

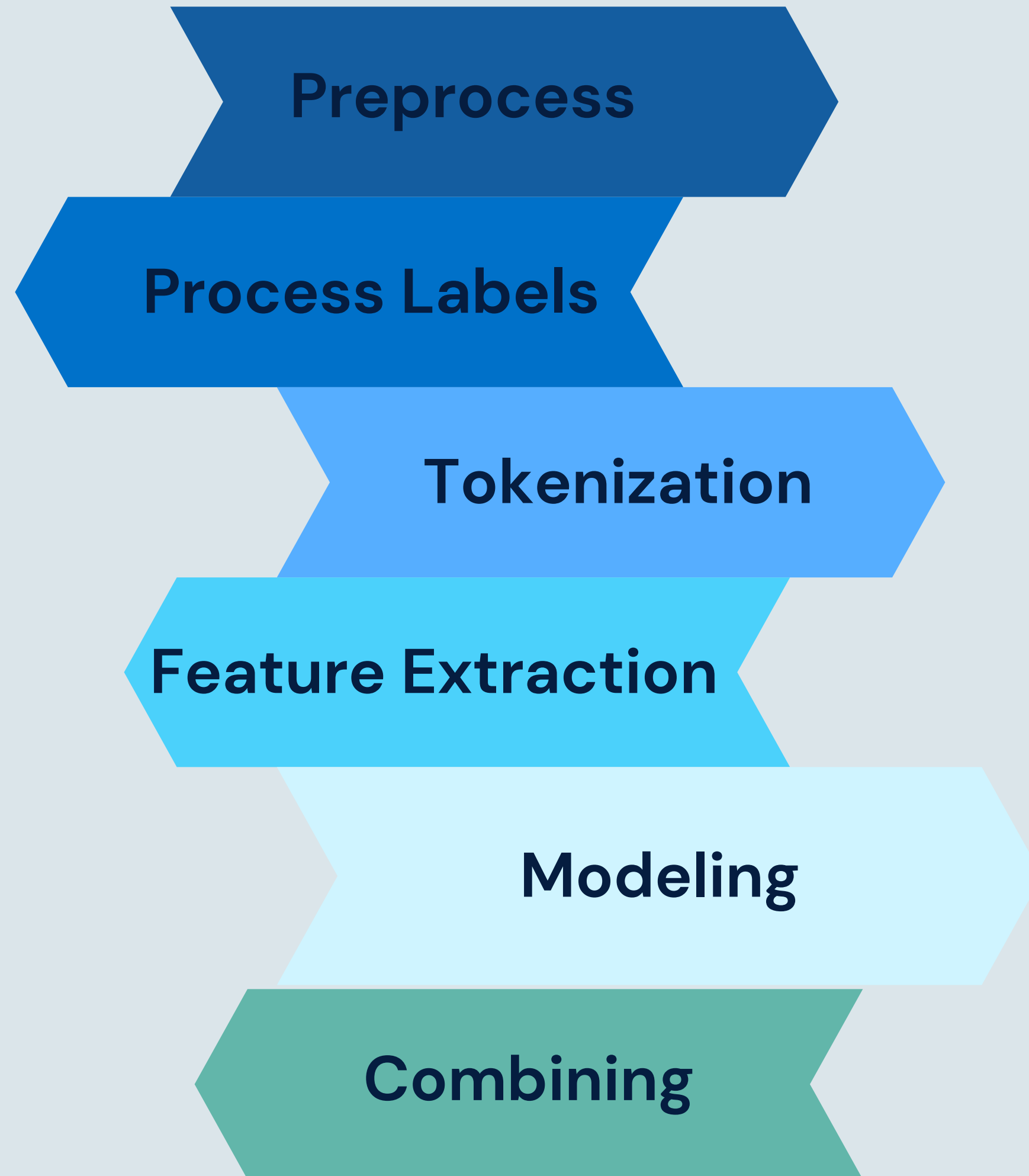


NLP PROJECT

PIZZA ORDERS

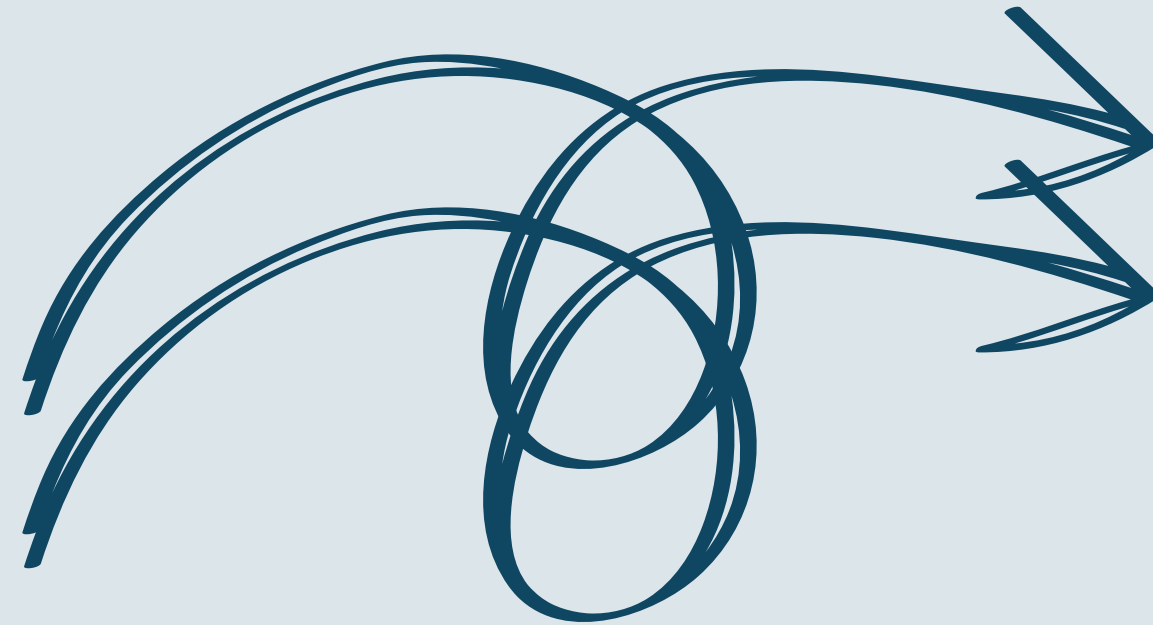


Pipeline



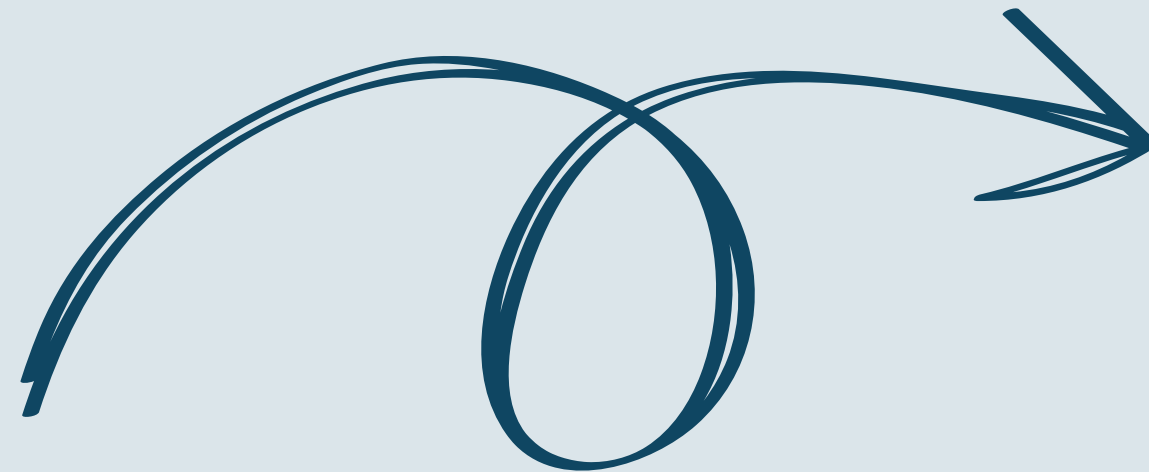
1-Preprocessing

We used



- **Spell checker**
- **Strip**
- **Lower**
- **Punctuation removal**

We also tried



- **Spell checker**
- **Contractions**
- **Strip**
- **Lowercase**
- **Punctuation removal**
- **Lemmatization**

