Learning to Write with Cooperative Discriminators

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SYNOPSIS

• Generations from RNN-based models tend to be generic, repetitive, and contradictory.
• The current loss scheme used for RNNs (cross-entropy & teacher-forcing) is fundamentally shallow & passive.
• To capture more abstract communicative goals we train discriminators to express elements of Grice’s Maxims [5]
• These discriminators learn to cooperate by practicing writing text and then comparing the result to human text

Discriminators are trained to identify abstract properties of text from adversarially extracted data:

Random Continuation, LM Continuation, LM Similarity Sequence

Cooperative Discriminators

A generalization of Product of Experts [4] is used to combine signals from different discriminators

GAN vs L2W

Modeling space is constrained by RNN limitations
Word level only loss

Modeling space is enriched by cooperative discriminators
Word & paragraph loss

RNN vs L2W

Teacher-forcing means RNNs only learn to read passively
Cross-entropy only measures word prediction error

Learning by practice means generators learn to write
L2W loss enhances generator with communicative goals

Discussion

TriAdvisor L2W Example
The bed was super comfortable! I can’t think of a single thing that wasn’t perfect. We didn’t have breakfast at the hotel, but there are plenty of cafes and patisseries nearby. It’s a bit of a walk to the nearest metro, but I’m sure that’s the best way to see Paris!

BookCorpus L2W Example
It was the voice of a man who had never heard him speak before. He didn’t even know what to say, so he just nodded and turned away. The rest of the congregation gathered around him. There were so many people in their midst now that they were all looking at him. He felt a little sick.

Results

L2W is preferred over competitive baselines by human evaluators, on specific criteria (left) and overall quality (right)

Works Cited