

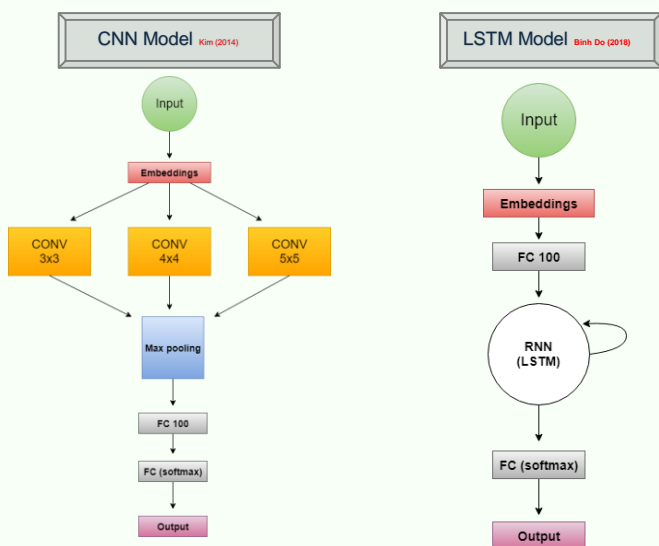
## Problem Statement

- Identify different aspects of a sentence. Each aspect consists of 3 subtasks:
  - Aspect category detection:  
“The pizza is overpriced and soggy.”  
Category: Food-quality  
Category: Food-price
  - Aspect Term extraction:  
“The food was tasty and the service impeccable.”  
Target: pizza  
Target: service
  - Sentiment polarity estimation:  
“The onion rings are great! “  
Polarity: Positive

## Work description

- 1<sup>st</sup> Semester:
  - Subtask 2:
    - Rule-based approach
    - ML approach (CRF)
  - Subtask 1: One-vs-rest classification (SVM) with thresholding
  - Subtask 3: One-vs-rest classification (SVM)
- 2<sup>nd</sup> Semester:
  - Subtask 1:
    - CNN classifier
    - One-vs-rest classifier (CNN)
  - Subtask 3:
    - CNN classifier
    - LSTM classifier

## Overall Approach/Design



## Implementation Issues

### Challenges:

- Selecting model/network architecture
- Hyper-parameter tuning
- Feature engineering for CRF aspect term extraction

### Employed Tools, Techniques:

- TensorFlow, Sklearn, CoreNLP, NLTK libraries
- Sequence labeling (IOB tagging)
- TF-IDF
- Word embeddings
- Model regularization (L2 regularization, Dropout)
- Cross-validation

## Results (English restaurant reviews)

Slot 1 F1-Score	Slot 2 F1-Score	Slot 3 Accuracy
NLANG./U/73.031 NileT./U/72.886 BUTkn./U/72.396 AUEB-/U/71.537 BUTkn./C/71.494 SYSU./U/70.869 XRCE/C/68.701 UWB./U/68.203 INSIG./U/68.108 ESI./U/67.979 UWB./C/67.817 GTU./U/67.714 AUEB-/C/67.35 NLANG./C/65.563 LeeHu./C/65.455 TGB./C/63.919* IIT-T./U/63.051 DMIS./U/62.583 DMIS./C/61.754 IIT-T./C/61.227 bunji./U/60.145 basel./C/59.928 UFAL./U/59.3 INSIG./C/58.303 IHS-R./U/55.034 IHS-R./U/53.149 SeemGo./U/50.737 UWate./U/49.73 CENNL./C/40.578 BUAP./U/37.29	NLANG./U/72.34 AUEB-/U/70.441 UWB./U/67.089 UWB./C/66.906 GTU./U/66.553 Senti./C/66.545 bunji./U/64.882 NLANG./C/63.861 DMIS./C/63.495 XRCE/C/61.98 AUEB-/C/61.552 UWate./U/57.067 KnowC./U/56.816* TGB./C/55.054* BUAP./U/50.253 basel./C/44.071 IHS-R./U/43.808 IIT-T./U/42.603 SeemGo./U/34.332	XRCE/C/88.126 IIT-T./U/86.729 NileT./U/85.448 IHS-R./U/83.935 ECNU./U/83.586 AUEB-/U/83.236 INSIG./U/82.072 UWB./C/81.839 UWB./U/81.723 SeemGo./C/81.141 bunji./U/81.024 TGB./C/80.908* ECNU./C/80.559 UWate./U/80.326 INSIG./C/80.21 DMIS./C/79.977 DMIS./U/79.627 IHS-R./U/78.696 Senti./U/78.114 LeeHu./C/78.114 basel./C/76.484 bunji./C/76.251 SeemGo./U/72.992 AKTSKI./U/71.711 COMMI./C/70.547 SNLP./U/69.965 GTU./U/69.965 CENNL./C/63.912 BUAP./U/60.885
One-vs-Rest (CNN) 72.7%	ML approach (CRF) 67.8%	CNN 82.2%
CNN 67.4%		ML approach (SVM) 79.4%
One-vs-Rest (SVM) 64.5%	Baseline 24.4%	LSTM 78.3%
Baseline		Baseline

## Validation

### Tested on other languages and domains (SLOT3)

#### Arabic hotel reviews

	F1-Score
INSIG	0.827
Our model (CNN)	0.818
IIT-T	0.817
Baseline	0.764

#### Turkish restaurant reviews

	F1-Score
IIT-T	0.842
Our model (CNN)	0.754
INSIG	0.742
Baseline	0.723