



Irony Detection in Twitter using different methods

Chen Zhou, Huan Wang and Rui Pan
Advisor: Prof. Brendan O'Connor
University of Massachusetts Amherst

Introduction

Background:

Irony is often understood as “the use of words that mean the opposite of what you really think especially to be funny”. Irony is a frequent phenomenon within human communication, occurring both in spoken and written discourse including books, websites, chats, Twitter messages, Facebook posts, news articles and product reviews[2]. Even for humans it is sometimes difficult to recognize irony. Irony markers are thus often used in human communication, supporting the correct interpretation (Attardo, 2000).[3]

Goals:

- Utilizing different techniques of NLP to detect sarcasm of Twitter message.
- Compare the performance of different approaches.

Dataset

- We use the dataset provided by SemEval 2018 task 3- Irony detection in English tweets.
- Examples:

label	Text example
0(Non-ironic)	I miss the days when all my close friends lived in the same city.
1(Ironic)	Nothing makes me happier then getting on the highway and seeing break lights light up like a Christmas tree.

4792 tweets	2396 ironic	3834 training data(80%)
	2396 non-ironic	958 test data(20%)

Methods

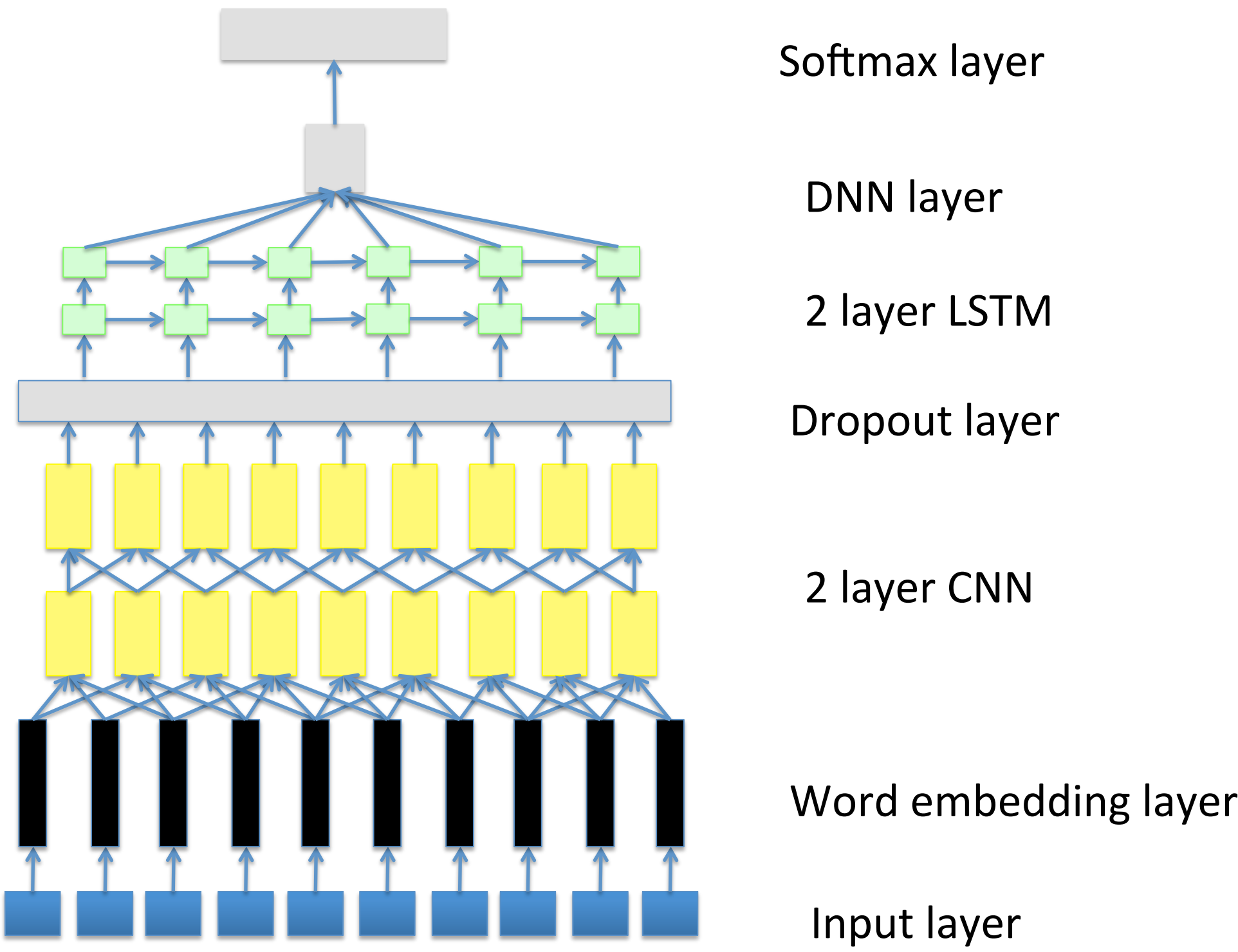
Naïve Bayes:

$$p(C_k|x) = \frac{p(C_k) \cdot p(x|C_k)}{p(x)}$$

Classifier Perceptron:

- Initialize $t = 1, \theta_0 = \vec{0}, S_0 = \vec{0}$
- For each example i (iterating multiples times through dataset),
 - Predict $y^* = \arg \max_{y'} \theta^T f(x_i, y')$
 - Let $g_t = f(x_i, y_i) - f(x_i, y^*)$
 - Update $\theta_t = \theta_{t-1} + rg_t$
 - Update $S_t = S_{t-1} + (t - 1)rg_t$
 - $t := t + 1$
- Calculate $\bar{\theta}$ based on S

