

# inSTEDD

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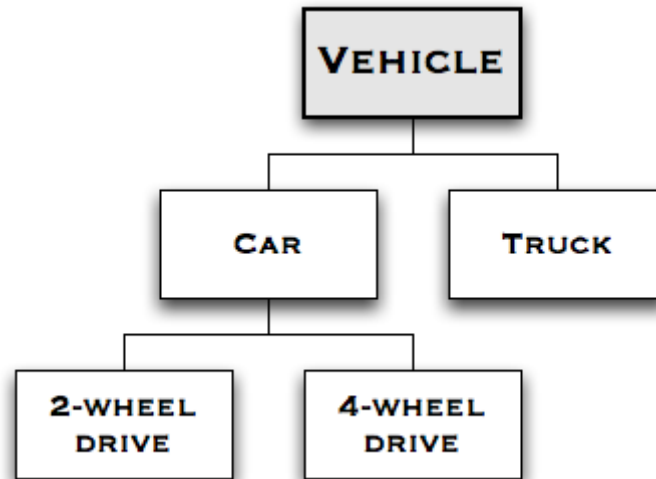
HFOSS, Trinity College -- June 11, 2009

# Evolve

- Predict and prevent the spread of diseases
- Evolve itself is an initiative from InSTEDD
- Our project focuses on the idea of predicting the outbreak of diseases by looking at documents
- Machine Learning will play an important role in the implementation of the project

# Ontology

- What is ontology?
  - A formal representation of a set of concepts within a domain and the relationships between those concepts
  - Used to captures knowledge
- Example:

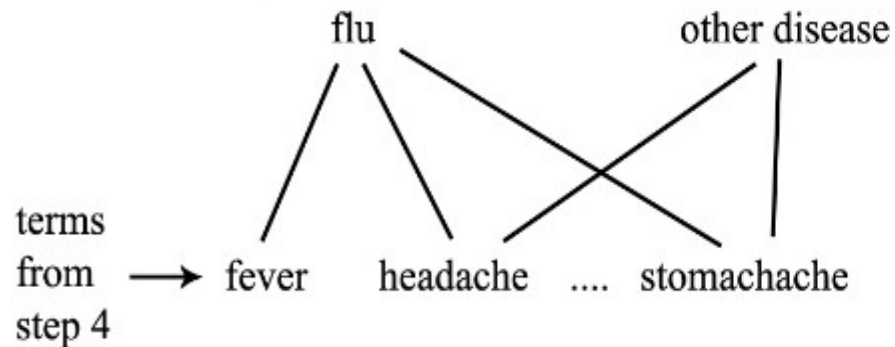


# OWL

- What is OWL?
  - Web Ontology Language
  - A knowledge representational language
  - Attractive and well-understood
- Why OWL?

# Current model of the app.

## Associating symptoms with diseases



## Predicted score

display number of points  
for:  
-flu (3) \*\*  
-other disease (2) \*\*

# EXAMPLE 1/13

# Load and save an ontology

```
OWLOntologyManager manager = OWLManager.createOWLOntologyManager();
URI physicalURI = URI.create("http://www.co-ode.org/ontologies/pizza/2007/02/12/pizza.owl");
OWLOntology ontology = manager.loadOntologyFromPhysicalURI(physicalURI);
for(OWLClass cls : ontology.getReferencedClasses()) {
    System.out.println(cls);
}
URI physicalURI2 = URI.create("file:/tmp/MyOnt2.owl");
manager.saveOntology(ontology, new OWLXMLOntologyFormat(), physicalURI2);
manager.removeOntology(ontology.getURI());
```

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- **Ontology loaded and saved**

```
UnclosedPizza
GarlicTopping
FishTopping
ValuePartition
CajunSpiceTopping
MozzarellaTopping
PizzaBase
NutTopping
PrinceCarlo
TobascoPepperSauce
VegetarianPizzaEquivalent2
GreenPepperTopping
HotSpicedBeefTopping
ParmesanTopping
PineKernels
GoatsCheeseTopping
IceCream
MixedSeafoodTopping
SpinachTopping
SpicyPizzaEquivalent
Soho
FourCheesesTopping
CaperTopping
HamTopping
JalapenoPepperTopping
MushroomTopping
Caprina
Siciliana
QuattroFormaggi
AmericanHot
OliveTopping
PeperoniSausageTopping
SpicyPizza
Capricciosa
```

# EXAMPLE 2/13

# Create an Ontology

## Add axioms

```
OWL ontology = manager.createOntology(ontologyURI);
OWLDataFactory factory = manager.getOWLDataFactory();
OWLClass clsA = factory.getOWLClass(URI.create(ontologyURI + "#A"));
OWLClass clsB = factory.getOWLClass(URI.create(ontologyURI + "#B"));
OWLAxiom axiom = factory.getOWLSubClassAxiom(clsA, clsB);
AddAxiom addAxiom = new AddAxiom(ontology, axiom);
manager.applyChange(addAxiom);
for(OWLClass cls : ontology.getReferencedClasses()) {
    System.out.println("Referenced class: " + cls);
}
```

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```

```
Referenced class: A  
Referenced class: B  
Superclasses of A:  
B
```

# Other examples

- Add an object property assertion to an ontology
- Delete entities from an ontology
- Interact with a reasoner
- Two merged ontologies

**Thank you!**