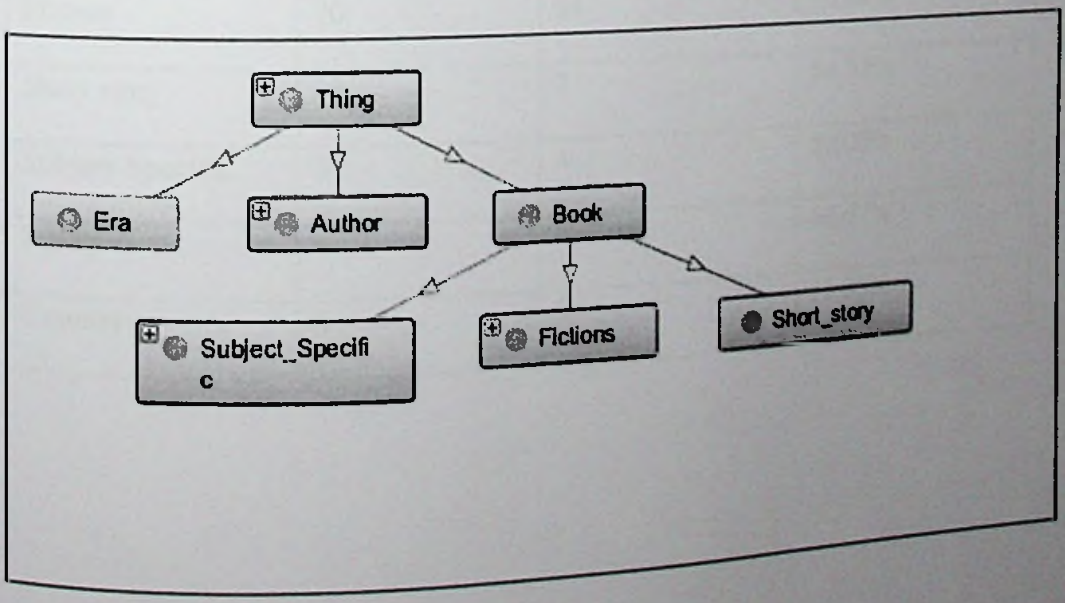
```

Updated Ontology





Sample Jape Rule

```
Rule: University1
(
{Token.string == "University"}
 {Token.string == "of"}
{Lookup.minorType == city}
):orgName
 -->
 :orgName.Organisation =


 {kind = "university", rule = "University1"}
```

The results of the system is given below

Percentage of identification of classes in each phase

Class Name	Number of actual classes	Number of identified classes	Average Accuracy
Author	81	61	75.31%
Book	85	58	68.24%
Era	12	8	66.67%
Language	4	2	50.00%
Fiction	20	14	70.00%
Short story	12	7	58.33%
Subject Specific	8	4	50.00%
Poetry	6	4	66.67%
Country	6	5	83.33%

The system identified the following individuals from the entered sentence.

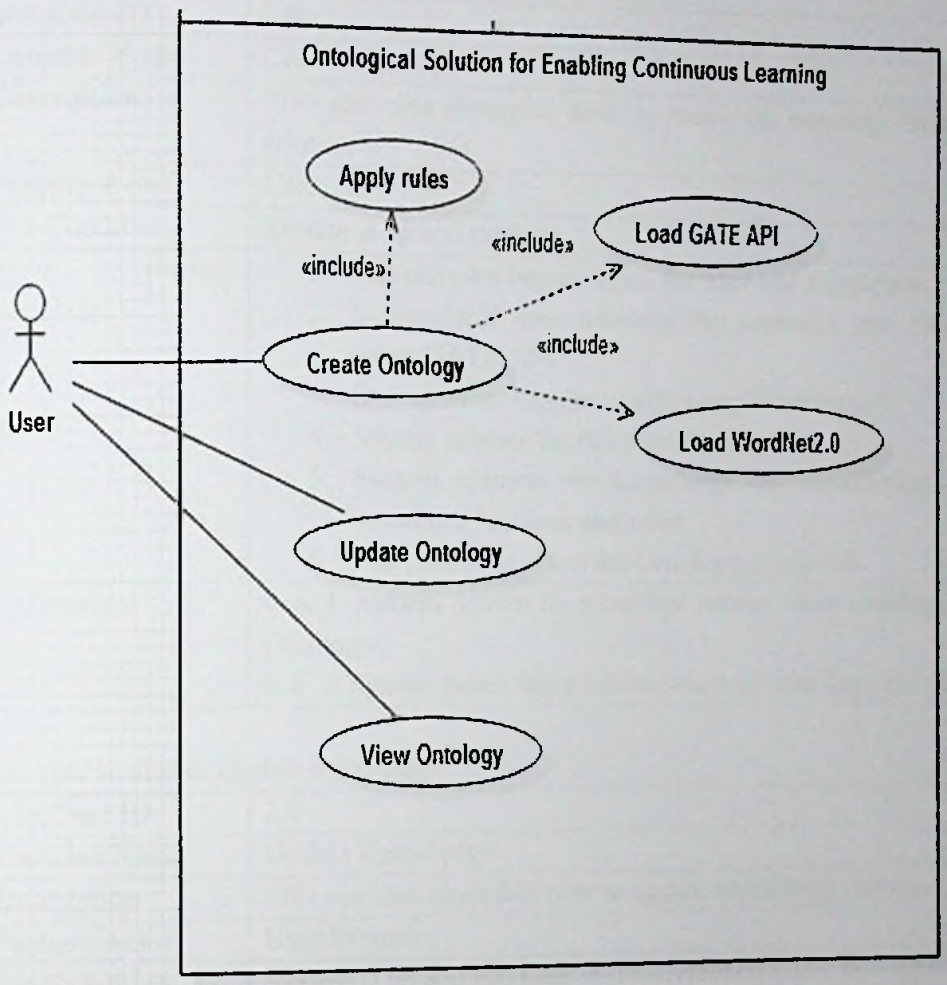
Percentage of identification of instances in each phase

instance Name	Number of actual instances	Number of identified instances	Average Accuracy
Martin Wickramasinghe	25	15	60.00%
Madolduwa	11	8	72.73%
Charles Dickens	11	6	54.55%
Oliver Twist	6	4	66.67%
Maxim Gorkey	8	5	62.50%
Anton Chekov	8	5	62.50%
