Spatiotemporal traffic data matrix

Anomalies

Random missing

Non-random missing

Space

T $2T$ $3T$ $4T$ $5T$ $6T$ $7T$

$\mathbf{Y} \in \mathbb{R}^{n_1 \times (n_2 n_3)}$

Fold along

Interval dimension

Partially observed tensor
(**incomplete** and **corrupted**)

n_1 detectors
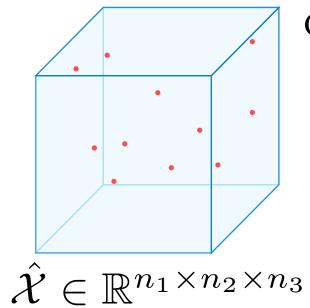
n_2 days

n_3 intervals

$\mathcal{Y} \in \mathbb{R}^{n_1 \times n_2 \times n_3}$

Data recovery task

Low-rank clean tensor

Sparse error tensor

$\hat{\mathcal{X}} \in \mathbb{R}^{n_1 \times n_2 \times n_3}$

$\mathcal{E} \in \mathbb{R}^{n_1 \times n_2 \times n_3}$

Data imputation task

Complete tensor
with anomalies

$\hat{\mathcal{X}} \in \mathbb{R}^{n_1 \times n_2 \times n_3}$