Assignment 1: InferSent

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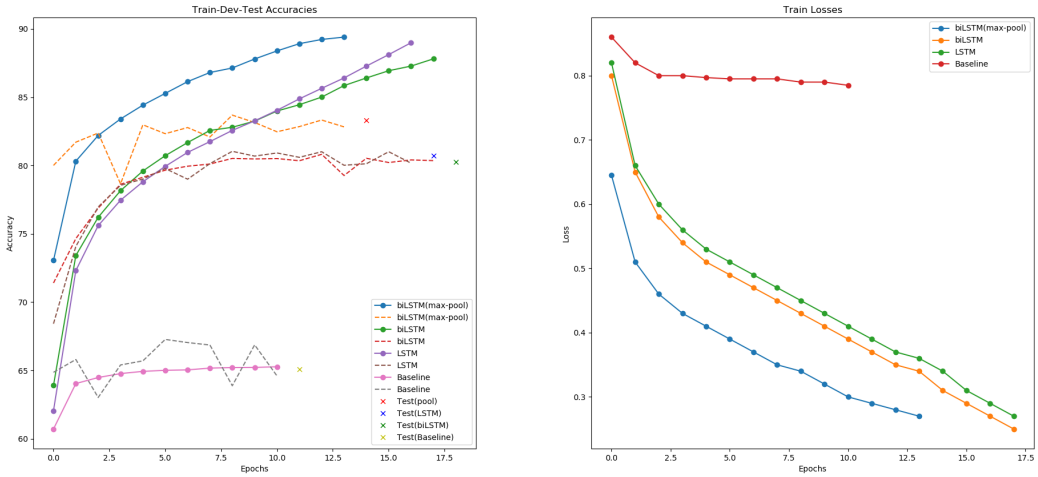
1 Training process



(a) Train-Dev-Test Accuracy

(b) Train loss

Figure 1: Test accuracy achieved by all the models: **Baseline** = 65.07%, **LSTM** = 80.73%, **biLSTM** = 80.26%, **biLSTM(max-pool)** = 83.32%

2 Results and Analysis

Model	MR	CR	SUBJ	MPQA	SST	TREC	MRPC	SICK-R	SICK-E	STS-14
Baseline	77.19	78.14	91.1	87.85	80.29	83.0	72.87/81.38	0.80	78.49	0.54/0.55
LSTM	70.15	74.38	82.25	85.39	74.03	58.8	72.0/81.66	0.83	81.96	0.49/0.48
biLSTM	74.4	78.6	89.28	87.88	78.14	83.6	73.16/81.98	0.87	84.6	0.55/0.57
biLSTM(max-pool)	**78.08**	**81.35**	**92.24**	**88.85**	**82**	**88.4**	**74.38/81.44**	**0.88**	**85.26**	**0.64/0.65**

Table 1: SentEval scores on 10 downstream tasks of the 4 models. biLSTM with max-ppol outperforms all the other models at all the 'transfer' tasks.

Model	NLI		Transfer	
	dev	test	macro	micro
Baseline	64.6	65.07	81.1	82.73
LSTM	80.73	80.0	75.87	75.65
biLSTM	80.26	79.83	81.21	82.65
biLSTM(max-pool)	**83.82**	**83.83**	**84.82**	**85.18**

Table 2: Macro- and Micro- Accuracies on SentEval scores ('transfer task') of the 4 models along with training performance measures ('NLI task').

GitHUb Code

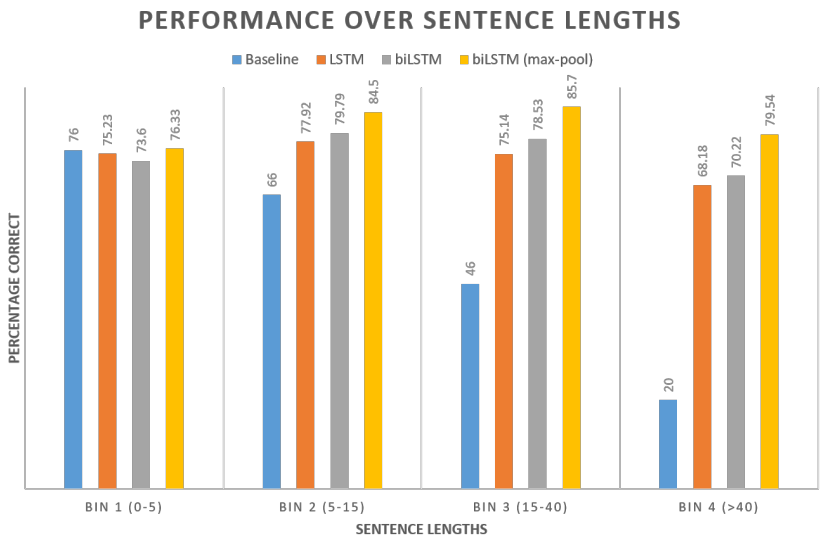


Figure 2: Performance of the models over different ranges of the sentence lenghts. We can observe that both biLSTM models perform much better than others as the sentence length increases. For shorter sentences, performance of all the models is comparable.