J.B. Dissanayake	7	4	57.14%
Kumarathunga Munidasa	7	4	57.14%
T.B. Elangarathna	7	4	57.14%
Mother	8	6	75.00%
Database Management Systems	3	1	33.33%
Operating Systems	3	2	66.67%

Percentage of identification of properties in each phase

property Name	Number of actual properties	Number of identified properties	Average Accuracy
Wrote	65	56	86.15%
born	22	18	81.82%
lived in	14	9	64.29%
belong	16	12	75.00%
published in	8	5	62.50%

Use case diagram of the system



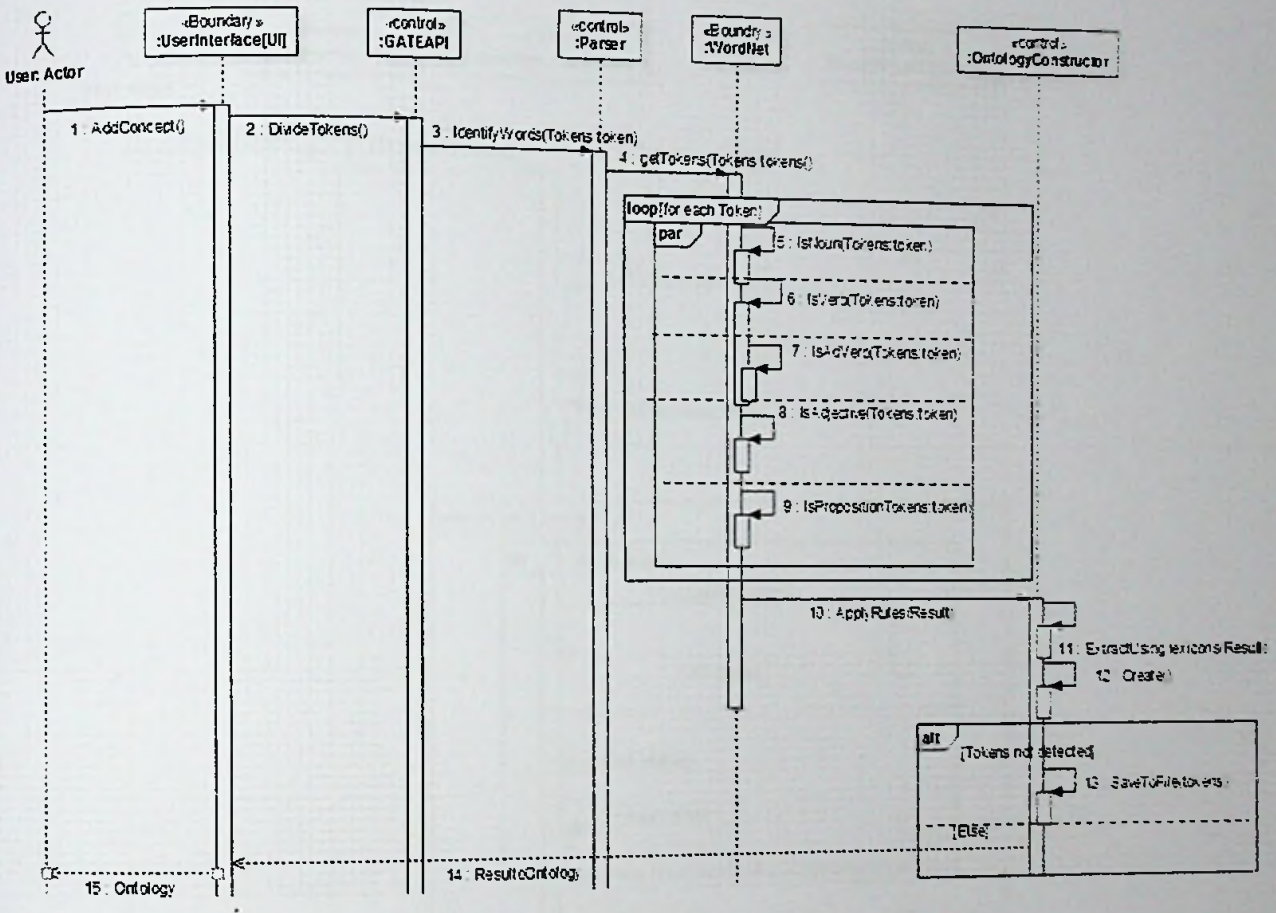
Use case Scenario - Construct the ontology

Use Case ID	1.0
Use case Name	Create Ontology
Description	This use case describes how to create an ontology from a concept
Primary Actor	User
Pre-Condition	System is up and running
Main Success Scenario	1. The use case begins when the user add a sentence. 2. System will then tokenize the sentence into tokens using GATE API. 3. System identifies the words using WordNet2.0. 4. System applies the rules for the tokens. 5. System extracts the knowledge by considering the semantics lexicons and rules. 6. Use case ends when the Ontology is created.
