Graph Edit Networks

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ICLR2021

Graph Edits

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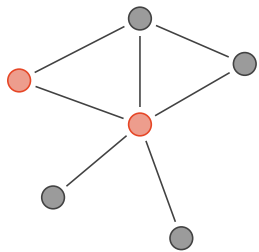

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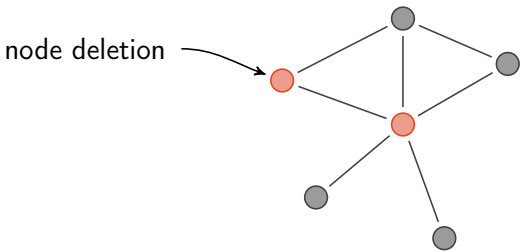

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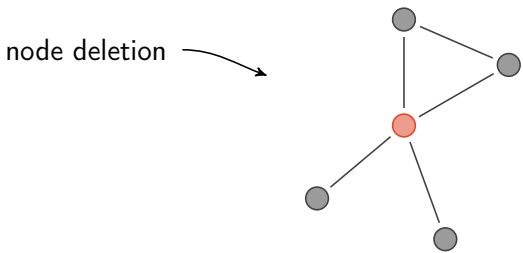

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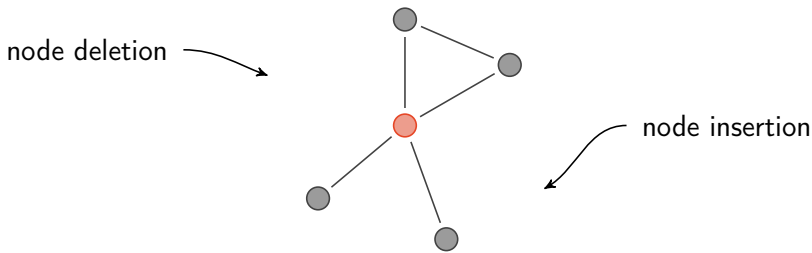

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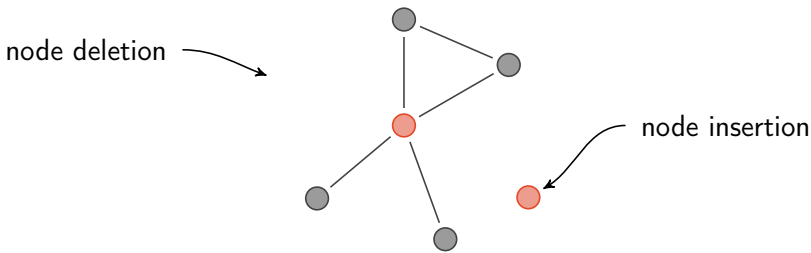

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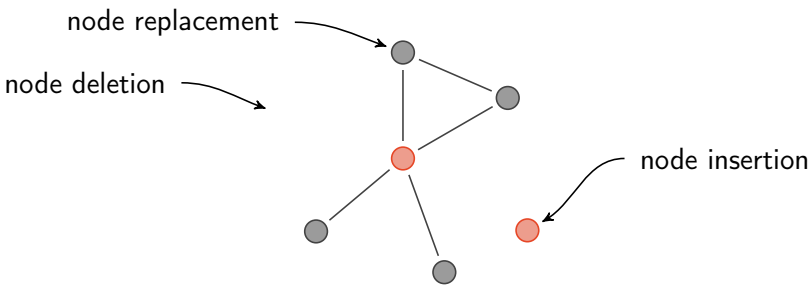

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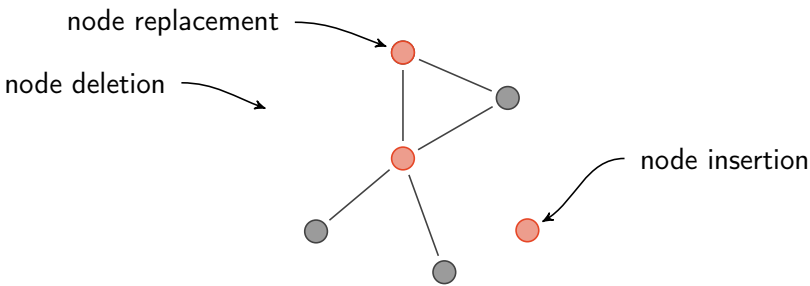

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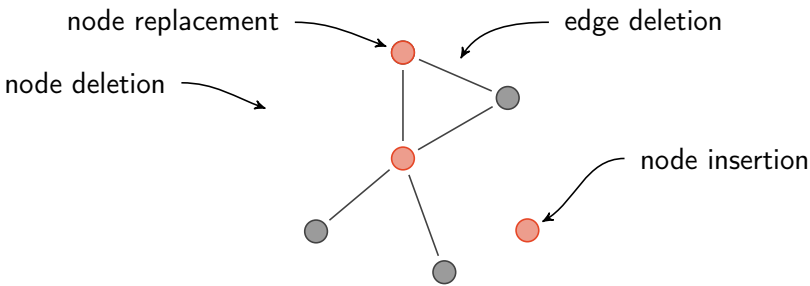

