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# PROBABILISTIC GRAPH NEURAL NETWORKS FOR TRAFFIC SIGNAL CONTROL


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# Introduction

- Background
- Existing Methods
- Challenges
- Our model： TSC-GNN

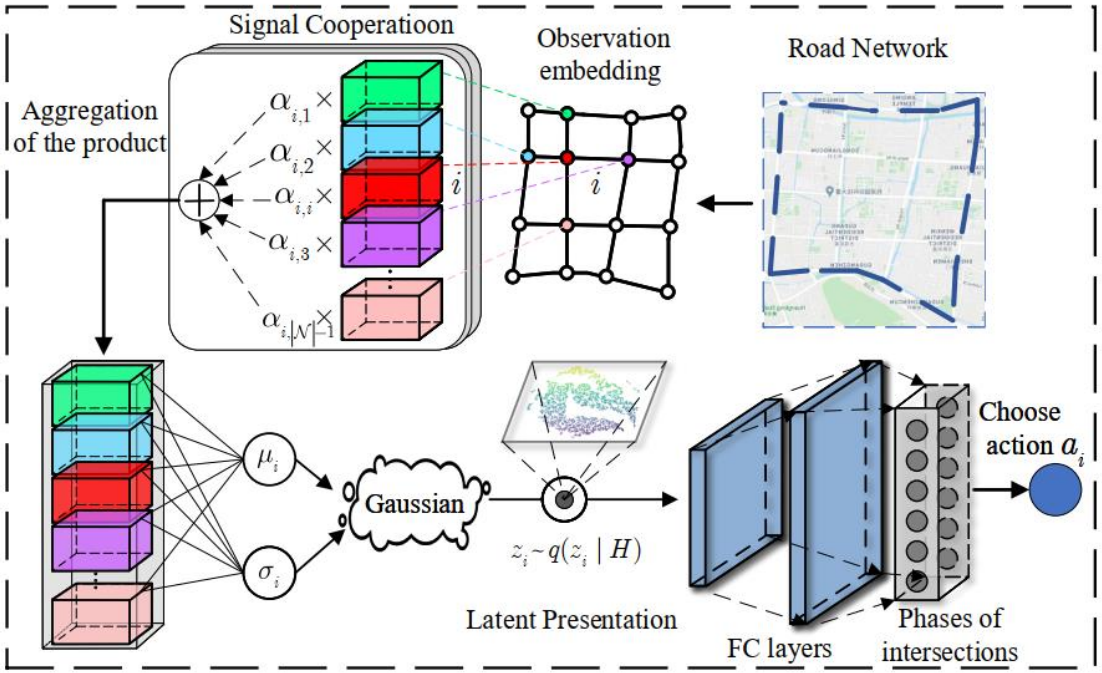
# Problem Definition

- **Reinforcement Learning for Traffic Signal Control**

$$\langle \mathcal{S}, \mathcal{O}, \mathcal{A}, \mathcal{P}, \mathcal{R}, \pi, \gamma \rangle$$

# Our model： TSC-GNN

- Cooperation of traffic signals
- Variational Graph Inference
- Q-value Prediction



# Experiments

- **Datasets**

(a) Gudang sub-district (b) Dongfeng sub-district

# Experiments

- **Baselines**

**1) FixedTime** **2) MaxPressure**

**3) CGRL** **4) Individual RL**

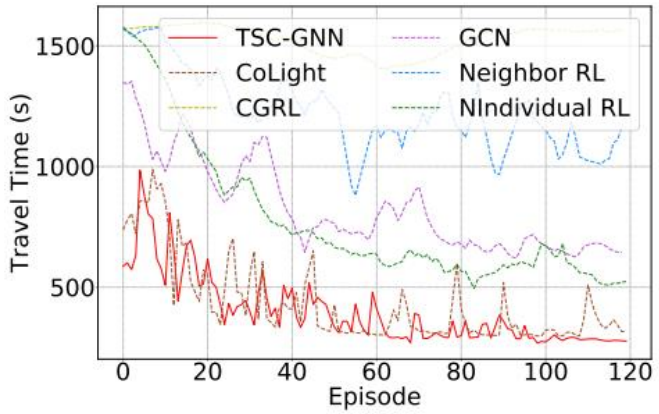
**5) OneModel** **6) Neighbor RL**

**7) GCN** **8) CoLight**

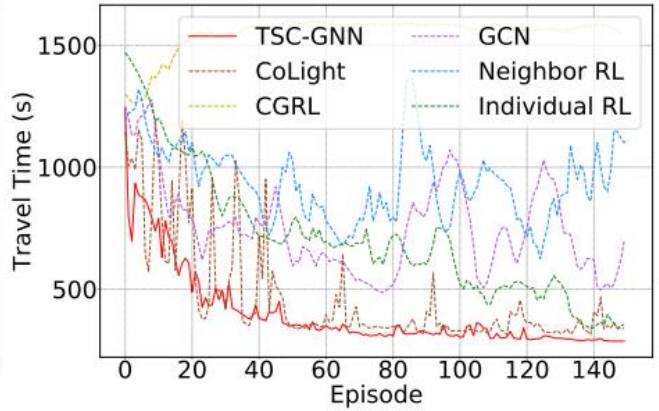
# Experiments

- **Results**

| Model | $D_{\text{Jinan}}$ | $D_{\text{Hangzhou}}$ |
|---|---|---|
| Fixedtime | 869.85 | 728.79 |
| MaxPressure | 361.33 | 422.15 |
| CGLR | 1210.7 | 1528.26 |
| Individual RL | 325.56 | 345.00 |
| OneModel | 728.63 | 394.56 |
| Neighbor RL | 1168.32 | 1053.45 |
| GCN | 625.66 | 768.43 |
| CoLight | 316.52 | 309.06 |
| **TSC-GNN** | **291.24** | **281.19** |




(a) $D_{\text{Hangzhou}}$




(b) $D_{\text{Jinan}}$

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## Thank you for listening!