

CHEDDAR

Smart Vehicle-to-Everything Integrated Sensing and Communications (V2X ISAC)

—continuous reliable connectivity

VariSAC: V2X Sustained Connectivity in RIS-Aided ISAC via GNN-Augmented Reinforcement Learning

Huijun Tang¹, Wang Zeng², Ming Du², Pinlong Zhao², Pengfei Jiao², Huaming Wu³, Hongjian Sun¹

¹ Durham University, UK

² Hangzhou Dianzi University, China

³ Tianjin University, China

1 Motivation

V2X

Spatio-Temporal Optimization

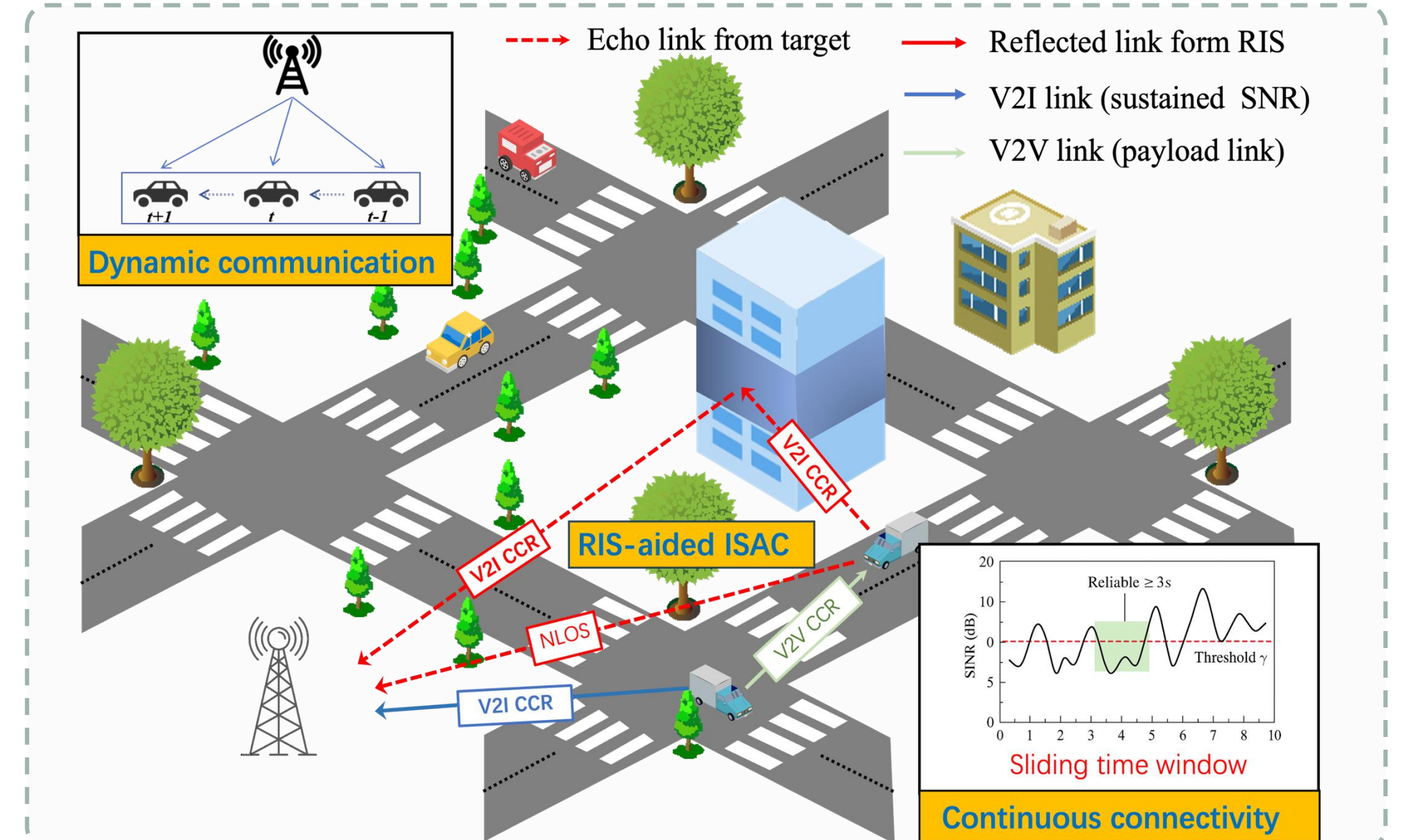
Dynamic and Heterogeneous V2X Network Topologies