Extensions:	6. a. 1. System detects un-identified tokens when creating the Ontology. 6. a 2. System stores those tokens into a file and use case ends.

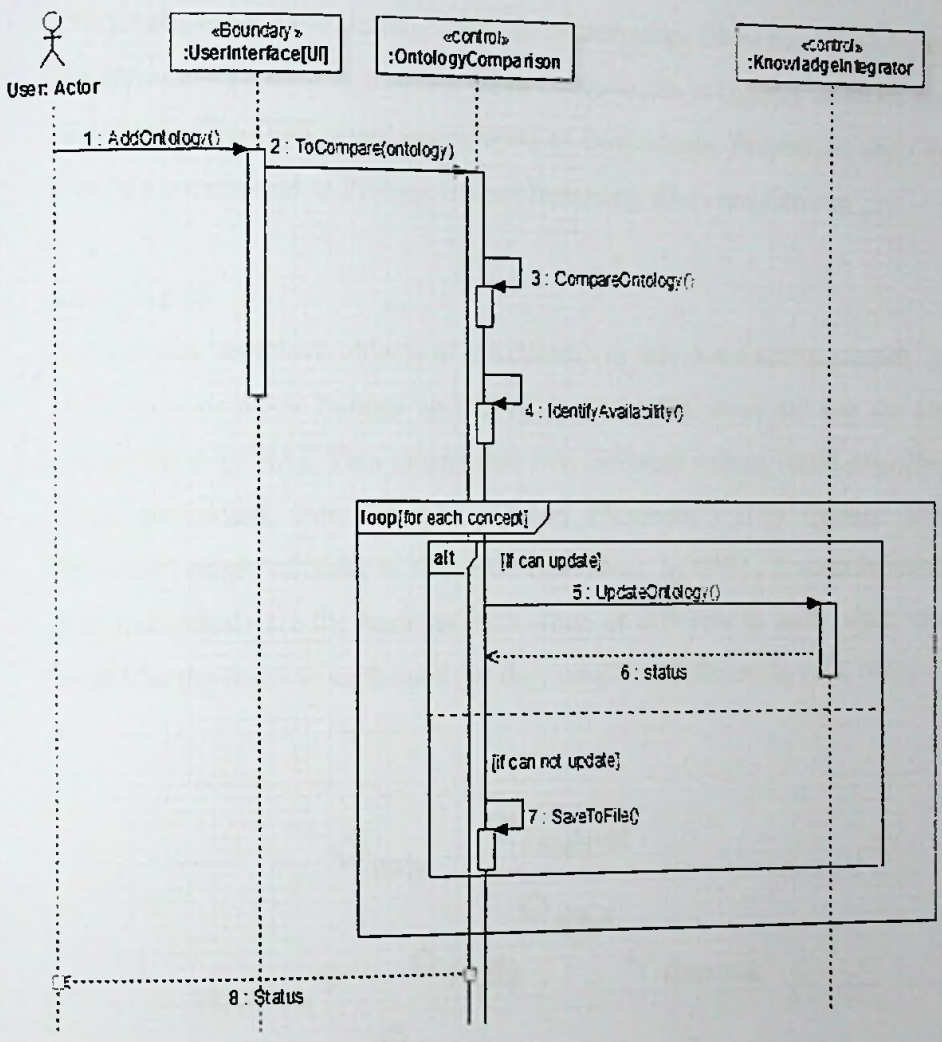
Use case scenario: Update knowledge

Use Case ID	2.0
Use case Name	Update Knowledge
Description	This use case describes how to update an existing ontology.
