

Improved Paraphrase Generation via Controllable Latent Diffusion

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Problems & Ideas

- Reconcile paraphrase quality with diversity :
 - existing end-2-end generation hardly ensure quality for diverse paraphrase.
 - Aim: efficient & controllable paraphrase to reconcile quality and diversity
- Idea: latent diffusion model with controller for paraphrase generation (LDP)

Canny to image



Semantic highlights to enforce Paraphrase

src	how is black money gon na go off with no longer the use of the same 500 and 1000 notes ?
original paraphrase	how does black money brought out to black money market or corruption?
enforcement	<M> <M> black money <M> <M> <M> <M> <M> no longer <M> <M> <M> <M> <M> <M> 1000 <M> <M>
Guided paraphrase	how does banning 500 and 1000 rupee notes solve the black money problem?

Table 2 Guide paraphrase semantics by input segments. One can highlight the input segments to guide the paraphrase. We inject input segments masked by placeholder <M> of ‘black money’, ‘no longer’, and ‘1000’ via controller, which improves the paraphrase.

Main Contributions

- Contributions:
 - A novel paraphrase generation via latent diffusion model, which further incorporates semantic control.
 - A comparable paraphrase generation with open-source LLMs.
 - As efficient as the traditional baselines.

	HE
Transformer-base	3.9
BART-FT	4.465
T5-GPVAE	4.355
BART-CVAE	4.255
DiffuSeq	3.655
SeqDiffuSeq	3.32
Llama2-7b	4.63
Llama3.1-8b	4.915
LDP(ours)	4.585
w/ SG	<u>4.75</u>

	Lapse (s)
Transformer	235 (206.3×)
BART-FT	238 (203.7×)
T5-GPVAE	3909 (12.4×)
BART-CVAE	252 (192.4×)
DiffuSeq(DDIM 2000)	48480 (1×)
DiffuSeq(DDIM 500)	11530 (4.2×)
SeqDiffuSeq(DDIM 2000)	13851 (3.5×)
LDP(ours)	290 (167.2×)