Diverse Translations With Sentence Codes

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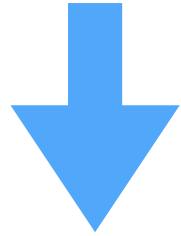JOHNS HOPKINS UNIVERSITY

Diversity Problem

- NMT has a diversity problem!

- Approaches:
  - beam search

  - sampling

  - hard constraints

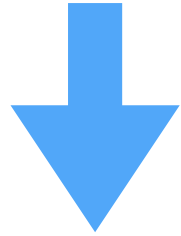 - **new:** sentence codes

Beam Diversity

niemand hat die absicht, eine mauer zu errichten

⬇

no one has the intention to build a wall .
no one has the intention of building a wall .
nobody has the intention to build a wall .
no one wants to build a wall .
no one has the intent to build a wall .
nobody has the intention of building a wall .
no one intends to build a wall .
nobody wants to build a wall .
nobody has the intent to build a wall .
nobody intends to build a wall .

Beam Diversity

niemand hat die absicht, eine mauer zu errichten

no one has the intention to **build** a **wall** .
no one has the intention of **building** a **wall** .
nobody has the intention to **build** a **wall** .
no one wants to **build** a **wall** .
no one has the intent to **build** a **wall** .
nobody has the intention of **building** a **wall** .
no one intends to **build** a **wall** .
nobody wants to **build** a **wall** .
nobody has the intent to **build** a **wall** .
nobody intends to **build** a **wall** .

Sampling not ideal

no one intends to build a wall .

" no one has intent to build a wall . "

no one **does prefer@@ ring** to build a wall .

no one **has motivation in** building a wall .

no one should be plotting to construct a wall .

no-one 's **angu@@ lating** ... to build a wall .

nobody 's about to build a **damon wall . excise** .

nobody 's intentional to build a wall **the disclosure of itself** .

no one 's **holding a real complaint . did you not want to build a brick wall any time ?**

Sampling not ideal

sampling from top 100 (at each step)

nobody wants to build a wall .
no one has the intention of creating a wall .
no one has the desire to build a wall .
nobody **has their intention** to build a wall .
no one **is intended** to build a brick wall .
nobody has an intention of building a brick wall .
nobody **has plotting** to build a wall .
nobody **intend** to make a wall .
but do n't let anybody set up a wall .
one has the intention to build a trap .

Constraints

input: niemand hat die absicht, eine mauer zu errichten

constraints	output
	no one has the intention of building a wall
goal	no one has the goal of building a wall
–intention	no one wants to build a wall
build	no one has the intention to build a wall

Summary

approach	simple	hands-free	works
beam search	✅	✅	❌
sampling	✅	✅	❌
constraints	⚠️?	❌	⚠️?
sentence codes	✅ **?**	✅	✅ **?**

Plan

- Read and discuss
  - *Generating Diverse Translations with Sentence Codes*
    Raphael Shu, Hideki Nakayama, Kyunghyun Cho
    ACL 2019
    https://www.aclweb.org/anthology/P19-1177/

- Design, write, train, and compare the encoders
  - Standard auto-encoder from linearized rep
  - Tree-based LSTM

- Incorporate into NMT pipeline and test