An explorative approach to unsupervised intent recognition

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- Sophisticated models that compete in performance and in complexity on benchmark corpora of annotated queries.

- Models are typically classification or sequence models trained on databases of annotated queries then used to predict intents on unseen utterances.

- Despite the approach's growing popularity, it relies on extensive human annotations and its opacity provides little to no insights into the structure of intent representation.

- **The unsupervised approach, far less explored, could be used to reduce labelling workload while enabling the elaboration of a clear and concise formal model of natural language intent.**

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"Banking77" requires annotations

Card Lost	*Could you assist me in finding my lost card?*
Link to Existing Card	*I found my lost card. Am I still able to use it?*
Failed Top-up	*Tell me why my topup wouldn't go through?*

	Instances per labels		
Model	**10**	**30**	**Full**
BERT-FIXED	67.55	80.07	87.19
BERT-TUNED	83.42	90.03	**93.66**
USE	84.23	89.74	92.81
CONVERT	83.32	89.37	93.01
USE+CONVERT	**85.19**	**90.57**	93.36

Casanueva et al., arxiv 2020

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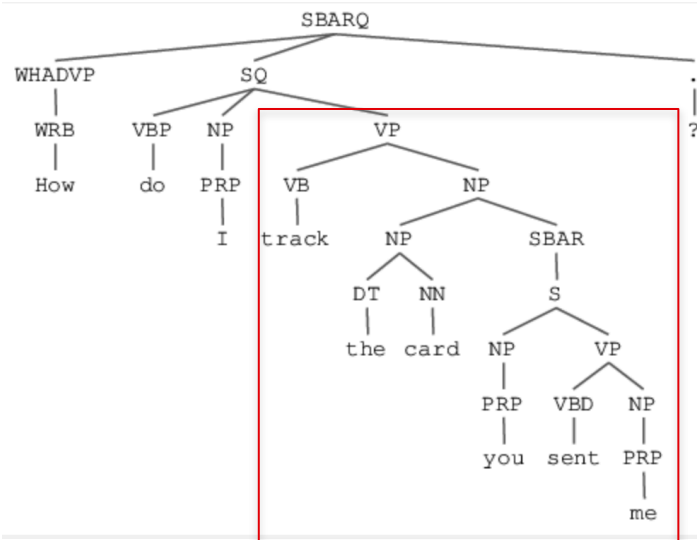
Banking77
>   * Sector: Finance
>   * Industry: Banking
>   * task: task-oriented dialog
>   * 13,083 {question, intents}
>   * 77 intents
>   * train input format: .csv
>   * url: [13]
>   * corpus url [30]
>   * license
>   * pros
>   * Ecological relevance:
>   * many intents, emulates
commercial systems env. [13]

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Input Text Utterance	Intents
Is it possible to **navigate** back in \<XXX\> **to previous page** after save processing? … I have a page where I click on a link and use navigateURL … want to be able to go back to the previous calling page and **complete** the **processing** of the **save**…	navigate previous page, complete processing save
The "Your tweets retweeted" page on Twitter… **find** out all the **users** who **retweeted** a tweet of mine? … how many people have retweeted a tweet and what their **Twitter IDs** are?	find retweeted Twitter IDs
Is there a WordPress plugin that will **tweet when** a scheduled post is posted? I know there are tons … that will tweet when you **publish** a post, but none I have tried will do it on a **scheduled post**.	tweet when publish scheduled post
How can I **keep** my **phone from** just **falling** overwhen watching videos? … also want to **have** my **hands free** to do other things … but I find due to most phones not being particularly 'grippy' it is hard to lean them up … any nifty life hacks for this?	keep phone from falling, have hands free
I'm starting a micro-school… I want to **manage sick notes** and **absences** … How can I **synchronize** one **central** Google **Calendar** that only administrators have access… Parents should be able to schedule future absences and excuse past absences…	manage sick notes, manage absences, synchronize central calendar

VB   NP

navigate to previous

VB   NP

find out all the users …

VB   PP

tweet when ..

