Tensor Data Recovery

from multiple aggregated views

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Background

- Data recovery is common in remote sensing imagery (two images of different resolution) and in ML (super resolution applications)
- While deep learning solutions are effective for images, the do not translate well to socio-demographic data (sociology, economics, political science), where most of the restoration works is driven by Bayesian inferences
- **Solution: Coupled Matrix-Tensor Factorization!**

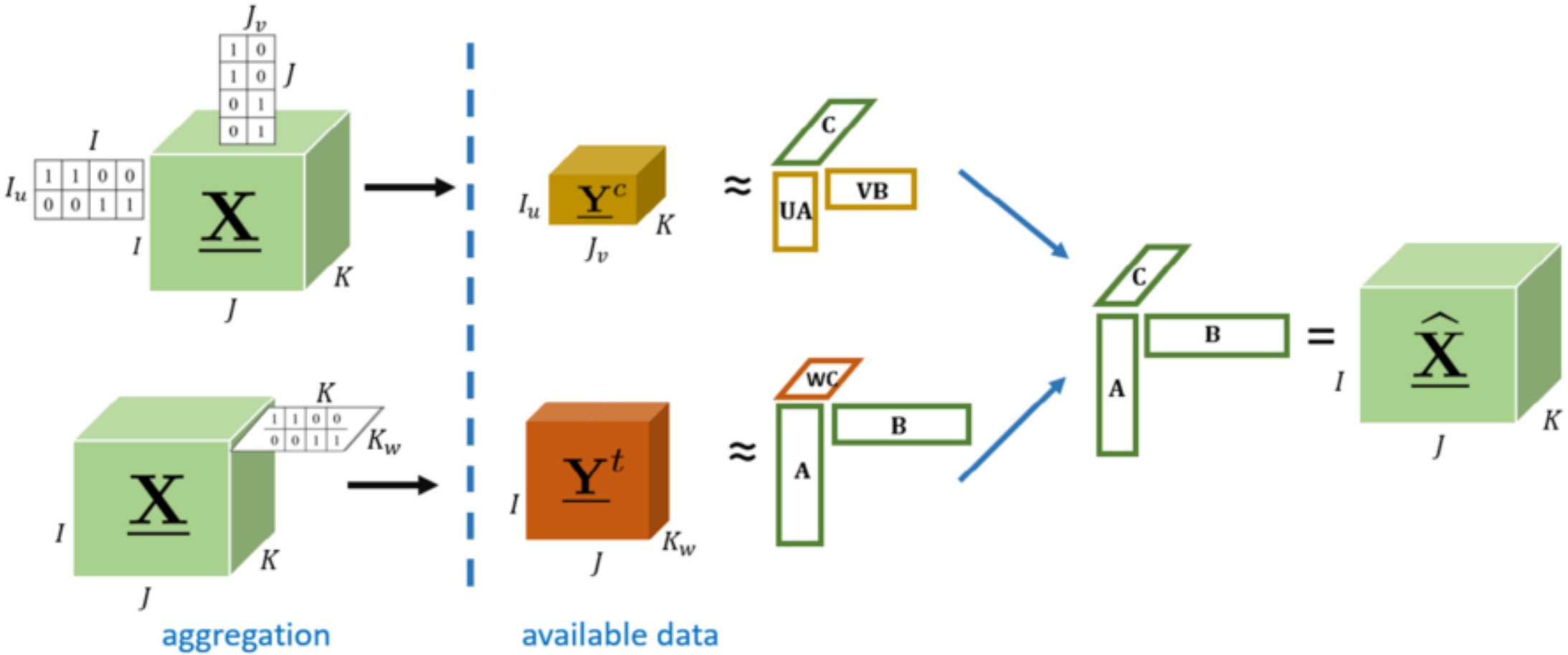

Fig. 3. Overview of PREMA.

Methods

$$\min_{\mathcal{F}}(A, B, C) := ||\Omega^t \times (Y^t - ([[A, B, WC]])||_F^2 + ||\Omega^c \times (Y^c - ([[UA, VB, C]])||_F^2$$

- where $\Omega^{t/c}$ are weight tensors (0/1);
- W, U, V - are mixing (aggregation) matrices
- Y^t and Y^c - are two aggregated views

Data

- Mapbox data (100m by 100m)
- SafeGraph Census Block Group data

Methods

- Implement PREMA
- Add probabilistic (uncertainty) estimation to 'restored' data

Thanks!