DL Project Report

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(a) Redundant statements found:

- $VegitarianPizzaEquivalent1$ and $VegitarianPizzaEquivalent2$
  All define the same pizzas in different ways. Fix: Remove $VegitarianPizzaEquivalent2$

- $SpicyPizzaEquivalent$ and $SpicyPizza$
  All define the same pizzas in different ways. Fix: Remove $SpicyPizzaEquivalent$

- $Caprina$ has $SundriedTomatoTopping$ which is a $TomatoTopping$
  and $TomatoTopping$ as well.
  Fix: Remove $TomatoTopping$ requirement.

- $Giardiniera$ has $SlicedTomatoTopping$ which is a $TomatoTopping$
  and $TomatoTopping$ as well.
  Fix: Remove $TomatoTopping$ requirement.

- $Pizza$ has $Food$ and $hasBase$ as $PizzaBase$ which is a subset of $Food$
  Fix: Remove $Food$ from definition of $Pizza$.

- $CheesyPizza$, $InterestingPizza$, $SpicyPizza$ and $MeatyPizza$ have
  $Pizza$ in their definition but as $hasTopping$ has domain of $Pizza$,
  hence $Pizza$ is redundant.
  Fix: Remove $Pizza$ from the definitions.

- Hot, $Medium$ and $Mild$ are subclasses of the anonymous ancestor
  "$Hot\ or\ Medium\ or\ Mild$" and also subclasses of $Spiciness$ but
  these two are equivalent.
  Fix: Remove "$Hot\ or\ Medium\ or\ Mild$" from $SubClassOf(AnonymousAncestor)$

(b) Inconsistent Pizza $\Rightarrow$ Consistent Pizza

Following are the reasons for the inconsistency and fixes we implemented
to make the ontology consistent:

- Inconsistency: $IceCream$ had the property $hasTopping$ which had
  domain $Pizza$, which is disjoin with $IceCream$.
  Fix: Removed $hasTopping$ from the definition of $IceCream$.

1

- Inconsistency: *CheesyVegetableTopping* has top disjoint parents.
  Fix: Deleted *CheesyVegetableTopping* as the class is inconsistent and cannot exist.

  After the above fixes the pizza ontology becomes consistent.

(c) Extending the ontology with redundant statements

Below are some obvious redundant statements added to the definition of classes and verified by generating the inferred subsumptions

- Add *Food* to the definition of *CheeseyPizza*, *InterestingPizza* and *MeatyPizza* which doesnt change anything because it is the superclass/parent of *Pizza* which is already in the definition.

- Add *not VegetarianPizza* to the definition of *MeatyPizza*. This is redundant because *VegetarianPizza* has *not (hasTopping some MeatTopping)* in its definition and *MeatyPizza* has *(hasTopping some MeatTopping)* in its definition.

- Add *hasTopping some PepperTopping* to subclass of *AmericanHot*. It is redundant as *PepperTopping* is already implied by *AmericanHot* being a subclass of "*hasTopping some HotGreenPepperTopping and hasTopping some JalapenoPepperTopping*" which are all subclasses/children of *PepperTopping*

- Add *VegetarianTopping* to the definition of *MushroomTopping* and *OliveTopping*. This is redundant because *MushroomTopping* and *OliveTopping* are subclass of *VegetableTopping* which is in turn *VegetarianTopping*