ATCS Practical

Learning general-purpose sentence representations

Lab session 1

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March 30, 2021

Organization
TA sessions

Week 1-3: Practical 1 – Learning general-purpose sentence representations

Week 4: Evaluation Practical 1

Week 5-9: Group research projects

Organization
Communication

- Slack for answering questions offline
  - Sign-up details on Canvas
  - For communication with Katia, please use email
- Channels
  - #general – General questions
  - #practicals – Questions about practical 1 and group project
  - #finding-teammates – Looking for a group to join, or other students to join your group
  - Feel free to create any other channel you like
  - Feedback is welcomed

Organization
Lisa

- Lisa SURFSara cluster for GPU access
  - Check your student mail for login details
- SLURM guide: link
- Short intro to Lisa at the end of the session

Practical 1
Learning goals

- Reproduce a paper from start to end;
- Implement a complete training and evaluation framework;
- Become familiar with Natural Language Inference and sentence representation learning;
- Practice to analyse a trained model.

Practical 1
Natural Language Inference

Premise: “Bob is in his PJs and in spite of the thunder and lightning outside, he is in dreamland.”

Hypothesis: “Bob is asleep.”

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⇒ **Entailment** 

Practical 1
Natural Language Inference

Premise: “Bob is in his PJs and in spite of the thunder and lightning outside, he is in dreamland.”

Hypothesis: “Bob lives with his parents.”

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Natural Language Inference

Premise: “Bob is in his PJs and in spite of the thunder and lightning outside, he is in dreamland.”

Hypothesis: “Bob lives with his parents.”

⇒ **Neutral** ?

Practical 1
Natural Language Inference

Premise: “Bob is in his PJs and in spite of the thunder and lightning outside, he is in dreamland.”

Hypothesis: “Bob is wearing a tuxedo.”

Practical 1
Natural Language Inference

Premise: “Bob is in his PJs and in spite of the thunder and lightning outside, he is in dreamland.”

Hypothesis: “Bob is wearing a tuxedo.”

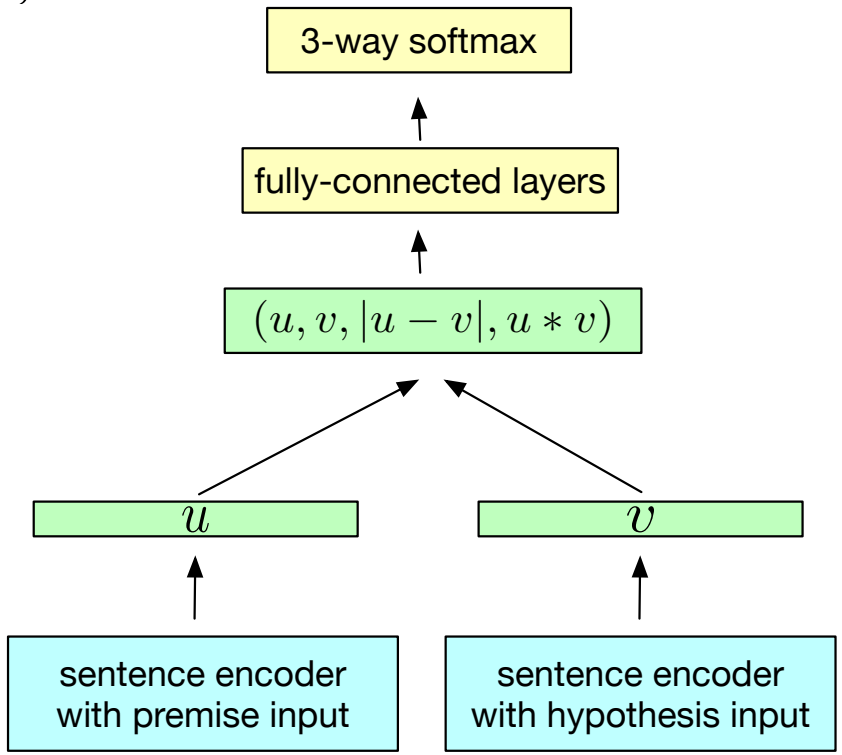
⇒ **Contradiction** ✗

Practical 1
Dataset

- Data: Stanford Natural Language Inference (SNLI) corpus;
- Size: 570k sentence pairs;
- Labels: entailment, contradiction, neutral