Primary Actor	User/System
Pre-Condition	System is up and running. Existing main Ontology is available.
Main Success Scenario	1. The use case begins when the actor adds an Ontology. 2. System compares knowledge of the new ontology with the main ontology. 3. System identifies the available knowledge. 4. Use case ends when the Ontology is updated.
Extensions:	4. a. 1. System detects concepts that cannot be updated. 4. a 2. System stores those concepts into a file and use case ends.

Sequence Diagram - Create Ontology



Sequence Diagram: Update Knowledge

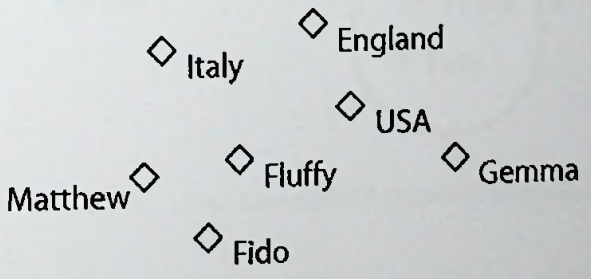


Components of OWL Ontologies

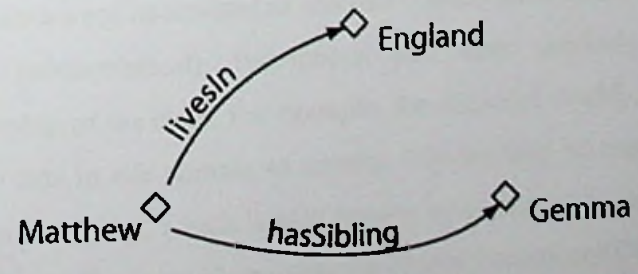
OWL ontologies have similar components to Protege frame based ontologies. However, the terminology used to describe these components is slightly different from that used in Protege. An OWL ontology consists of Individuals, Properties, and Classes, which roughly correspond to Protege frames Instances, Slots and Classes.

Individuals

Individuals, represent objects in the domain in which we are interested. An important difference between Protege and OWL is that OWL does not use the Unique Name Assumption (UNA). This means that two different names could actually refer to the same individual. For example, \Queen Elizabeth", \The Queen" and \Elizabeth Windsor" might all refer to the same individual. In OWL, it must be explicitly stated that individuals are the same as each other, or different to each other, otherwise they might be the same as each other, or they might be different to each other.



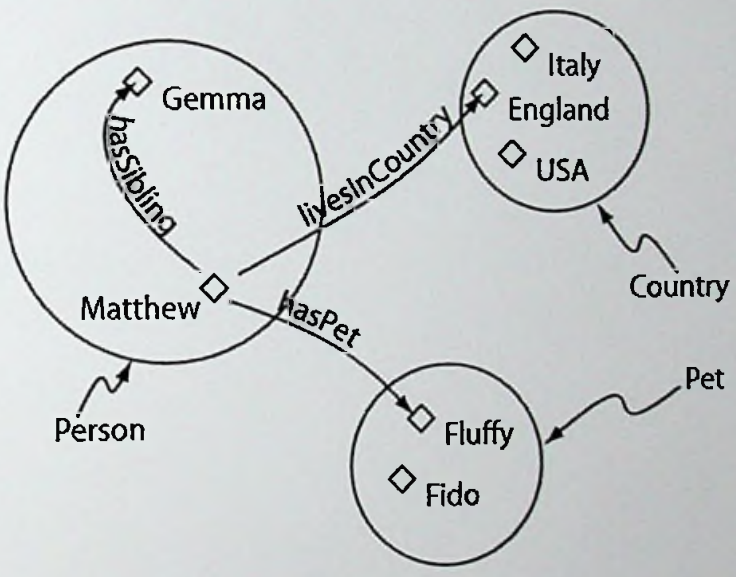
Representation Of Individuals



Representation Of Properties

Properties

Properties are binary relations on individuals. properties link two individuals together. For example, the property hasSibling might link the individual Matthew to the individual Gemma , or the property hasChild might link the individual Peter to the individual Matthew. Properties can have inverses. For example, the inverse of hasOwner is isOwnedBy. Properties can be limited to having a single value. They can also be either Transitive or symmetric.



