

Text Style Transfer via Learning Style Instance Supported Latent Space.
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김수형

- What is Text Style Transfer
- Model Overview
- Experiments & Result
- QnA

●



(a) Input style (b) Target text (c) Image Analogy (d) NST-mask (e) Doodle (f) T-Effect

some left-wing
rity of labour

(g) UT-Effect (h) Ours

Griffiths resolution. Mr. Fath's line will be that as Labour MP's opposed the

Mr. Roy's United Federal Party is boycotting the London talks on the Protectorate's future. Said Mr. Nkumbula last night: 'We want to discuss what to do if the

This is Corsiva text to train a font style transfer modelable to change the font style between texts. Let's explain how it works

Դժոյցս ևս յանց զստոս անք Եկեղեցի
ստորոք յիւ Եղբայրս Եկեղեցիս Եւ Եւսեբ
յիւս Եւ Եւսեբիոս Եւս Եւսեբ Եւս Եւսեբ
Եւս Եւսեբ Եւս Եւսեբ Եւս Եւսեբ Եւս Եւսեբ
Եւս Եւսեբ Եւս Եւսեբ Եւս Եւսեբ Եւս Եւսեբ
Եւս Եւսեբ Եւս Եւսեբ Եւս Եւսեբ Եւս Եւսեբ

[illegible]

This is Lobster text to train a font style transfer modelable to change the font style between texts. Let's explain how

ԿՐԹՈՐԻՒՆ ԵՍՅԱՆ ԴԵՄԵՏ ԵՍԵՆՆԻ ԿԵՆՏՐԱԼ ԻՆՏԵՐՆԱԿԱՆ
 ԷԿՍՊՈԶԻՑԻԱ ԵՐԵՎԱՆԻ ԱՌԹԻՄԵԴԻԿԱՆ ԷԼԻՏԱԿԱՆ ԴԵՐՅԱՆ
 ԴԻՍԿՈՒՆԻ ՕԼԵՆԿԱՆ ԵՆ ԽՈՐԴԱՆԻ ԱՌԹԻՄԵԴԻԿԱՆ ԴԵՐՅԱՆ ԵՆ
 ԷԼԻՏԱԿԱՆ ԴԵՐՅԱՆ ԵՆ ԽՈՐԴԱՆԻ ԱՌԹԻՄԵԴԻԿԱՆ ԴԵՐՅԱՆ ԵՆ
 ԷԼԻՏԱԿԱՆ ԴԵՐՅԱՆ ԵՆ ԽՈՐԴԱՆԻ ԱՌԹԻՄԵԴԻԿԱՆ ԴԵՐՅԱՆ ԵՆ
 ԷԼԻՏԱԿԱՆ ԴԵՐՅԱՆ ԵՆ ԽՈՐԴԱՆԻ ԱՌԹԻՄԵԴԻԿԱՆ ԴԵՐՅԱՆ ԵՆ

Ինչպէս ինքն իմանալիս, աս պարտաւոր
 է ժողովուրդին: Եւ ինչպէս ինքն իմանալիս, աս
 խոստովանելու է ինքն իմանալիս: Եւ ինչպէս ինքն
 իմանալիս, աս ինքն իմանալիս: Եւ ինչպէս ինքն իմանալիս, աս

What is Text Style Transfer

- **Natural Language**

- 문체의 변환
- 상황별, 작가별

Informal	I'd say it is punk though.
Formal	However, I do believe it to be punk.
Informal	Gotta see both sides of the story.
Formal	You have to consider both sides of the story.