2-Process Labels

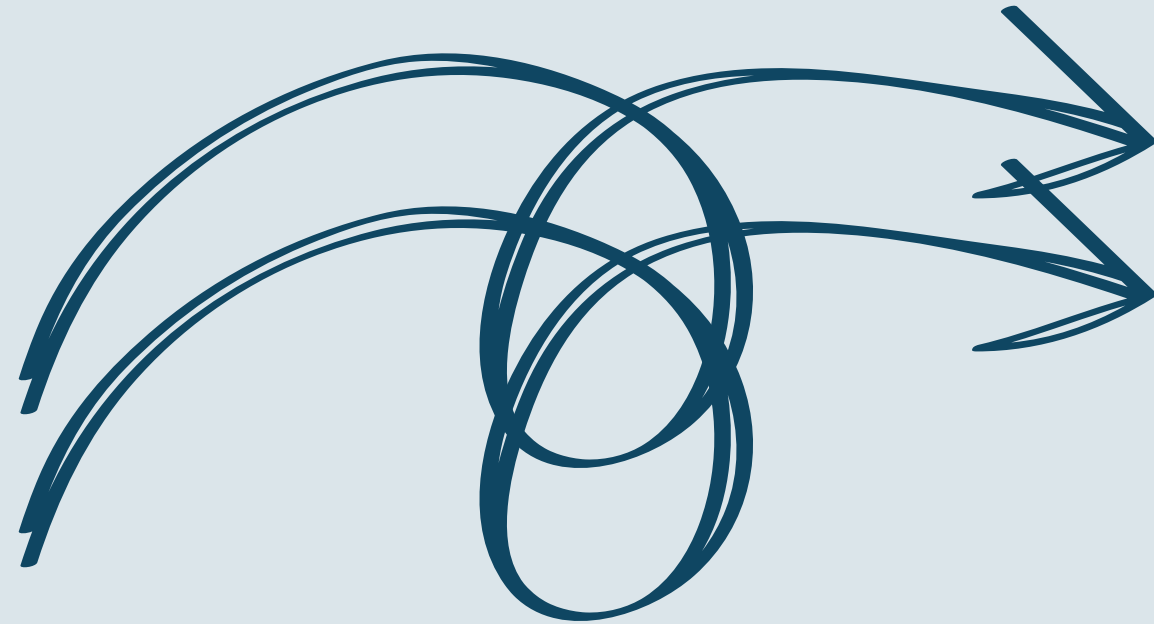
Top



Labeled
Entities

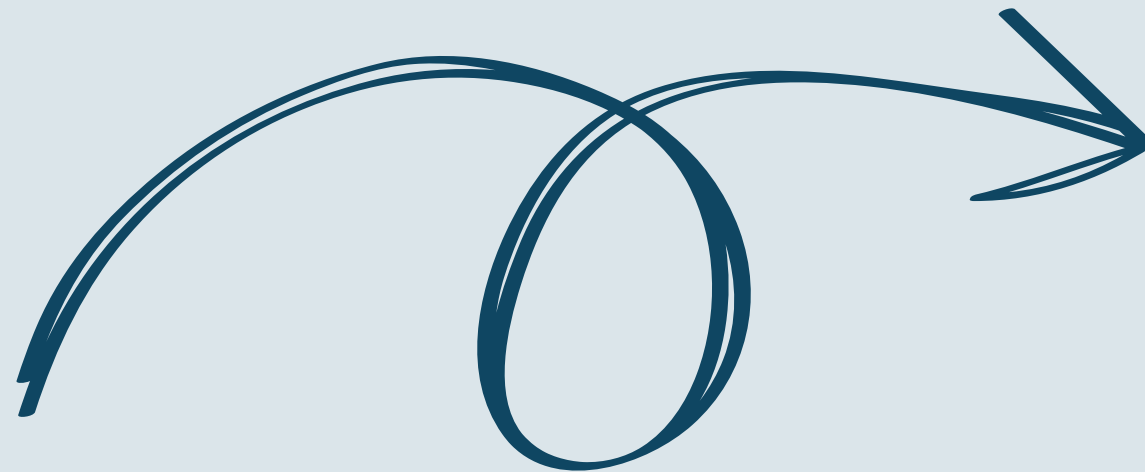
2-Process Labels

We used



Custom function

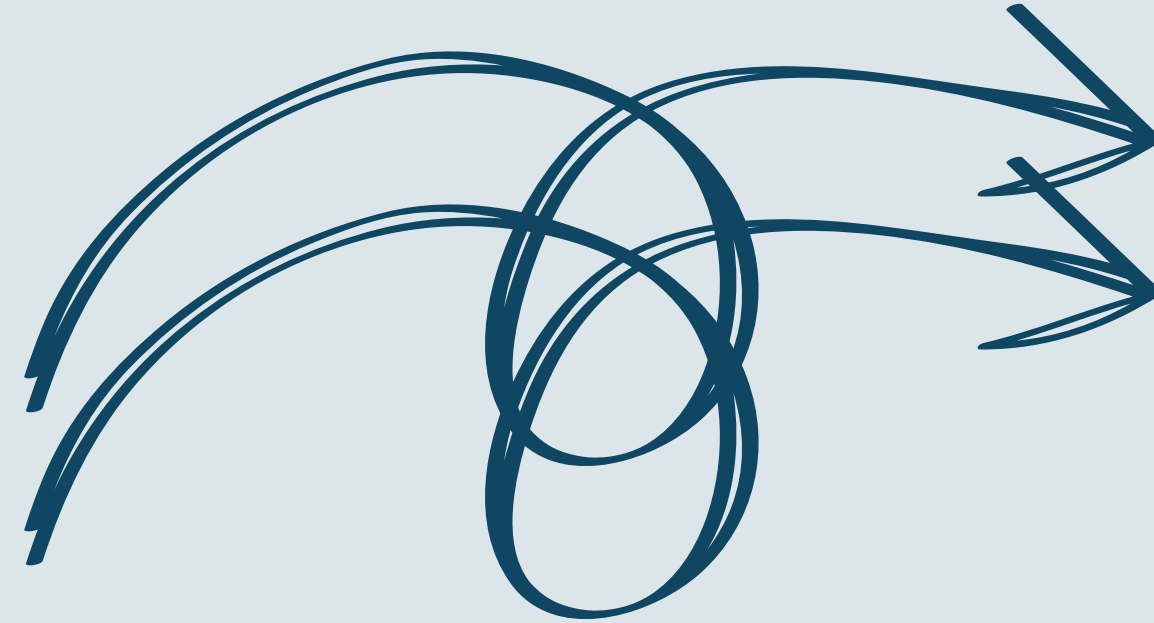
We also tried



Regex

3- Tokenization

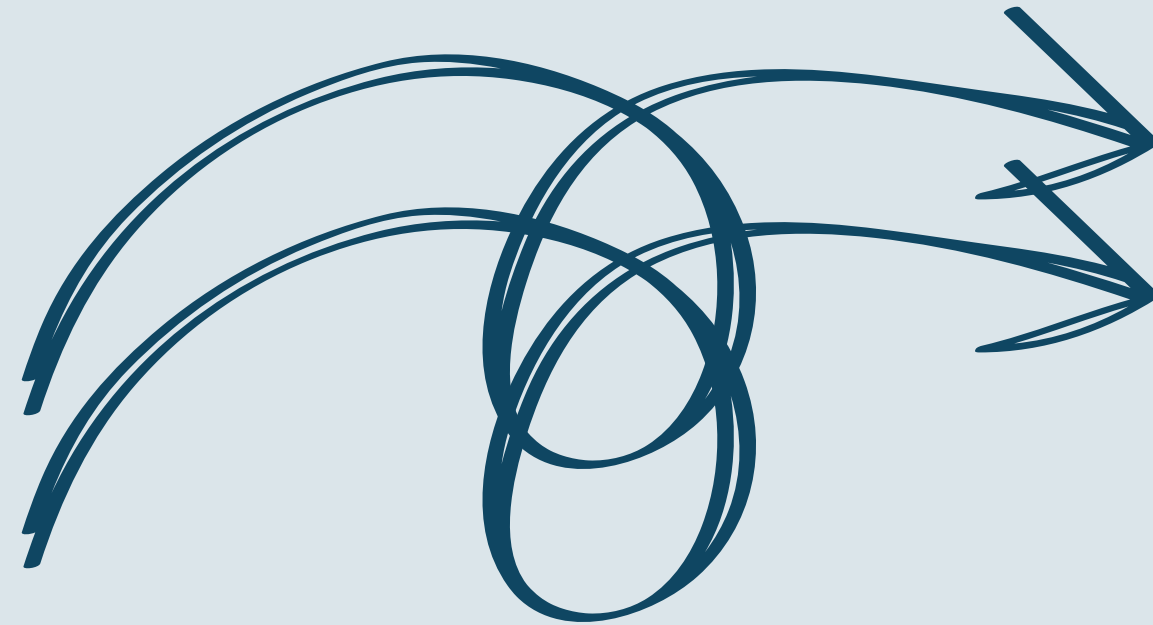
We used



BertTokenizer

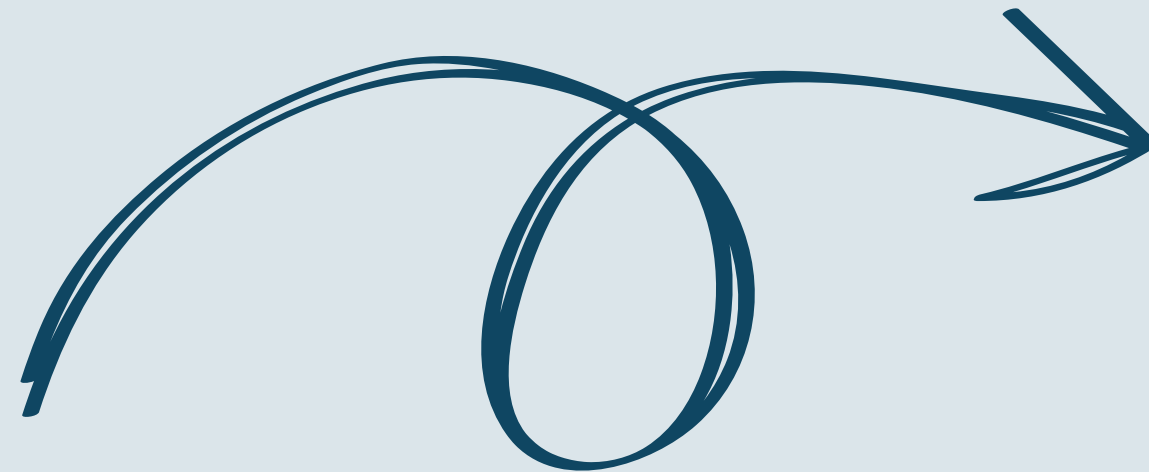
4- Feature Extraction

We used



Trainable embeddings

We also tried



- **Context embeddings**
- **Word2vec**

5- Modeling

**NER
Model 1**

Order Type

**NER
Model 2**

Pizza Entities

Drink Entities

5- Modeling

NER

Encoder decoder for (PIZZAORDER and DRINKORDER)

Model 1

Order Type