Representation Of Classes (Containing Individuals)

Classes

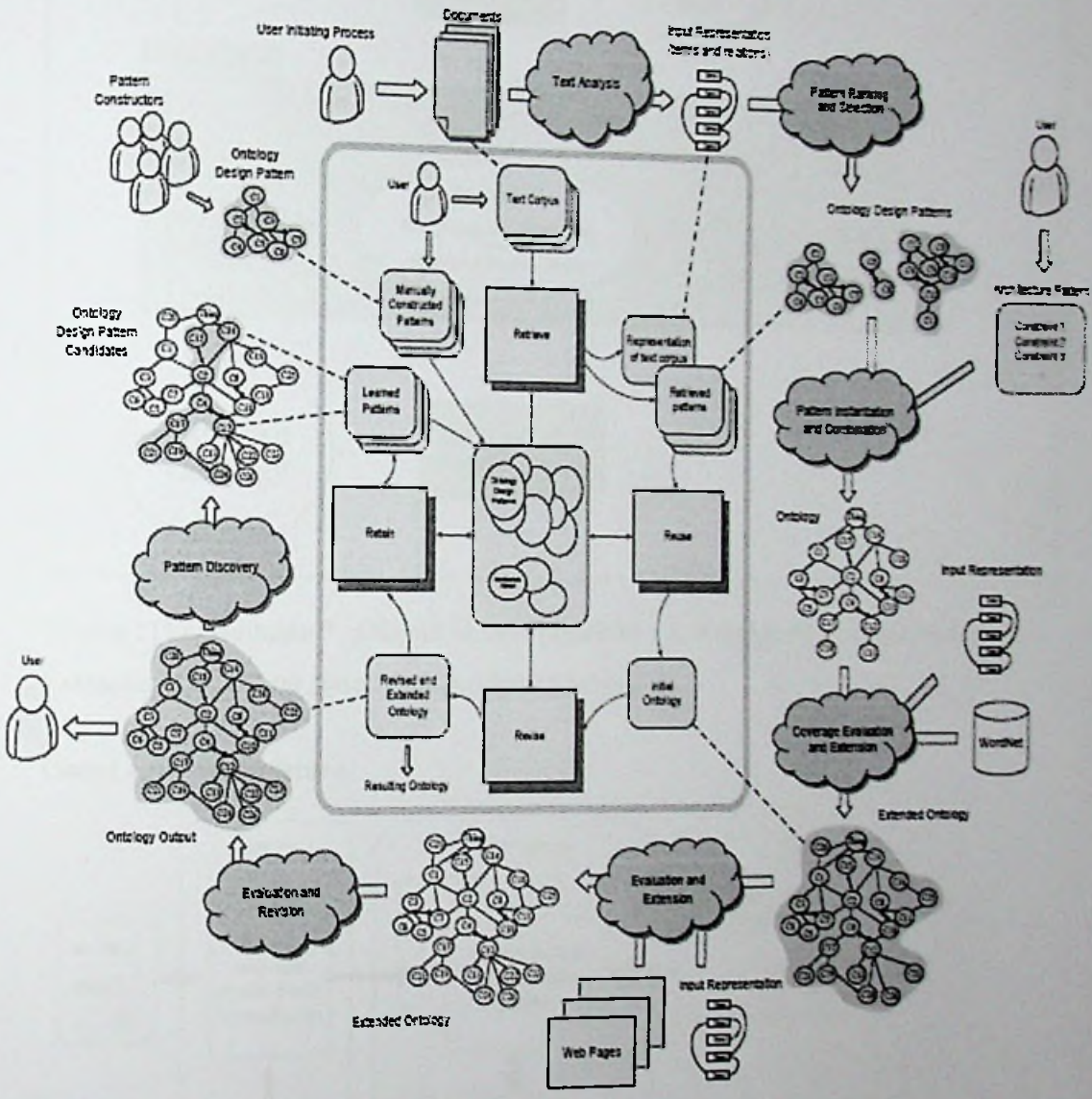
OWL classes are interpreted as sets that contain individuals. They are described using formal (mathematical) descriptions that state precisely the requirements for membership of the class. For example, the class Cat would contain all the individuals that are cats in our domain of interest. Classes may be organized into a superclass-subclass hierarchy, which is also known as a taxonomy. Subclasses specialize their super classes. For example consider the classes Animal and Cat. Cat might be a subclass of Animal (so Animal is the superclass of Cat).

This says that, `All cats are animals', `All members of the class Cat are members of the class Animal ', `Being a Cat implies that you're an Animal ', and ` Cat is subsumed by Animal '. One of the key features of OWL-DL is that these superclass-subclass relationships (subsumption relationships) can be computed automatically by a reasoned.

