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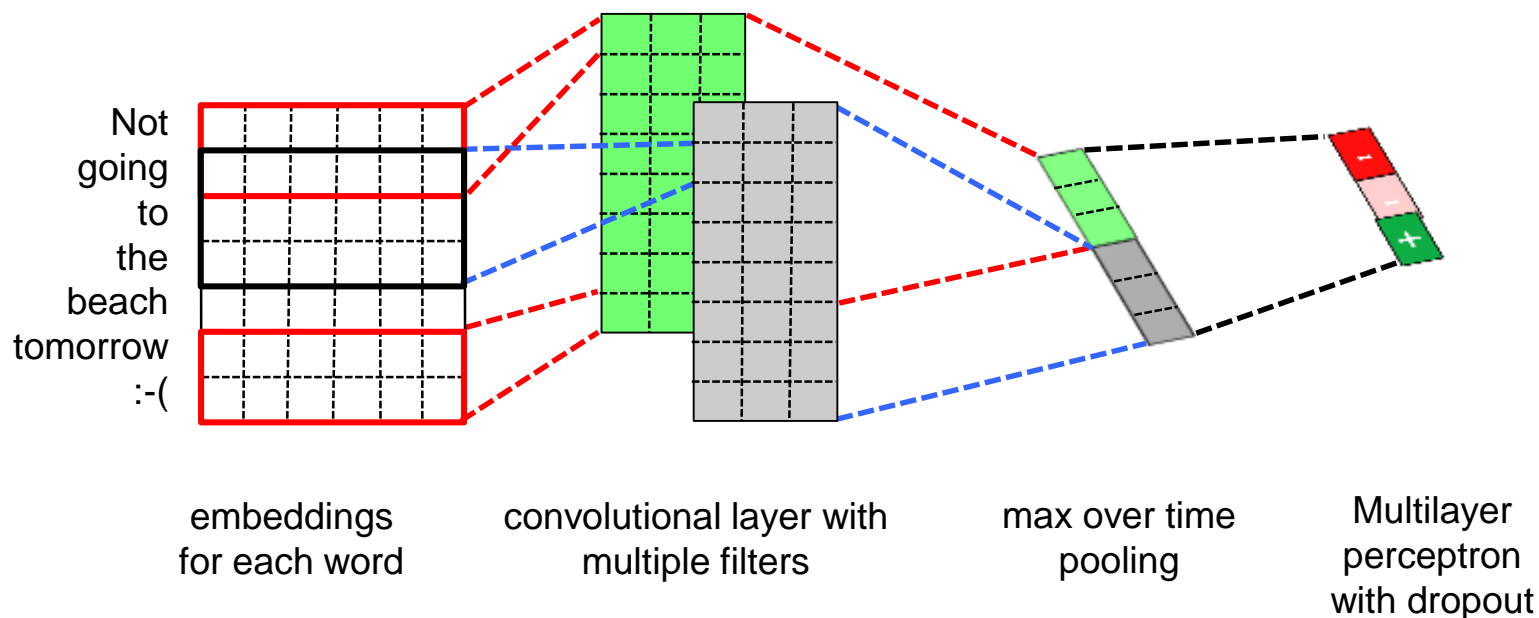
Convolutional Neural Networks for Sentiment Analysis on Italian Tweets

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Task 2. Polarity Classification

Convolutional Neural Network



G. Attardi, D. Sartiano (2016) SemEval 2016, Task 4

Training the network

Plain Word Embeddings

- **Word2vec on 167 million Italian tweets**
- **Parameters:**
 - embeddings size 300
 - window dimension 5
 - discarding words with $\text{freq} < 5$
- **450k word embeddings obtained**

Sentiment Specific WE

- **Starting from plain WE**
- **Sentiment polarity of texts into the embeddings**
- **Positive and Negative tweets based on emoticons**
 - More negative tweets than positive tweets

Distant Supervision

- Silver corpus created as follows:
- Randomly choose max 10k tweets per class (mixed and neutral added)
- Select tweets which are assigned same class by:
 1. emoticon presence (RE match)
 2. classifier trained using the task trainset (gold).

Experiments

- **Extensive experiments with various configurations of the classifier:**
 - filters
 - plain or sentiment specific word embeddings
 - gold or silver training set.
- **Best settings:**

	Run 1		Run 2	
Embeddings	WE skipgram		SWE	
Training set	Gold	Silver	Gold	Silver
Filters	2, 3, 5	4, 5, 6, 7	7, 7, 7, 7, 8, 8, 8, 8	7, 8, 9, 10

Results

- Top official results for polarity classification

System	Positive F-score	Negative F-score	Combined F-score
UniPI_2.c	0.685	0.6426	0.6638
team1_1.u	0.6354	0.6885	0.662
team1_2.u	0.6312	0.6838	0.6575
team4_.c	0.644	0.6605	0.6522
team3_.1.c	0.6265	0.6743	0.6504
team5_2.c	0.6426	0.648	0.6453
team3_.2.c	0.6395	0.6469	0.6432
UniPI_1.u	0.6699	0.6146	0.6422
UniPI_1.c	0.6766	0.6002	0.6384
UniPI_2.u	0.6586	0.5654	0.612

- The extended silver corpus did not help, possibly because the resulting corpus was still unbalanced.

New Results

Unipi_2c	Positive	Negative	F-score
official run	0.685	0.6426	0.6638
plain embeddings	0.6851	0.6612	0.6731
SE 200k tweets 25 epochs	0.6779	0.6826	0.6803
SE 500k tweets 4 epochs	0.6818	0.6856	0.6837

Conclusions

- The experiments confirmed the validity of the Convolutional Neural Networks in Twitter sentiment classification, also for the Italian language.
- Sentiment Embeddings proved to be effective for sentiment classification