Controllable Natural Language Generation
Research Progress: First Year

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# Outline

1. Introduction
2. Challenges
3. State of the Art
4. Ongoing Research
5. Future Work
Introduction
Introduction

NLG
- Generates Text Based on Structured Data

Controllable NLG
- Generating Realistic Sentences whose Attributes can be Controlled
  - Stylistic Attributes
    - Politeness, Sentiment, Formality...
  - Personal Styles
    - Demographic Attributes, Gender, Age...
  - Controlling Story Generation
    - Plot, Sequence, Ending, Persona...
  - Others
    - Topic Sequence, Entities, Keywords, Information Ordering...
Introduction

Attribute Transfer

- Rephrasing the Text to Contain Specific Attributes
- Without Changing the Intent or Affect within the Context

Examples

- Politeness
  - Shut up! the video is starting! → Please be quiet, the video will begin shortly.
- Sentiment
  - The food ’s ok , the service is among the worst I have encountered. → The food is good , and the service is one of the best I ’ve ever encountered.
- Formality
  - The kid is freaking out. → That child is distressed.
Challenges
Challenges

- No Parallel Data Sets
- Hard to Detect Attributes
- Preserving the Structure and Meaning of the Input
- Automatic Evaluations
State of the Art
State of the Art

- RNN
  - Prabhumoye, Tsvetkov, et al. 2018
  - Rao and Tetreault 2018

- VAE
  - Shen et al. 2017
  - Xu, Cao, and Cheung 2019

- Transformer
  - Dai et al. 2019
  - Raffel et al. 2019

- Pre-trained models
  - Sudhakar, Upadhyay, and Maheswaran 2019
  - Dathathri et al. 2019
Ongoing Research
Ongoing Research

Research Problem

- Multiple Attribute Text Transfer

Challenges

- Transfer of Multiple Attributes Together
- Content Preservation
- Trade off between Structure and Fluency
- Controlling the Degree of Some Attributes’ Transfer
- Accuracy Metrics
Solution

Completed

- Highly Intense and Polarized Data
- Back Translation
- Transformer
- External Input of Style Token
  - `<n>` The food is tasteless. → `<p>` The food is delicious.
- Pre-trained Attribute Classifier

In Progress

- Style Embedding
- Content Preservation
- Multiple Losses
- Conditional Discriminator

In Pipeline

- Accuracy Metric: Structure, Style, Correctness
Future Work
Future Work

Research Work

- Unsupervised Text Style Transfer He et al. 2020 Yang et al. 2018
- Controllable Story Generation Peng et al. 2018 Chandu et al. 2019
- Controlling Topic Sequence Prabhumoye, Quirk, and Galley 2019
- Domain Adaptive Text Style Transfer D. Li et al. 2019
Thank you!

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References I


References II


Used Data-Sets

- WMT14 EN-DE Translations Neidert et al. 2014
- IMDB Reviews Lin, Matsumoto, and Mihalcea 2011
- Yelp Reviews Juncen Li et al. 2018
- Amazon Reviews Ni, Jiacheng Li, and McAuley 2019