

Appendix A Node features

Table 1: Node features description

Feature group description	Type	#features
# no payments from the contract creation date to the payment date	Numerical	1
Outstanding balance of a credit card at a cut-off date	Numerical	1
Payments between:	Numerical	2
1) start date of the billing period and cut-off date (a final date of the billing period);		
2) cut-off date to payment date (the date when a customer is supposed to pay)		
Credit card consumption in delivery app (total, average and standard deviation) between:	Numerical	6
1) start date to cut-off date;		
2) cut-off date to payment date		
Credit card consumption in other commercials (total, average and standard deviation) between:	Numerical	6
1) start date to cut-off date;		
2) cut-off date to payment date		
Number of transactions between:	Numerical	2
1) start date to cut-off date;		
2) cut-off date to payment date		
Credit limit	Numerical	1
Number of no payments between the contract creation date and the payment date	Numerical	1
Bureau score of the user at an application date	Numerical	1
Estimated income at an application date	Numerical	1
Amount of increase in the credit limit	Numerical	1
User's operative state at the payment date	Categorical	1
Credit limit increase indicator	Categorical	1
Counter of past referrals	Numerical	1

Appendix B Network characteristics



Fig. 1: Network characteristics

Appendix C Convergence plots

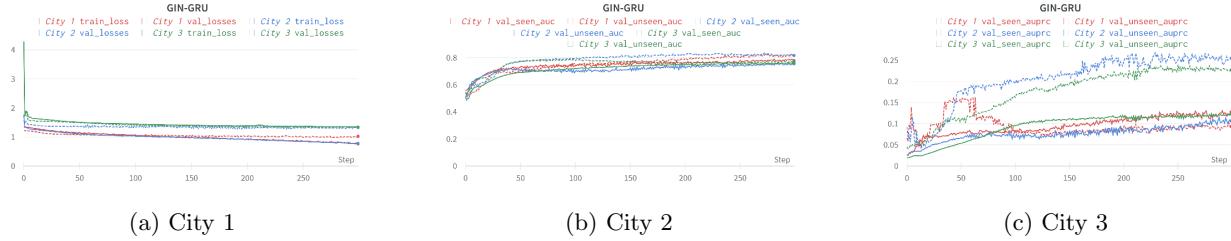


Fig. 2: GIN-GRU

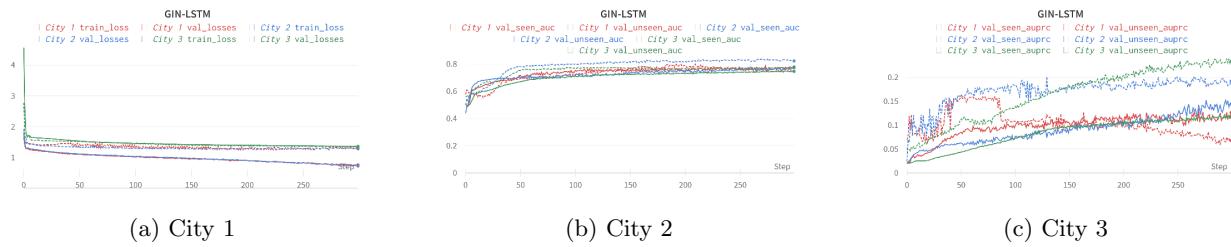


Fig. 3: GIN-LSTM

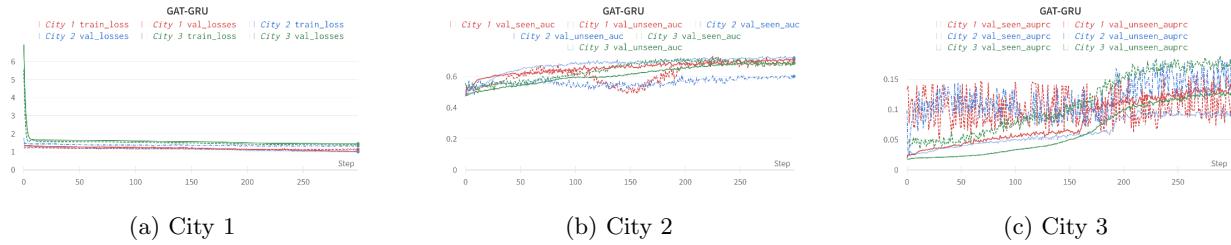


Fig. 4: GAT-GRU

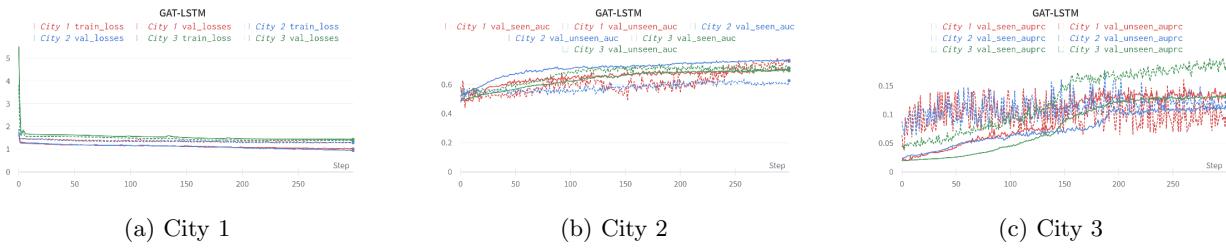


Fig. 5: GAT-LSTM

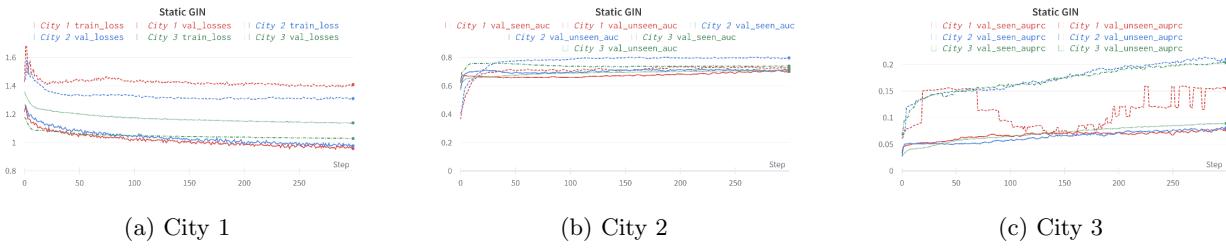


Fig. 6: Static GIN

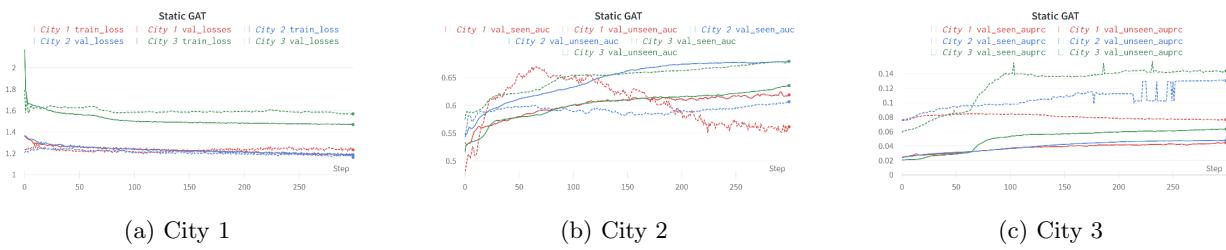


Fig. 7: Static GAT

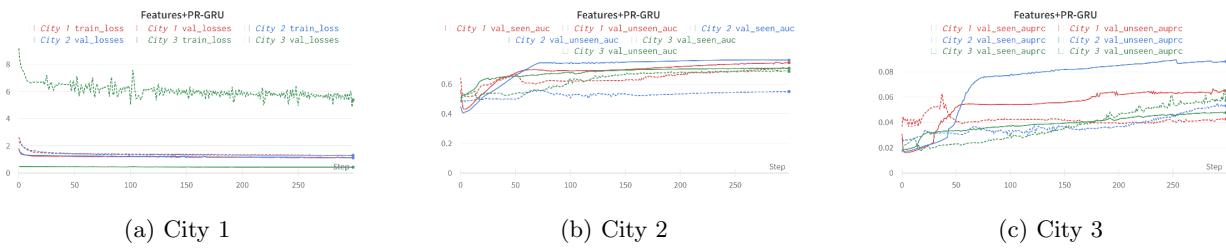


Fig. 8: Features+PR-GRU

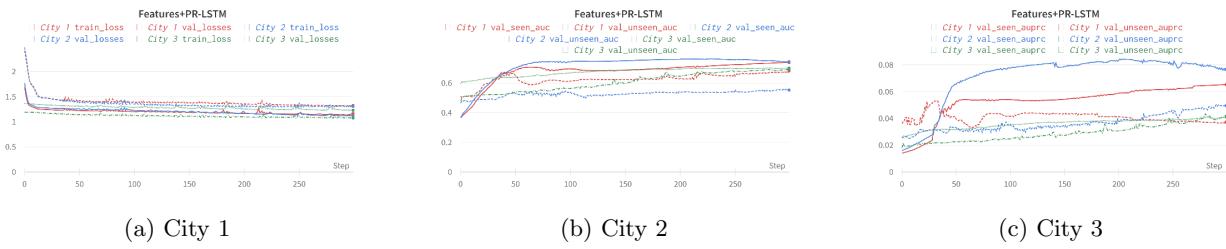


Fig. 9: Features+PR-LSTM

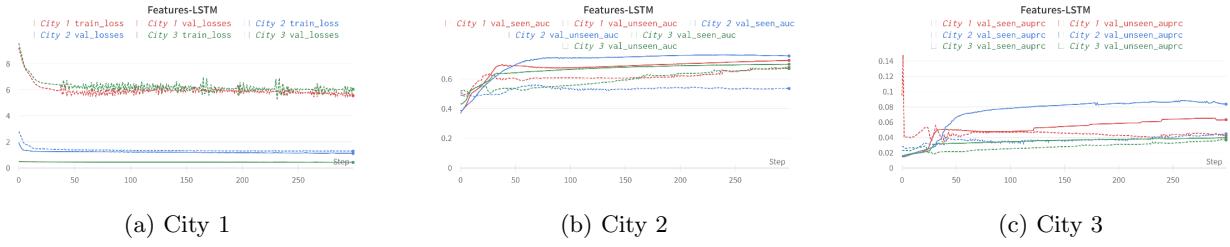