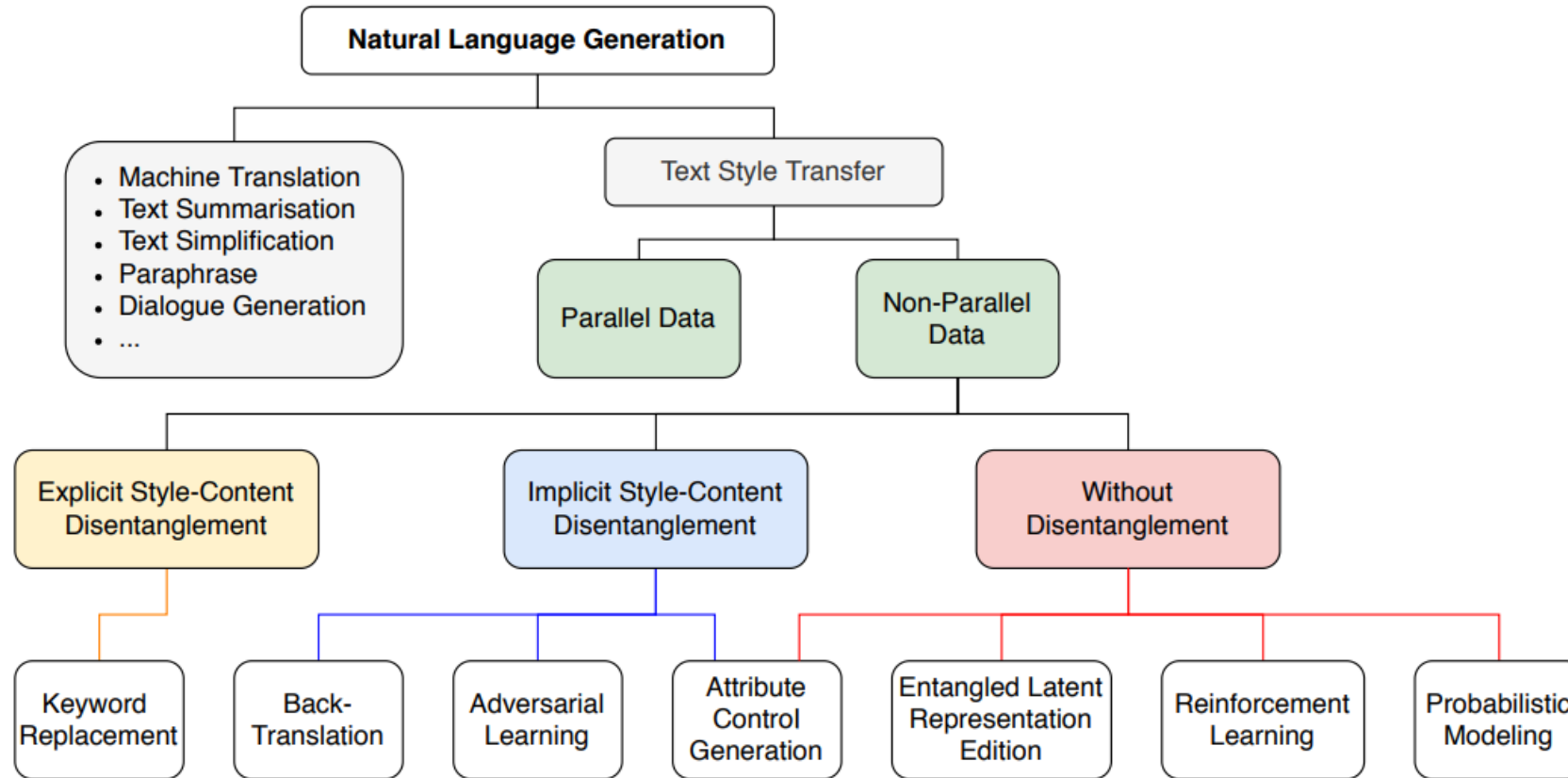
[Source]: [Fake] mexican food and [expensive] .

[Target]: [Inexpensive] and [traditional] mexican food !

[Source]: I [could barely get] it [though] they taste so [nasty] .

