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Today: improvements on BERT

1. training improvements ⇒ RoBERTa
   more data
2. longer sequences
   TransformerXL (XLNet)
3. more efficient pretraining objectives
   ELECTRA
4. smaller models
   ALBERT

RoBERTa: very simple
Collection of modifications

1. train w/ bigger batches
   ↳ smaller # of batches w/ larger batch size
   ↳ gradient accumulation to bypass GPU mem. limitations
2. no next sentence prediction
   ↳ downstream perf. unaffected
   ↳ [CLS] token gets no pretraining
3. pretrain on more data

↳ 16 GB → 160 GB
↳ common crawl, URLs from Reddit

4. pretrain for longer (more batches/epochs)
↳ 500K steps

TransformerXL

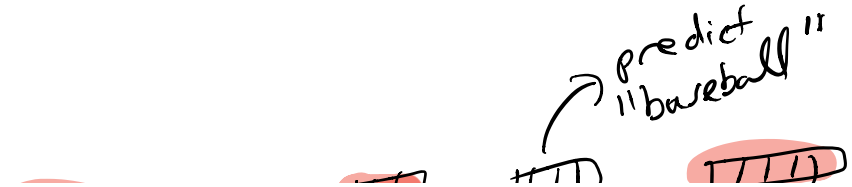
BERT has a fixed token limit of 512 for its inputs. How can we model longer sequences?

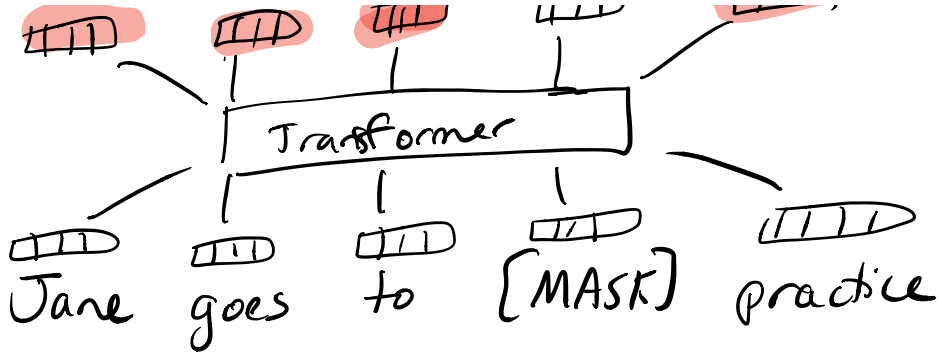
↳ idea: add a recurrent mechanism that connects adjacent segments

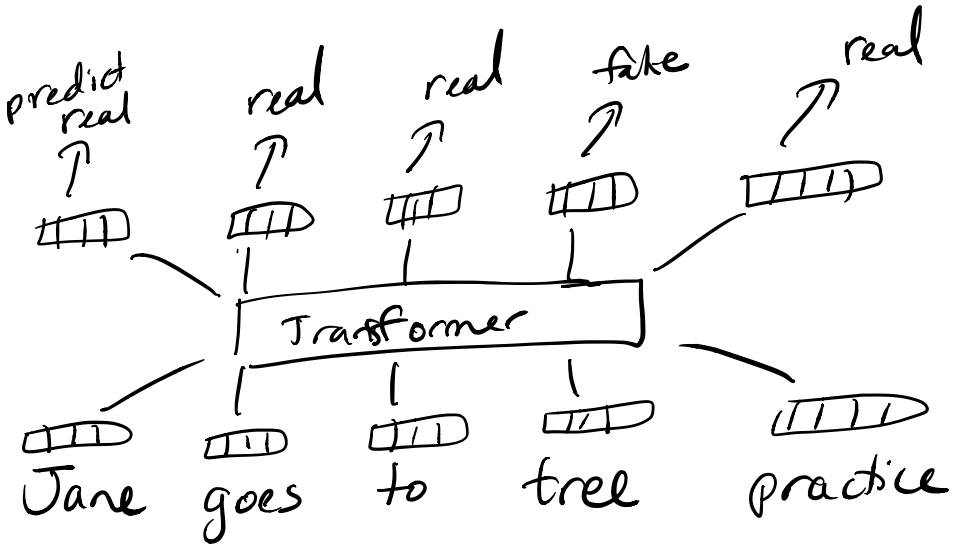
↳ no gradient flow to previous segments
hidden states from prev. segment are cached

→ practical limit to this extended context window
→ 900 words for TransformerXL

ELECTRA – cheaper obj. fn







↳ how do I decide which words to replace and with what?

↳ "generator" ⇒ coming up w/ fake words

↳ train a small BERT model

Jane goes to [MASK] practice

↓

football
basketball
baseball

↳ sampled words from generator form fake words for ELECTRA

- every single token is associated with a prediction of real/fake, not just 15% of words as in BERT

ALBERT - more params != better model

- cross-layer param sharing
  - Q, K, V projection matrices } shared across all layers
  - W matrices in FF layers }

BERT-large: 334M params

ALBERT-large: 18M params

↳ what if we make our shared set of params bigger?

ALBERT-XXL: 235M params, 4096d hidden state size

↳ outperforms BERT-large

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