Fig. 10: Features-LSTM

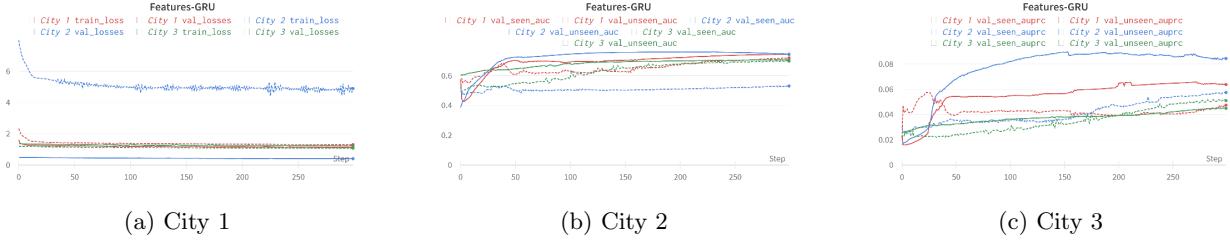


Fig. 11: Features-GRU

Appendix D Best model configurations

Best model configurations are presented below ¹.

Table 2: Model configurations

Model	#layers	GNN	#emb. GNN	#hid.dim. GNN	SMOTE rate	#layers	RNN	#hid.dim. RNN	Loss
GIN-LSTM	2		512	512	0	1		256	Focal
GIN-GRU	2		512	512	0	1		512	Focal
GAT-LSTM	2		256	256	0	1		512	Focal
GAT-GRU	2		256	256	0	2		256	Focal
Features+PR-LSTM	/	/	/	/	0	1		512	BCE
Features+PR-GRU	/	/	/	/	0.5	1		512	Focal
Features-LSTM	/	/	/	/	0.5	1		256	Focal
Features-GRU	/	/	/	/	0	1		512	BCE
Static GAT	4		256	512	0.5	/	/	/	Focal
Static GIN	2		512	512	0.5	/	/	/	BCE

¹ Due to the limited computing power, some configurations for City 3 are not feasible. In particular, the configuration with four layers in the GAT encoder of the GAT-GNN models as well as configurations with GNN hidden dimensions = Number of generated GNN embeddings = RNN hidden dimensions = 512 are not feasible.