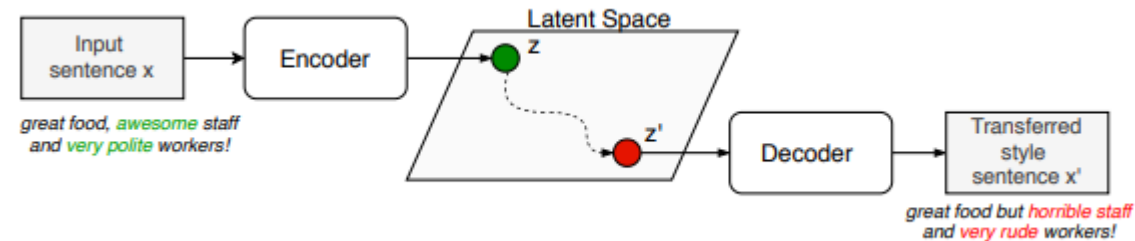
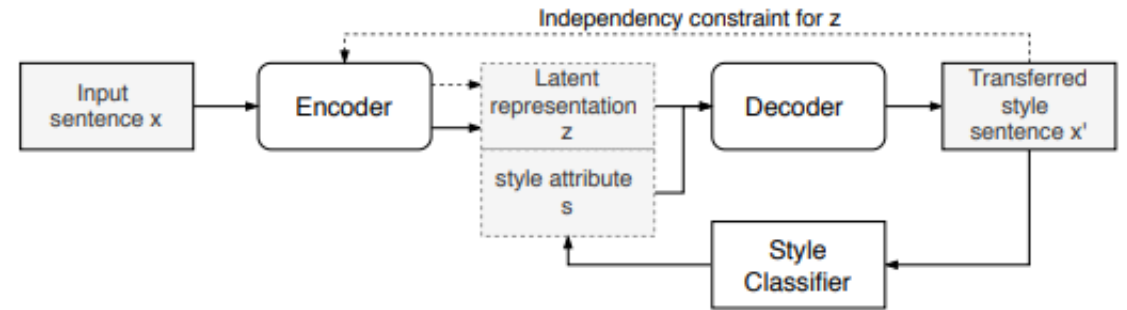
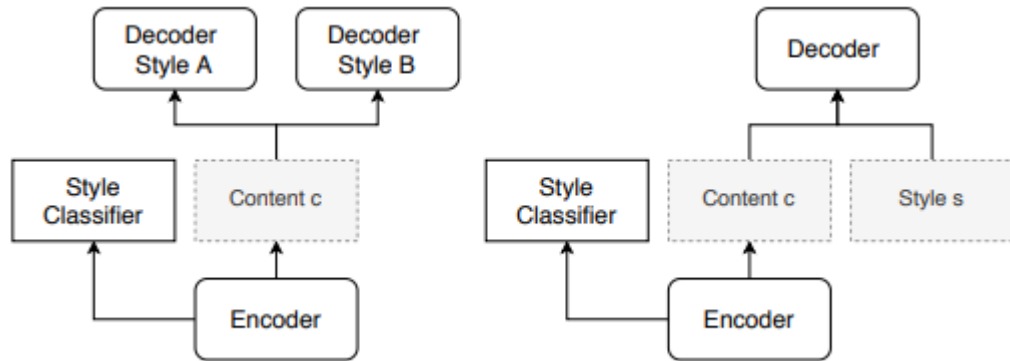
[Target]: I [love] it [because] they taste so [great] .

What is Text Style Transfer



Hu, Zhiqiang, Roy Ka-Wei Lee, and Charu C. Aggarwal. "Text Style Transfer: A Review and Experiment Evaluation." *arXiv preprint arXiv:2010.12742* (2020).

What is Text Style Transfer



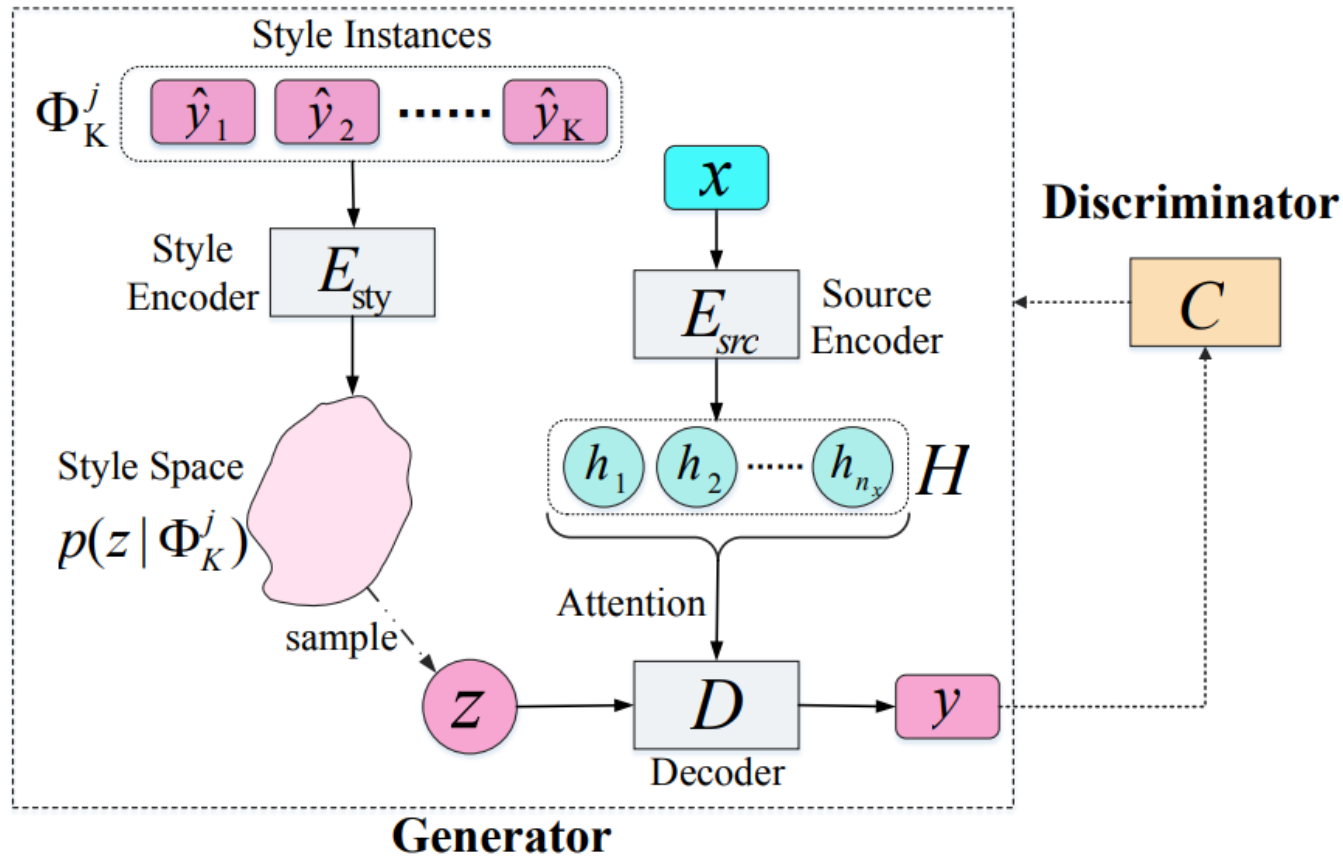
Hu, Zhiqiang, Roy Ka-Wei Lee, and Charu C. Aggarwal. "Text Style Transfer: A Review and Experiment Evaluation." *arXiv preprint arXiv:2010.12742* (2020).