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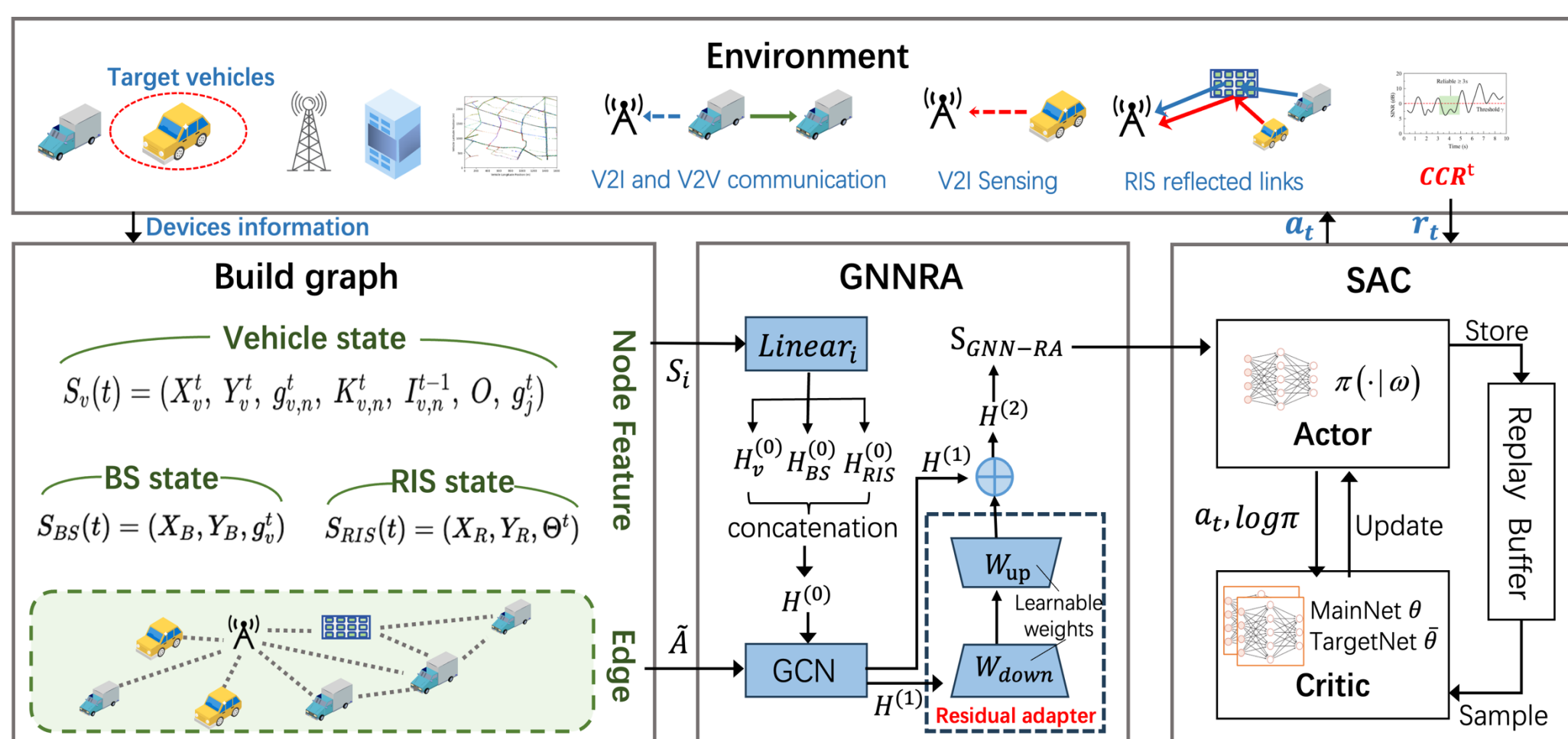
ISAC