Source: Practical Guide to Develop Ontology

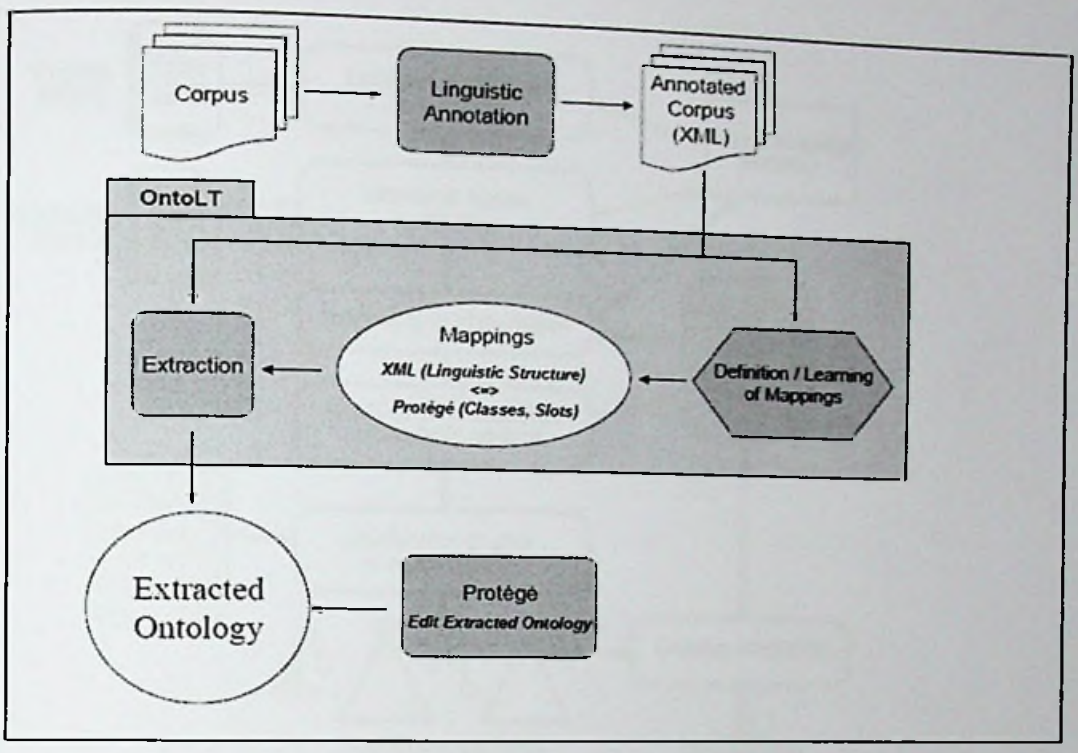
*130.88.198.11/**tutorials/protegeowltutorial**/.../ProtegeOWL**Tutorial**P4_v...*

Architecture of OntoCase



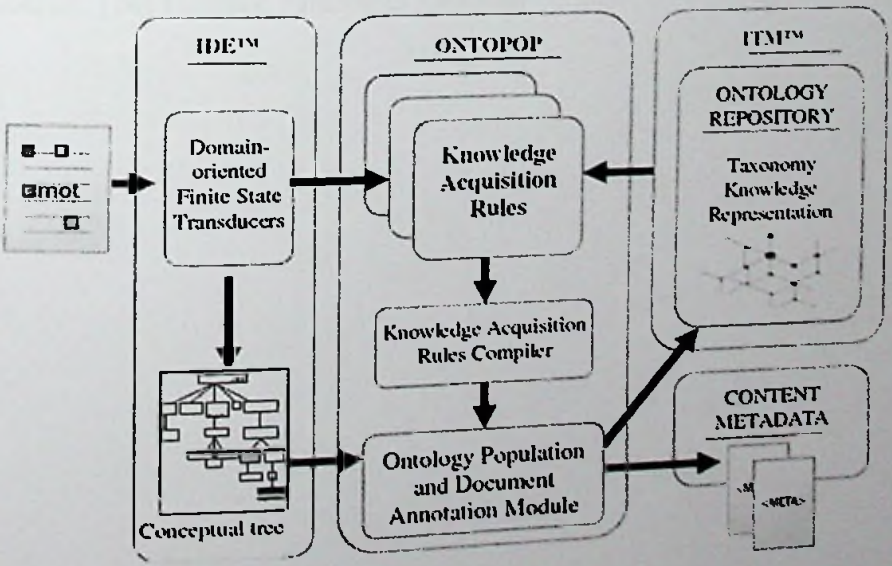
Source : [6] Eva Blomqvist ,OntoCase

Overview of the OntoLT Approach



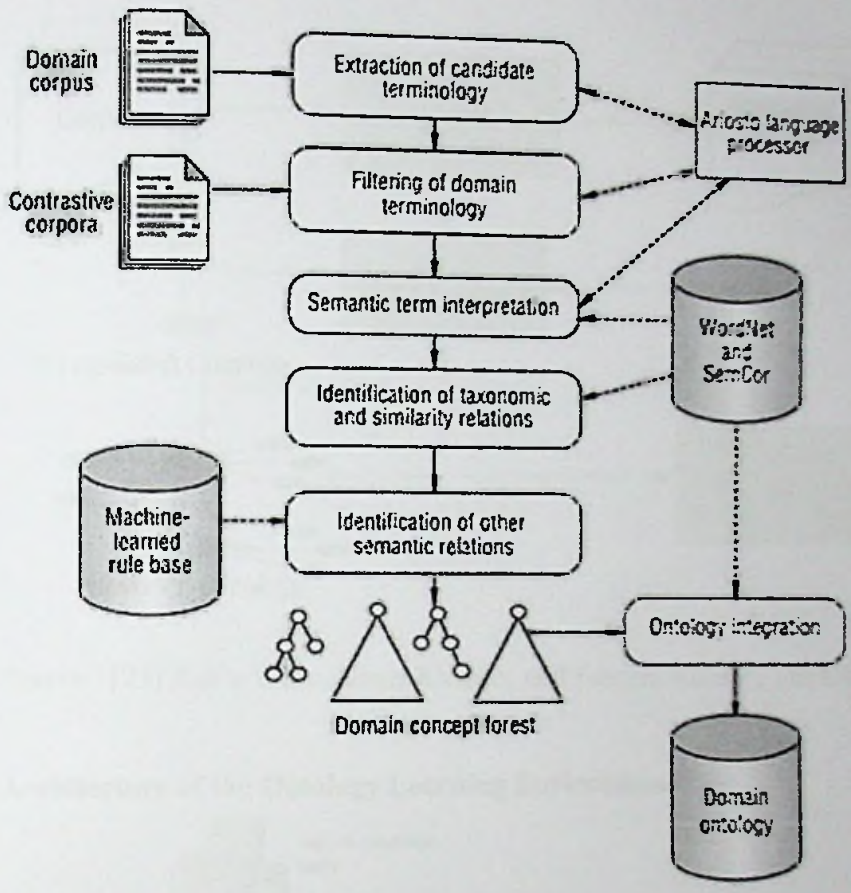
Source : [12] BuitelaarP. ,Olejnik D. and Sintek M , A, Protege Plug-In for Ontology Extraction from Text Based on Linguisitc Analysis

