

KRR Lab Assignment
Description Logics and Ontology Design

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Exercise 1:

Express the following sentences in Description Logics, using:

- The individual names bonnie, and clyde,
- The concept names Person, Honest and Crime
- The roles names reports (a person reports a crime), commits (a person commits a crime), suspects (a person suspects a person), and knows (a person knows a person).

Sentences

- No honest man has committed a crime.
- Bonnie does report Clyde.
- Clyde has committed at least 10 crimes.
- Everybody who knows a suspect (in a given crime) is also a suspect (in that crime).
- Only those who are honest suspects someone.
- If one suspects someone, one reports them.
- Nobody suspects Bonnie.
- Everyone that knows someone that commits a crime also commits a crime.

$\neg \text{Honest} \sqsubseteq \exists \text{commits.Crime}$

$\text{reports}(\text{bonnie}, \text{clyde})$

$\text{Clyde} \sqcap \geq 10 \text{ commits.Crime}$

$\forall \text{Person} \sqcap \exists \text{knows} . (\exists \text{suspect.Crime}) \sqsubseteq \exists \text{suspect.Crime}$

$\text{Person} \sqcap \exists \text{suspect.Person} \sqsubseteq \text{Honest.Person}$

$\text{Person} \sqcap \exists \text{suspect}.\text{Person} \sqsubseteq \exists \text{reports}.\text{Person}$

$\neg \text{Person} \sqcap \text{suspects}(\text{bonnie})$

$\forall \text{Person} \sqcap \exists \text{knows} . (\text{Person} \sqcap \exists \text{comits} . \text{Crime}) \sqsubseteq \exists \text{suspect} . \text{Crime}$

Exercise 2

Select three real restaurant reviews from any review platform (e.g. Google Reviews), of about 100-200 words each.

Identify and categorize key concepts mentioned in the reviews into an ontology with:

- Classes (e.g., Food, Service, Ambiance, Staff)
- Data Properties (e.g., temperature, speed, friendliness)
- Object Properties (e.g., serves, employs, contains)

Provide in your written report:

1. The three selected reviews
2. A diagram modeling your ontology concepts and the relations between them + an OWL file containing a model of your ontology built using Protege
3. An analysis detailing:
 - Which kind of natural language expressions can be captured and which are failed to be captured by your ontology
 - Challenges you encountered in mapping informal language to structured relationships

First review:

We've been visiting Naples for years (my partner is Italian,) and I've always wanted to try da Michele. Previous times it had been too busy, but we arrived today (Monday,) at 3pm and only had to wait 10mins. Unfortunately however, it did not live up to the hype.

Quality ingredients - yes

Value for money - yes

The atmosphere was a bit lacklustre and I believe the pizza dough was a bit heavier than others I have tried in Naples. The service was quick however, bare in mind there is communal seating, but we didn't mind that.

I would definetley recommended trying it, as it seems to be an institution in Naples, however personally I know for certain there is at least 1 pizzeria better than this.

Second review:

We were only in Naples for two days, so we didn't get to explore and eat as much pizza as we had wanted to. But if you want a great, old school no frills Napoli pizza experience, this is a great option. The pizzas are piping hot when they come out and are quite big for an individual size, but they're only 5 euro each. They offer 4 different pizzas, we of course went with the traditional Margherita which was very very good. Beverages are limited - water, coke, beer. We got in pretty quickly to sit down, but by the time we left there was a large crowd of about 20-25 people outside waiting to be seated. The turnaround is pretty efficient, we were in and out within a half an hour or so, but keep in mind there may be a long wait.

Third review:

I honestly cannot believe this place has bad reviews. Hands down the best pizza in Napoli!! I had it as takeaway and eat in, I would HIGHLY recommend waiting to eat in, it is definitely worth the wait.

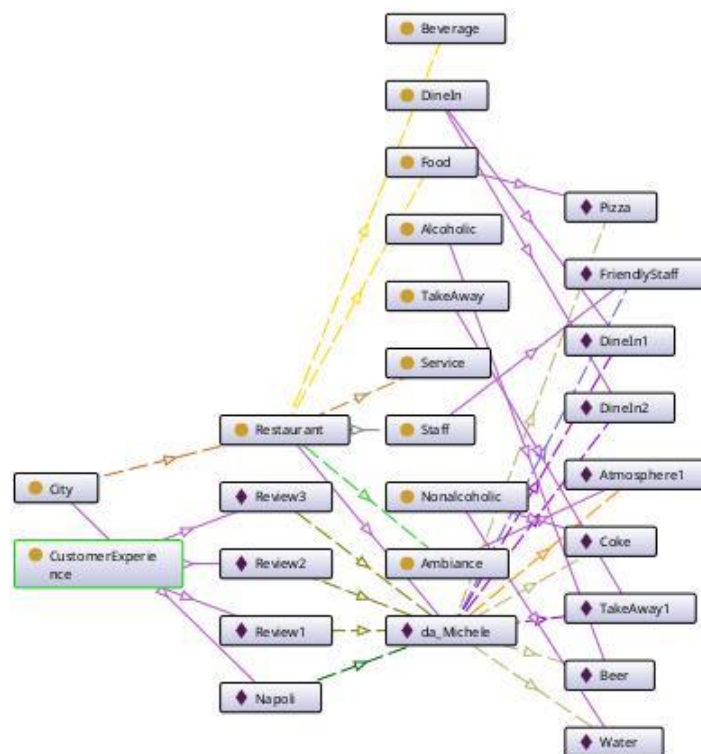
They serve truly authentic Neapolitan pizza, I have never tasted pizza like it until I visited this place.

Not only is the wait totally worth it but the staff are super friendly and it is ridiculously affordable, 5€ for a huge pizza.

The taste of the pizzas though!! The crust, the thin base, the toppings it is all absolutely delicious. I definitely understand why they have so many awards.

Don't let the crowd or wait put you off, don't leave Napoli without visiting this place!!! I personally cannot wait to return!!

The diagram:



Expressions Successfully captured:

- Statements that directly mention specific attributes of entities (e.g.: “Quality ingredients – yes”, Price: “5€”)
- Clear Sentiments (e.g.: "The pizza was the best in Napoli!")
- Location (e.g.: "Located in Naples")
- Quantitative Data and Service Metrics (e.g.: “Only had to wait 10mins”, “Service was quick”)

Expressions Failed to be captured:

- Misspellings and Typos (e.g.: “I would definetley recommended trying it”)
- Different Terms with Similar Meanings (e.g.: “Affordable” vs. “Cheap”)
- The ontology cannot discern the specific quality being described without additional contextual information (“e.g.: “The pizza dough was a bit heavier than others”)
- The same word written in 2 different languages (e.g.: “Napoli” vs. “Naples”)

Challenges:

- Informal language often contains ambiguous terms and vague descriptions that lack precise definitions. (e.g.: "nice," "good," or "bad" without clear contextual indicators)
- Informal reviews exhibit a wide range of linguistic styles, sentence structures, and expressions, leading to variability in how information is conveyed. (e.g.: Expressing recommendations as direct statements ("highly recommend") versus implied suggestions ("worth the wait")).
- Reviews may contain typos, misspellings, or grammatical mistakes (e.g.: "definetley recommended")
- Reviews may imply certain attributes or relationships without explicitly stating them (e.g.: Stating "great atmosphere" without specifying elements that contribute to the ambiance)
- The meaning of certain terms can change based on context, and subjective opinions vary between reviewers (e.g.: "busy" could be positive (active place) or negative (long waits) based on context)