

Spatiotemporal neural networks (STNN)

The diagram illustrates the architecture of a Spatiotemporal Neural Network (STNN) for traffic domain knowledge. It consists of the following components:

- Traffic domain knowledge:** A box containing a graph structure with nodes and edges, and a legend for node types (e.g., "the vehicle is in", "the vehicle is at", "the vehicle is near").
- GNNs (Graph Neural Networks):** A sequence of GNNs processing the spatial graph structure over time.
- RNN cells (Recurrent Neural Networks):** A sequence of RNN cells capturing temporal dependencies between the GNN outputs.
- Time:** The progression of time, indicated by the sequence of GNNs and RNN cells.

Disentangle representation

Weather condition

Coupling External Factors

Disentangle

Geography attributes

STNN

Traffic Event

low rank subspace

Feature mode

Space mode

Time mode

STNN

STNN

STNN

Random factors

Feature

Time

Space

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Deep factor analysis models for prediction

Time = 1 Variable 2 Time = T-1

Latent factor

STNN

Time = T

Variable 1