OntoLearn architecture



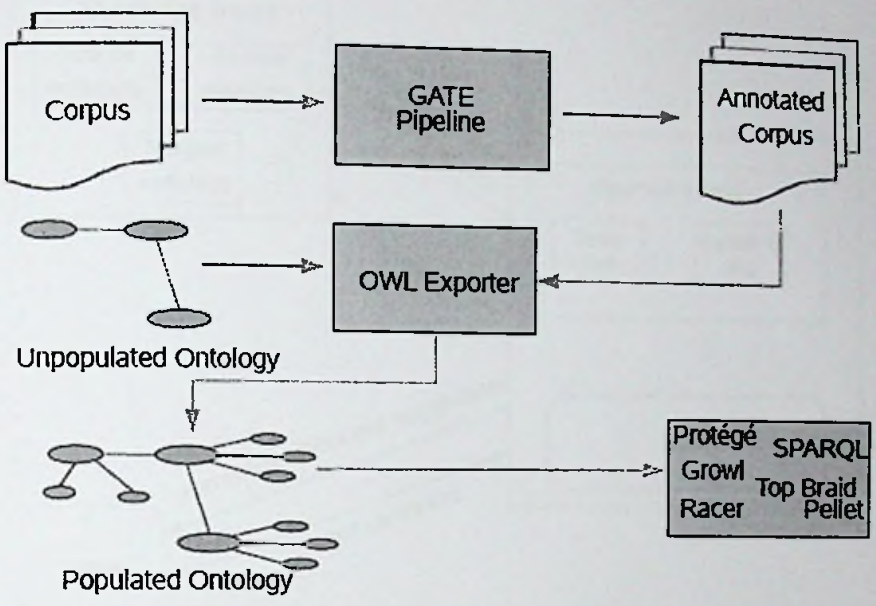
Source : [14] Navigli R., Velardi P., Gangemi , OntoLearn

The OntoPop's platform



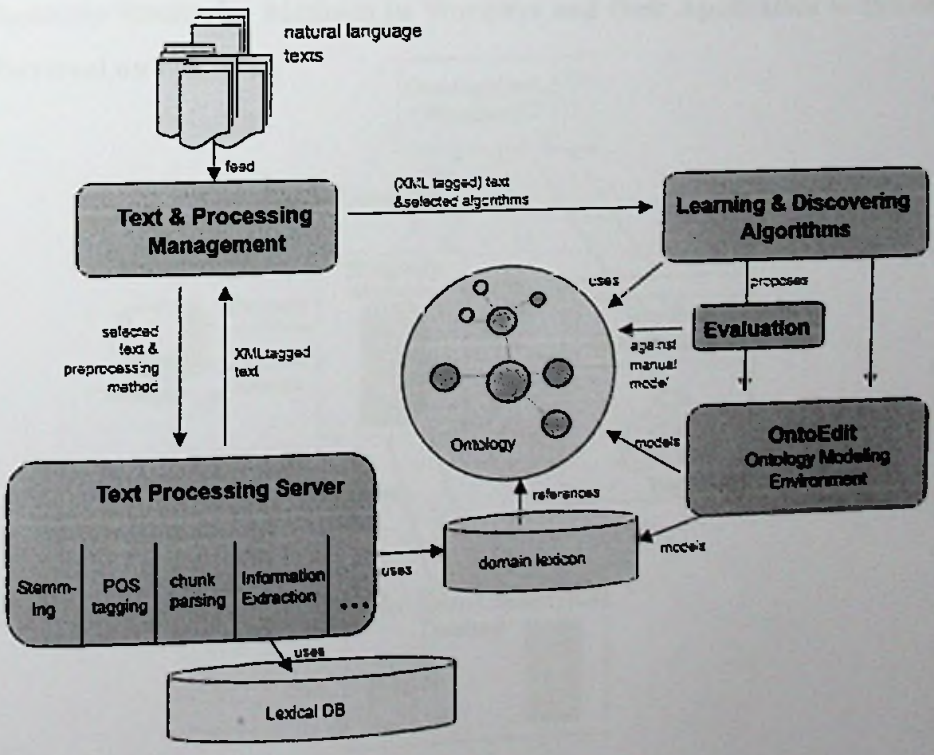
Source : [16] Florence Amardeilh ,OntoPop

Architecture of OwlExporter



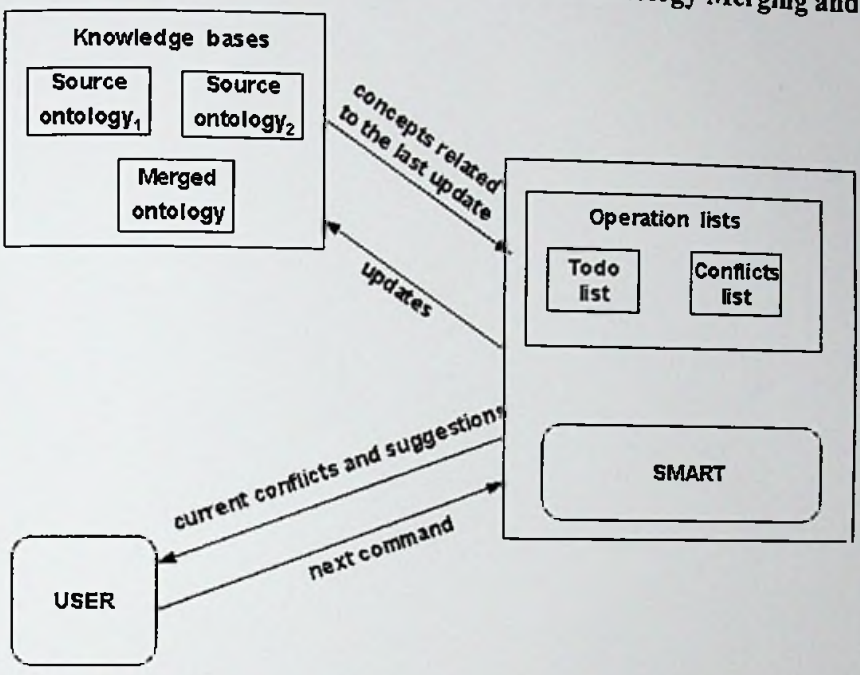
Source : [23] Ren´e Witte, Ninus Khamis, and Juergen Rilling , The OWLExporter