What is

Task	Attribute Values	Datasets	Size	Pa?
<i>Style Features</i>				
Formality	Informal↔Formal	GYAFC ³ (Rao and Tetreault 2018)	50K	✓
Politeness	Impolite→Polite	Politeness ⁴ (Madaan et al. 2020)	1M	✗
Gender	Masculine↔Feminine	Yelp Gender ⁵ (Prabhumoye et al. 2018)	2.5M	✗
Humor& Romance	Factual↔Humorous↔ Romantic	FlickrStyle ⁶ (Gan et al. 2017)	5K	✓
Biasedness	Biased→Neutral	Wiki Neutrality ⁷ (Pryzant et al. 2020)	181K	✓
Toxicity	Offensive→Non-offensive	Twitter (dos Santos, Melnyk, and Padhi 2018)	58K	✗
		Reddit (dos Santos, Melnyk, and Padhi 2018)	224K	
		Reddit Politics (Tran, Zhang, and Soleymani 2020)	350K	
Authorship	Shakespearean↔Modern	Shakespeare (Xu et al. 2012)	18K	✓
	Different Bible translators	Bible ⁸ (Carlson, Riddell, and Rockmore 2018)	28M	
Simplicity	Complicated→Simple	PWKP (Zhu, Bernhard, and Gurevych 2010)	108K	✓
		Expert (den Bercken, Sips, and Lofi 2019)	2.2K	✓
		MIMIC-III ⁹ (Weng, Chung, and Szolovits 2019)	59K	✗
		MSD ¹⁰ (Cao et al. 2020)	114K	✓
		Math ¹¹ (Koncel-Kedziorski et al. 2016)	<1K	✓
Engagingness	Plain→Attractive	TitleStylist ¹² (Jin et al. 2020a)	146K	✗
<i>Content Preferences</i>				
Sentiment	Positive↔Negative	Yelp ¹³ (Shen et al. 2017)	250K	✗
		Amazon ¹⁴ (He and McAuley 2016)	277K	
Topic	Entertainment↔Politics	Yahoo! Answers ¹⁵ (Huang et al. 2020)	153K	✗
Politics	Democratic↔Republican	Political ¹⁶ (Voigt et al. 2018)	540K	✗

Jin, Di, et al. "Deep learning for text style transfer: A survey." *arXiv preprint arXiv:2011.00416* (2020).