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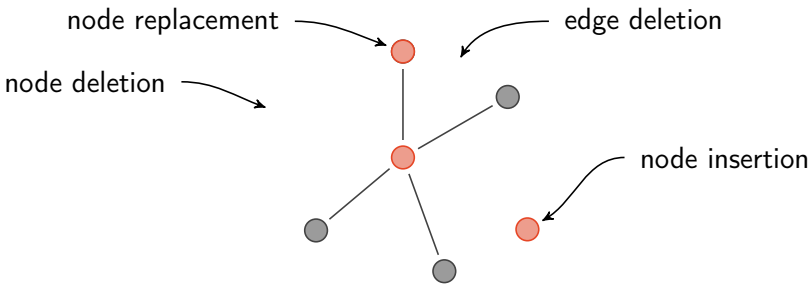

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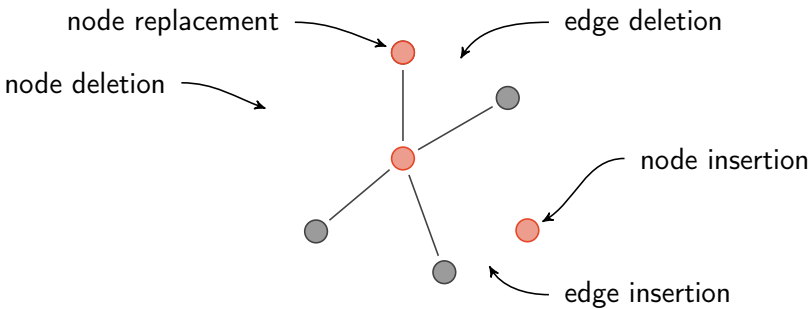

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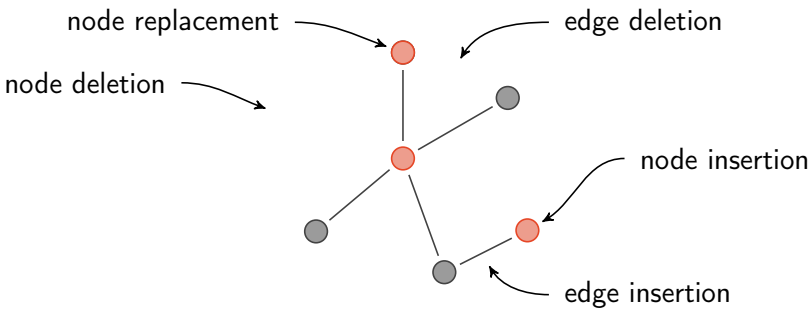

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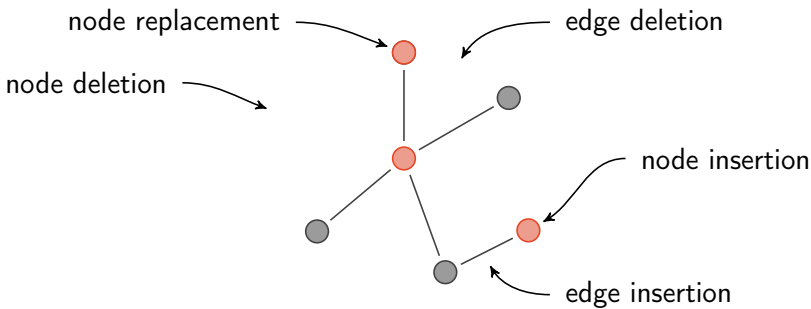
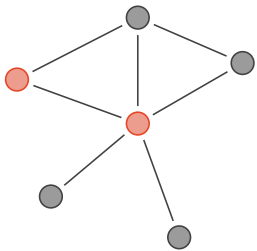


Our contribution: A novel model (graph edit network) that can predict **all** these changes.

Architecture



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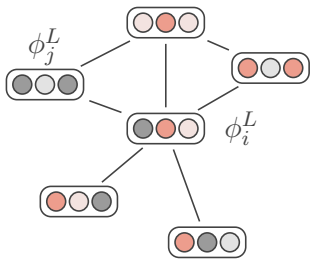

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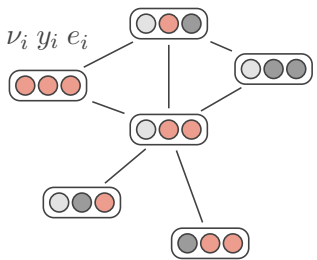

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2. Linear layer for **edit scores** (Graph Edit Network)

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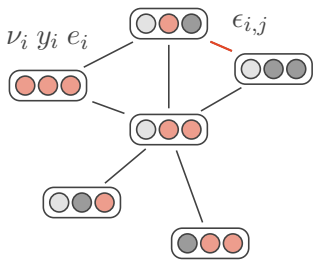