Architecture of the Ontology Learning Environment



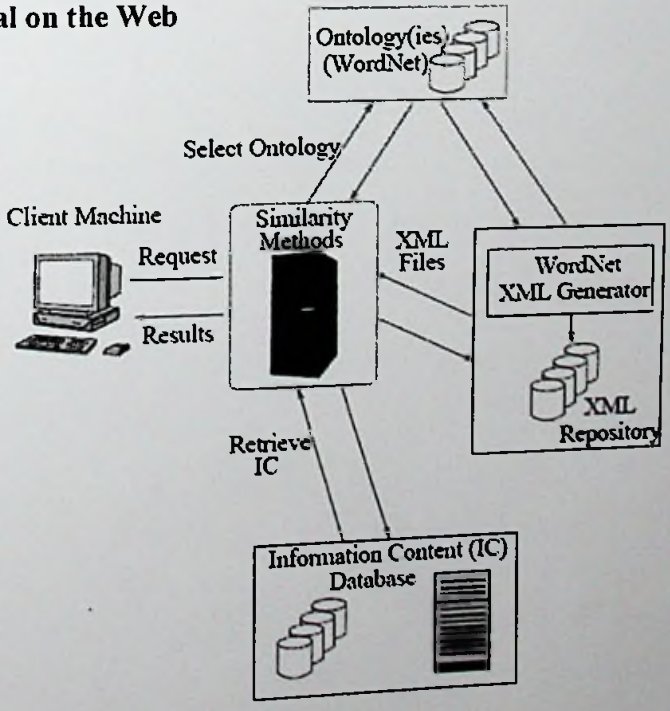
Source : [13] Alexander Maedche and Steffen Staab, TEXT-TO-ONTO

SMART: Algorithm and Tool for Automated Ontology Merging and Alignment



Source : [10] Fridman Noy, N. and Musen, M.A. (1999). SMART

Semantic Similarity Methods in WordNet and their Application to Information Retrieval on the Web



Source : [20] Giannis Varelas , Epimenidis Voutsakis and Paraskevi Raftopoulou