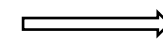
Model Overview



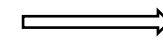
- StylIns model
 - Style Encoder(E_{sty}), Source Encoder(E_{src}) : Bidirectional LSTM
 - Decoder(D) : Bahdanau Attention LSTM
 - Discriminator : CNN (M+1 classifier)
 - Model structure
 - ✓ Embedding: 256, hidden : 512
 - ✓ K=256, 512

Experiments & Results

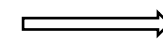
Dataset	Styles	Paired			Unpaired	
		Train	Valid	Test	Train	Valid
Yelp	Neg.	N/A	N/A	500	180k	2,000
	Pos.			500	270k	2,000
GYAFC	Inf.	52k	2,788	1,332	N/A	N/A
	For.	52k	2,247	1,019		
CPVT	Ver.	4k	1,000	2,000	200k	10k
	Poe.	4k	1,000	2,000	200k	10k



Positive <-> Negative



Formal <-> Informal



Sentence -> poet style sentence

- ❖ CPVT(Chinese Poetic and Vernacular Text)
- ❖ GYAFC(Grammarly's Yahoo Answers Formality Corpus)

Informal: *I'd say it is punk though.*

Formal: *However, I do believe it to be punk.*

Informal: *Gotta see both sides of the story.*

Formal: *You have to consider both sides of the story.*

Experiments & Results

Models	Acc↑	BLEU↑	Cos↑	PPL↓	GM↑	Acc↑	BLEU↑	Cos↑	PPL↓	GM↑
	Yelp (<i>Unsupervised</i>)					GYAFC (<i>Unsupervised</i>)				
MultiDec [Fu <i>et al.</i> , 2018]	46.0	15.09	91	175	10.52	24.9	11.53	91	97	8.69
CorssAlign [Shen <i>et al.</i> , 2017]	73.2	9.41	90	76	10.94	66.8	3.18	88	35	8.52
DelRetri [Li <i>et al.</i> , 2018]	88.5	16.61	93	136	12.92	61.1	21.20	91	110	12.58
Template [Li <i>et al.</i> , 2018]	81.6	22.62	92	296	13.14	49.2	34.75	94	249	13.06
Disentangled [John <i>et al.</i> , 2019]	91.7	6.71	89	26	11.39	67.5	8.16	90	24	11.18
StyleTransformer [Dai <i>et al.</i> , 2019]	86.2	27.45	96	231	14.29	63.1	40.91	95	180	14.74
StyIns (Ours)	90.8	26.03	96	109	14.83	67.8	46.73	96	92	16.11

Models	CPVT (<i>Semi-Supervised 1k</i>)					GYAFC (<i>Semi-Supervised 2.5k</i>)				
	Acc↑	BLEU↑	Cos↑	PPL↓	GM↑	Acc↑	BLEU↑	Cos↑	PPL↓	GM↑
CPLS [Shang <i>et al.</i> , 2019]	99.0	0.77	89	329	5.85	71.2	36.99	93	41	16.03
StyIns (Ours)	97.4	3.74	95	443	8.68	68.0	47.30	96	93	16.16
Models	CPVT (<i>Semi-Supervised 4k</i>)					GYAFC (<i>Semi-Supervised 10k</i>)				
	Acc↑	BLEU↑	Cos↑	PPL↓	GM↑	Acc↑	BLEU↑	Cos↑	PPL↓	GM↑
CPLS [Shang <i>et al.</i> , 2019]	98.3	3.13	90	283	8.37	71.4	39.25	94	44	16.24
StyIns (Ours)	97.5	4.00	95	410	8.86	70.6	47.81	96	92	16.36

Experiments & Results

Result samples

(d)	negative → positive	[Yelp]	positive → negative
Input	do not go to this practice they are horrible!	they were extremely friendly and reasonably priced.	
Disent.	love this practice.	they were extremely rude and extremely slow.	
StyleTr.	do not go to this practice they are amazing!	they were extremely rude and reasonably priced.	
StyIns	i always go to this practice they are great!	they were extremely rude and over priced.	
	informal → formal	[GYAFC]	formal → informal
Input	u 'll find a man who really deserves u one day).	that is strange but perhaps. i do not know. i will speak to my friend later next to his locker.	
Disent.	you should take a chance to find a person.	this is a friend that i know i like him and i know that.	
StyleTr.	perhaps you can find a man who really deserves one day because.	that 's strange but u.	
StyIns	you will find a man who really deserves you one day .	:) strange but maybe . . do n't know . . . get to my friend later next to his locker . . . ! !	

갈색 – 출처 문장과 무관한 내용

Experiments & Results

Result samples

[CVPT]

Input 敬仰你的高尚品德，别后会日夜把你思念。

Due to (my) respect for your noble character, I will miss you day and night after our separation.

CPLS 喜君最名事，当日夜歌致。

I heard of your well-known fame, and thus, the very night I sang to you to express my ecstasy.

StyIns 敬仰君高德，日夜把君念。

Due to (my) respect for your noble character, I will miss you day and night.

QnA

End