VB   NP

keep my phone from …

VB   NP

manage sick notes

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Chunking

Semantic similarity analysis

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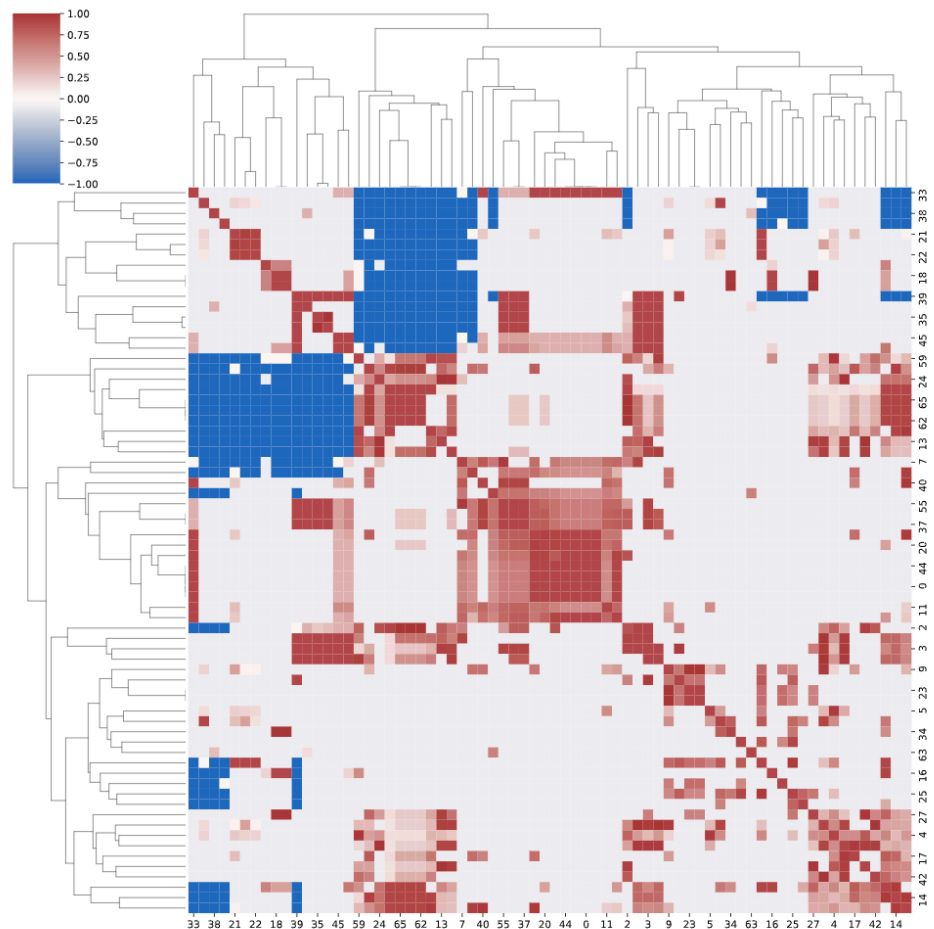
Some good labels but need real eval.

query	label
have gotten new card	2
tracking number card	2
need Australian dollars instead UK currency	2
get new card	2
trade currencies	2
exchange currencies using	1
have nt got card	2
exchange currencies using	1
need exchange currencies	1
track card was sent me	2
use exchange currencies	1