Neural network:

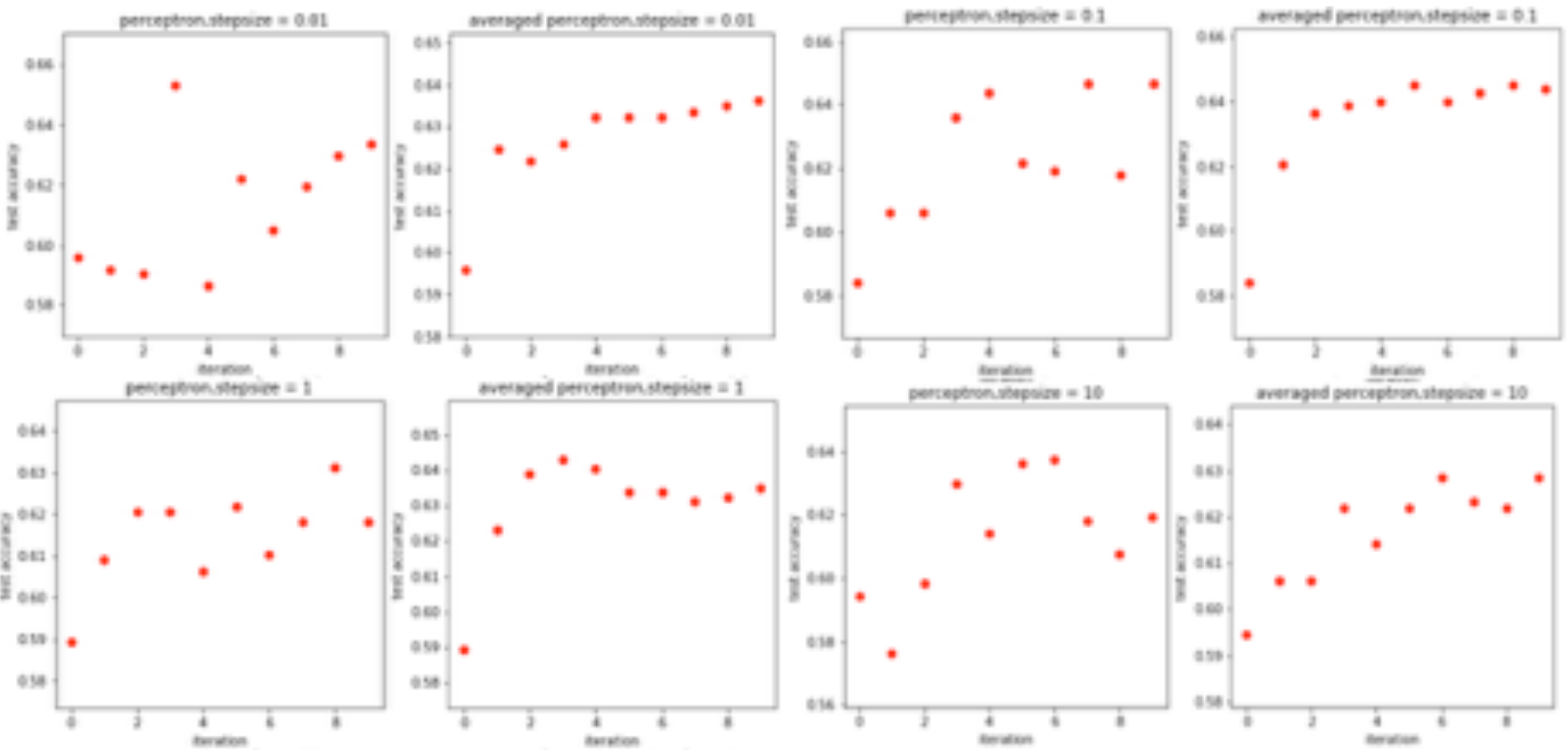


Results

- Naïve Bayes:** We evaluate the model with different pseudocount parameter. The accuracy for different

pseudocount parameter	1	10	50	100
accuracy(%)	92.57	84.75	76.14	79.14

- (Averaged) perceptron algorithm:** We ran 10 iterations each time with different step size {0.01, 0.1, 1, 10}.



- Neural network:**
CNN(filter size=64, filter width=3) + LSTM(hidden memory unit = 64) + DNN
Accuracy is 0.802

Discussions and Conclusions

- Accuracy using Naïve Bayes model goes down when the pseudocount parameter increase.
- For average perceptron model, the maximum accuracy we got was 65.32% on development set with stepsize 0.01 at the third iteration.

Contact

Chen Zhou chenzhou@umass.edu
Huan Wang huanwang@umass.edu
Rui Pan ruip@umass.edu

References

[1] Ghosh, A. and Veale, T.: 2016, Fracking Sarcasm using Neural Network, Proceedings of the 7th Workshop on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis, Association for Computational Linguistics, San Diego, California, pp. 161–169.
[2] Joshi, A., Bhattacharyya, P. and Carman, M. J.: 2016, Automatic Sarcasm Detection: A Survey, CoRR abs/1602.03426.

[3] Liu, B.: 2012, Sentiment Analysis and Opinion Mining, Synthesis Lectures on Human Language Technologies, Morgan & Claypool Publishers.
[4] Leo Breiman, Jerome H. Friedman, Richard A. Olshen, and Charles J. Stone. 1984. Classification and Regression Trees . Wadsworth, Belmont, California.
[5] Buschmeier, Konstantin, Philipp Cimiano, and Roman Klinger. "An Impact Analysis of Features in a Classification Approach to Irony Detection in Product Reviews." WASSA@ ACL. 2014.