takes the input and outputs the label entities
as on of the following labels

B_PIZZAORDER

,I_PIZZAORDER,B_DRINKORDER,I_DRINKORDER ,O

5- Modeling

NER

Model 2

Shared encoder with two decoders

Pizza Entities

each decoder takes the corresponded input part
and outputs the entities labeled

as

Drink Entities

B-I_Topping ,B-I_STYLE,B-I_SIZE ,B-I_NUMBER ,O ,
and more with total 36 entities

6- Combining

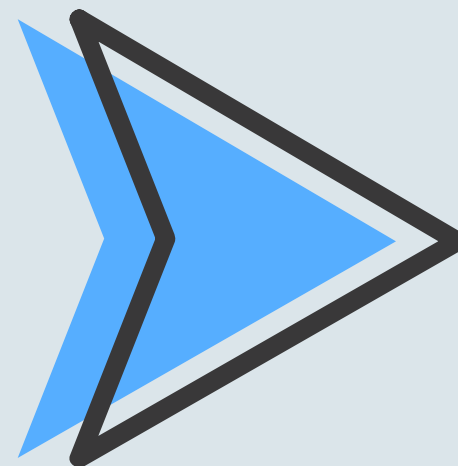
Raw Input

Model 1 Prediction

Model 2-1
Prediction

Model 2-1
Prediction

Model 2
Prediction



Top

Demo

Input

Order Processing App

Enter your order:

i want a large onion and pepperoni pizza with extra cheese

output
json

(ORDER i want (PIZZAORDER (NUMBER a) (SIZE large) (TOPPING onion) and (TOPPING pepperoni) pizza
with (QUANTITY extra) (TOPPING cheese)))

```
{
  "ORDER": {
    "PIZZAORDER": [
      0: {
        "NUMBER": "a"
        "SIZE": "large"
        "AllTopping": [
          0: {
            "NOT": false
            "Quantity": NULL
            "Topping": "onion"
          }
          1: {
            "NOT": false
            "Quantity": NULL
            "Topping": "pepperoni"
          }
          2: {
            "NOT": false
            "Quantity": NULL
            "Topping": "cheese"
          }
        ]
      }
    ]
  }
}
```

Thank You