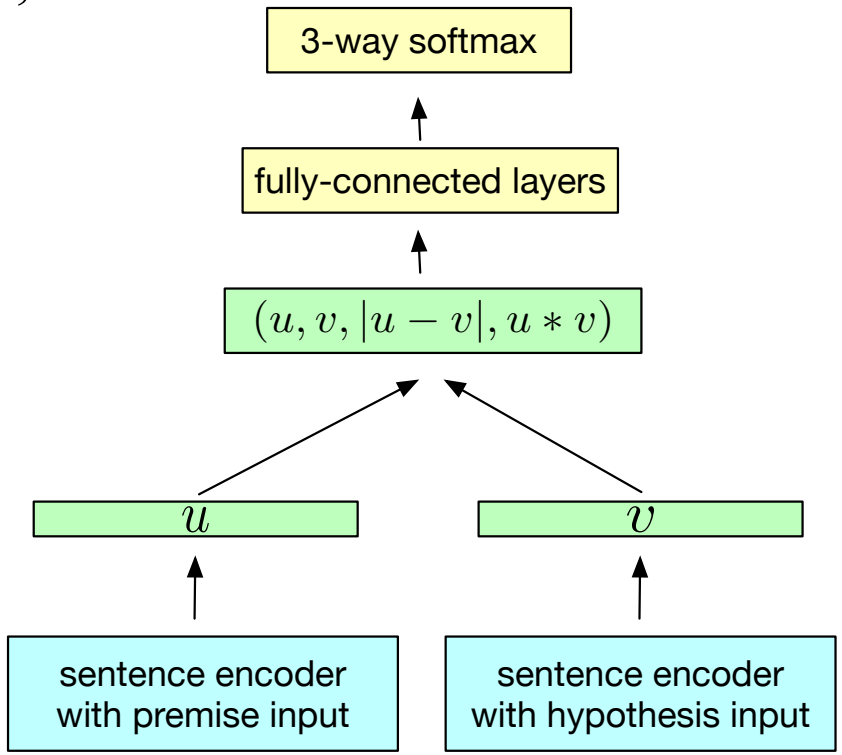
Practical 1
Models

1. Embed words of P and H with GloVe word embeddings;
2. Encode P and H with same encoder and pool words;
3. Classify with MLP



Practical 1
Models

1. Embed words of P and H with GloVe word embeddings;
2. Encode P and H with same encoder and pool words;
   a) Average word embeddings;
   b) Uni-LSTM, use last hidden state;
   c) Bi-LSTM, use first and last hidden state;
   d) Bi-LSTM, use max pooling over words.
3. Classify with MLP.



Practical 1
Evaluation

- Regular testing using the SNLI test set (Bowman et al., 2015);
- Transfer testing using SentEval library (Conneau & Kiela, 2018).

Practical 1
Practicalities

- Read the papers before starting
- Implement in PyTorch, use Torchtext for preprocessing SNLI and GloVe;
- Use a Tensorboard;
- Follow a tutorial for using SentEval;
- Use Lisa to train!

Practical 1
Deliverables

- Code: Python files for training and evaluation;
- Documentation: A short ReadMe describing code with instructions for running;
- Pretrained models: The final checkpoint for each model including a Tensorboard
- Demo: A Jupyter notebook demonstrating your models and (optionally) analysis
- Error analysis: one-page report summarizing your results and findings

Deadline: Friday, April 16, midnight.

Practical 1
Grading

- In-person evaluation through Zoom screen-sharing
  - We have a discussion about your results and analysis
  - Be ready to demonstrate the models in action in the notebook
- Scheduled to take place Tuesday, 20 April.

Time for questions!

References

S. R. Bowman, G. Angeli, C. Potts, and C. D. Manning. A large annotated corpus for learning natural language inference. arXiv preprint arXiv:1508.05326, 2015.

A. Conneau and D. Kiela. Senteval: An evaluation toolkit for universal sentence representations. In Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC-2018), 2018.

A. Conneau, D. Kiela, H. Schwenk, L. Barrault, and A. Bordes. Supervised learning of universal sentence representations from natural language inference data. In Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing, pages 670-680, Copenhagen, Denmark, September 2017. Association for Computational Linguistics.