Joint Optimization

Distinct V2I and V2V connectivity requirements



2 Approach — the VariSAC framework



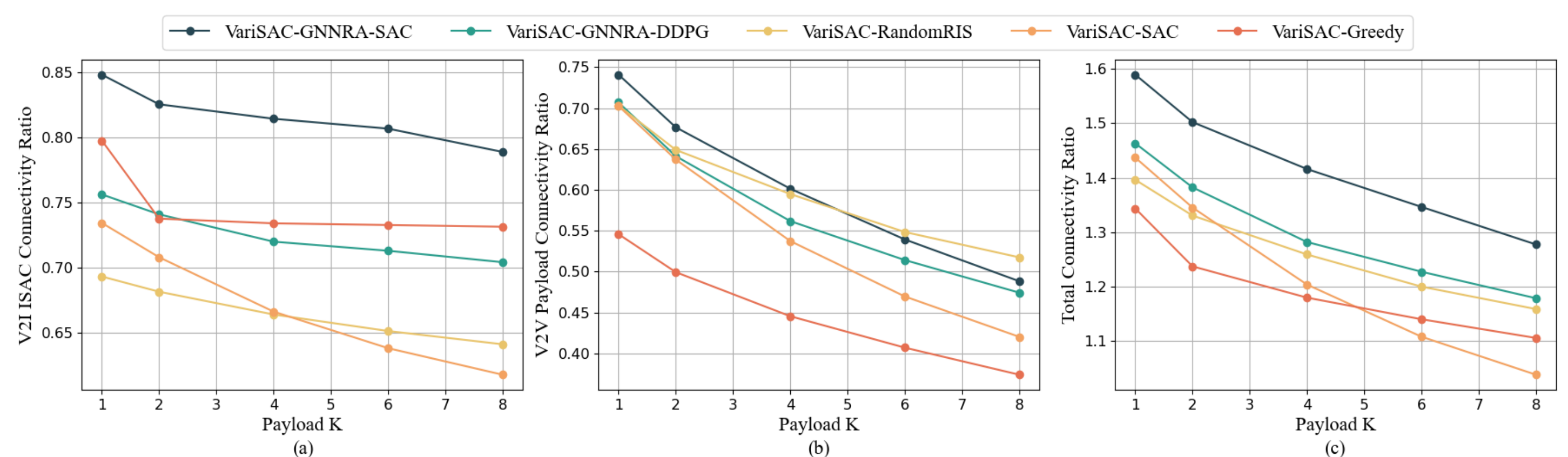
Continuous Connectivity Ratio (CCR) with Sliding Window Reliability Modeling:

- Duration-based SNR requirements
- Probabilistic delivery constraints
- Unified metric Continuous Connectivity Ratio

3 Key results

+15% ↑ vs Greedy

total connectivity vs greedy allocation on real-world trajectories

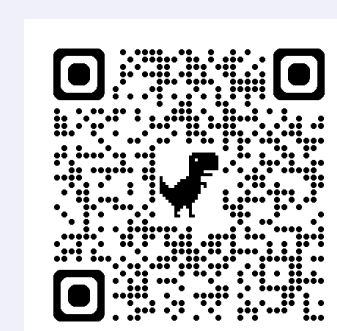


Impact & what's next

- Sustained links for safety-critical V2X: cooperative perception, platooning, remote driving.
- A graph + RL blueprint for 6G ISAC resource management.
- Next: multi-RIS and multi-cell coordination.

Contact & paper

Paper



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