A Appendix

Premise: `Excellent`
Hypothesis: `Pathetic`

Base = [**9.6518**, 2.8749, -12.3981] (***Entailment***)
LSTM = [-1.7245, 0.5521, **1.1724**] (***Contradiction***)
biLSTM = [-4.9323, 1.2784, **3.6504**] (***Contradiction***)
biLSTM(max-pool) = [-15.0683, 1.5829, **13.4708**] (***Contradiction***)

Premise: `This burger is very good`
Hypothesis: `This burger is very bad`

Base = [**2.3129**, 2.1854, -4.4383] (***Entailment***)
LSTM = [-0.0933, **0.3281**, -0.2348] (***Neutral***)
biLSTM = [-2.6843, -0.1019, **2.7698**] (***Contradiction***)
biLSTM(max-pool) = [-3.0693, 0.2361, **2.8359**] (***Contradiction***)

Premise: `I am a boy`
Hypothesis: `I am not a boy`

Base = [**2.8127**, 0.7847, -3.5601] (***Entailment***)
LSTM = [**0.4299**, -0.1724, -0.2575]] (***Entailment***)
biLSTM = [**0.4546**, -0.3356, -0.1364] (***Entailment***)
biLSTM(max-pool) = [-0.8157, -1.1039, **1.9276**] (***Contradiction***)

Premise: `The man is riding a bike wearing a blue helmet`
Hypothesis: `The woman is riding a bike wearing a blue helmet`

Base = [**2.0862**, -0.4986, -1.5574] (***Entailment***)
LSTM = [-0.5291, -0.5784, **1.1075**] (***Contradiction***)
biLSTM = [-1.6187, -1.0998, **2.6845**] (***Contradiction***)

biLSTM(max-pool) = [-7.2812, -1.5112, **8.7917**]] (***Contradiction***)

Premise: `A lady is in the park`
Hypothesis: `A lady is in the house`

Base = [**0.9784**, 0.1472, -1.0930] (***Entailment***)
LSTM = [-1.2440, -0.5133, **1.7574**] (***Contradiction***)
biLSTM = [-3.6487, -1.1938, **4.8015**] (***Contradiction***)
biLSTM(max-pool) = [-4.7834, -2.0677, **6.8549**] (***Contradiction***)

Premise: `I tried to make this a really long sentence but I am failing so bad that I have to write something that does not even make sense`
Hypothesis: `This is a short sentence`

Base = [**1.9736**, 1.4264, -3.3548] (***Entailment***)
LSTM = [**0.3392**, 0.2548, -0.5939] (***Entailment***)
biLSTM = [-4.6421, 1.4537, **3.1921**] (***Contradiction***)
biLSTM(max-pool) = [**1.4613**, 0.5478, -2.0038] (***Contradiction***)

Premise: `I can tell you that I do not like fast cars and also I can say for sure that I do not like bikes`
Hypothesis: `I can tell you that I like fast cars and also I can say for sure that I do not like bikes`

Base = [**2.2253**, 0.8985, -3.0780] (***Entailment***)
LSTM = [**1.6140**, 0.0471, -1.6611] (***Entailment***)
biLSTM = [**0.9712**, 0.2159, -1.1899] (***Entailment***)
biLSTM(max-pool) = [**0.5556**, -0.0174, -0.5308] (***Entailment***)

Premise: `I can tell you that I do not like fast cars and also I can say for sure that I do not like bikes`
Hypothesis: `I can tell you that I like fast cars and also I can say for sure that I like bikes`

Base = [**2.2253**, 0.8985, -3.0780] (***Entailment***)
LSTM = [**1.1728**, 0.0794, -1.2522] (***Entailment***)
biLSTM = [-0.1934, 0.0876, **0.0975**] (***Contradiction***)
biLSTM(max-pool) = [-0.7368, -0.1455, **0.8880**] (***Contradiction***)