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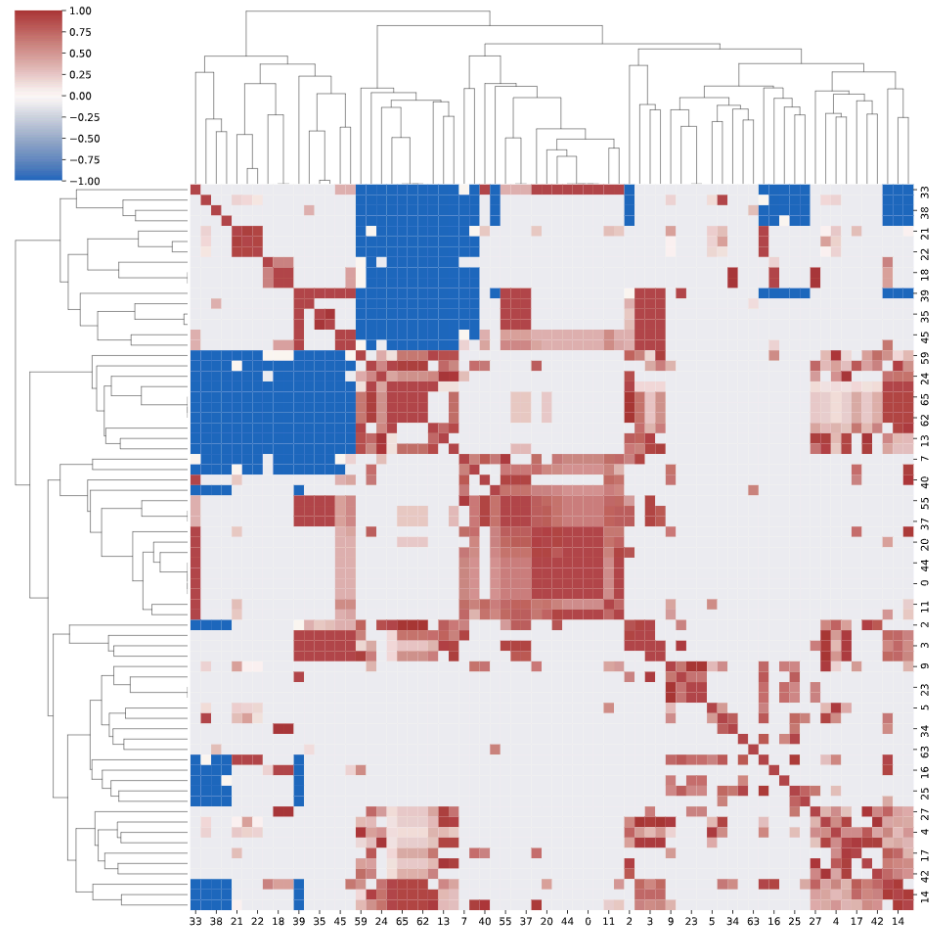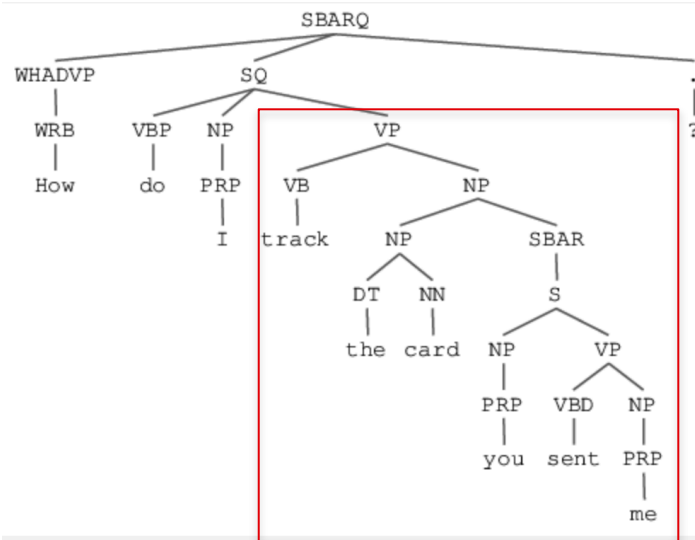
Chunking

Functional parsing
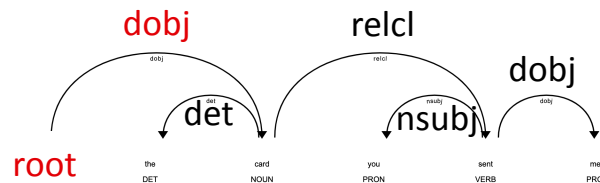
Parametrization

```
{
  Intent: track
  Intendeed: card
  entities: [
      {date: None,
       ?x: None
       pp: you sent me
      },
      ]
}
```

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Approach 1

How do I `track` the `card you sent me?`

↓

Chunking

↓

Semantic clustering

↓

Intent   Class label

Approach 2

How do I `track` the `card you sent me?`

↓

Chunking

↓

Parametrization

↓

Expressive
intent

{
  Intent: track
  Intendeed: card
  entities: [
        {date: None,
        ?x: None
        },
        ]
  }

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Perspectives

- Improve data understanding
- Understand how ambiguity affects parsing
- Improve similarity analysis
- Simplify and bridge the two approaches

etc …

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