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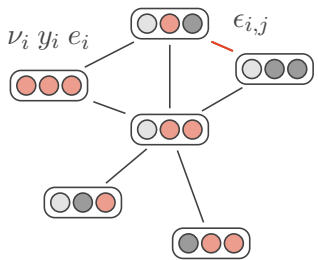

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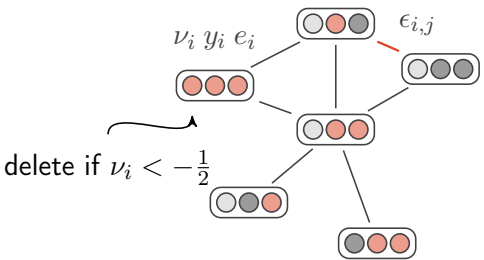

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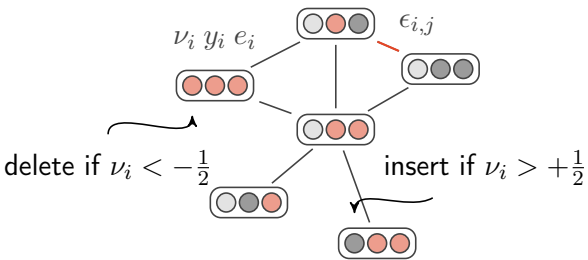

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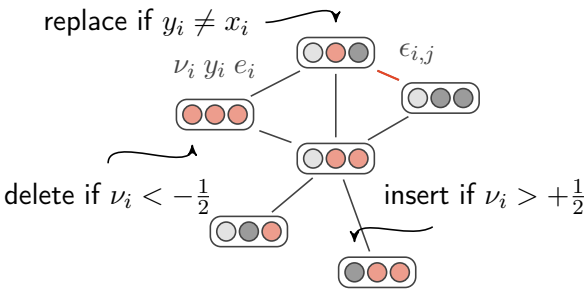

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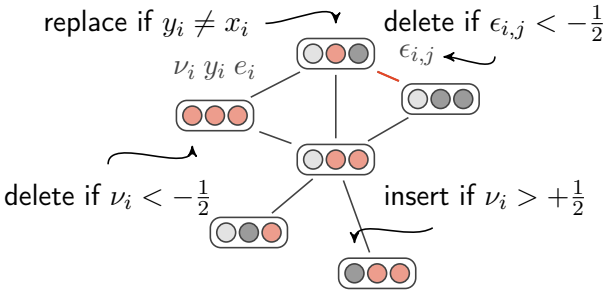

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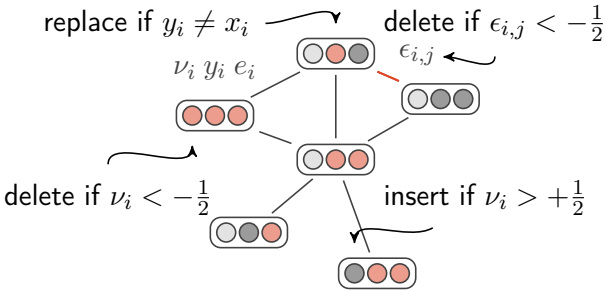

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Compute $\epsilon_{i,j}$ only if $e_i > 0$ and $e_j > 0 \Rightarrow$ linear time processing for sparse graphs

Theoretical Results

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Experiments

model	node insertion		node deletion		edge insertion		edge deletion	
	recall	precision	recall	precision	recall	precision	recall	precision
				edit cycles				
VGAE	0.62 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	0.69 ± 0.1	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0
VGRNN	0.64 ± 0.0	1.00 ± 0.0	0.63 ± 0.0	1.00 ± 0.0	0.95 ± 0.0	0.06 ± 0.0	1.00 ± 0.0	0.71 ± 0.1
XE-GEN	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0
GEN	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0
				degree rules				
VGAE	0.15 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	0.96 ± 0.0	0.88 ± 0.0	0.97 ± 0.1	1.00 ± 0.0	0.97 ± 0.1
VGRNN	0.14 ± 0.0	1.00 ± 0.0	0.72 ± 0.0	1.00 ± 0.0	0.56 ± 0.0	0.21 ± 0.0	1.00 ± 0.0	0.02 ± 0.0
XE-GEN	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	0.97 ± 0.0	0.99 ± 0.0	1.00 ± 0.0	1.00 ± 0.0
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				game of life				
VGAE	0.27 ± 0.1	1.00 ± 0.0	1.00 ± 0.0	0.03 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0
VGRNN	0.31 ± 0.1	1.00 ± 0.0	0.32 ± 0.1	1.00 ± 0.0	1.00 ± 0.0	0.00 ± 0.0	1.00 ± 0.0	0.01 ± 0.0
XE-GEN	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	0.98 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0
GEN	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0	1.00 ± 0.0

Perfect accuracy for two tree datasets in contrast to nonzero error for kernel-based prediction

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Thank you for your attention!

`https://gitlab.com/bpaassen/graph-edit-networks`

References I