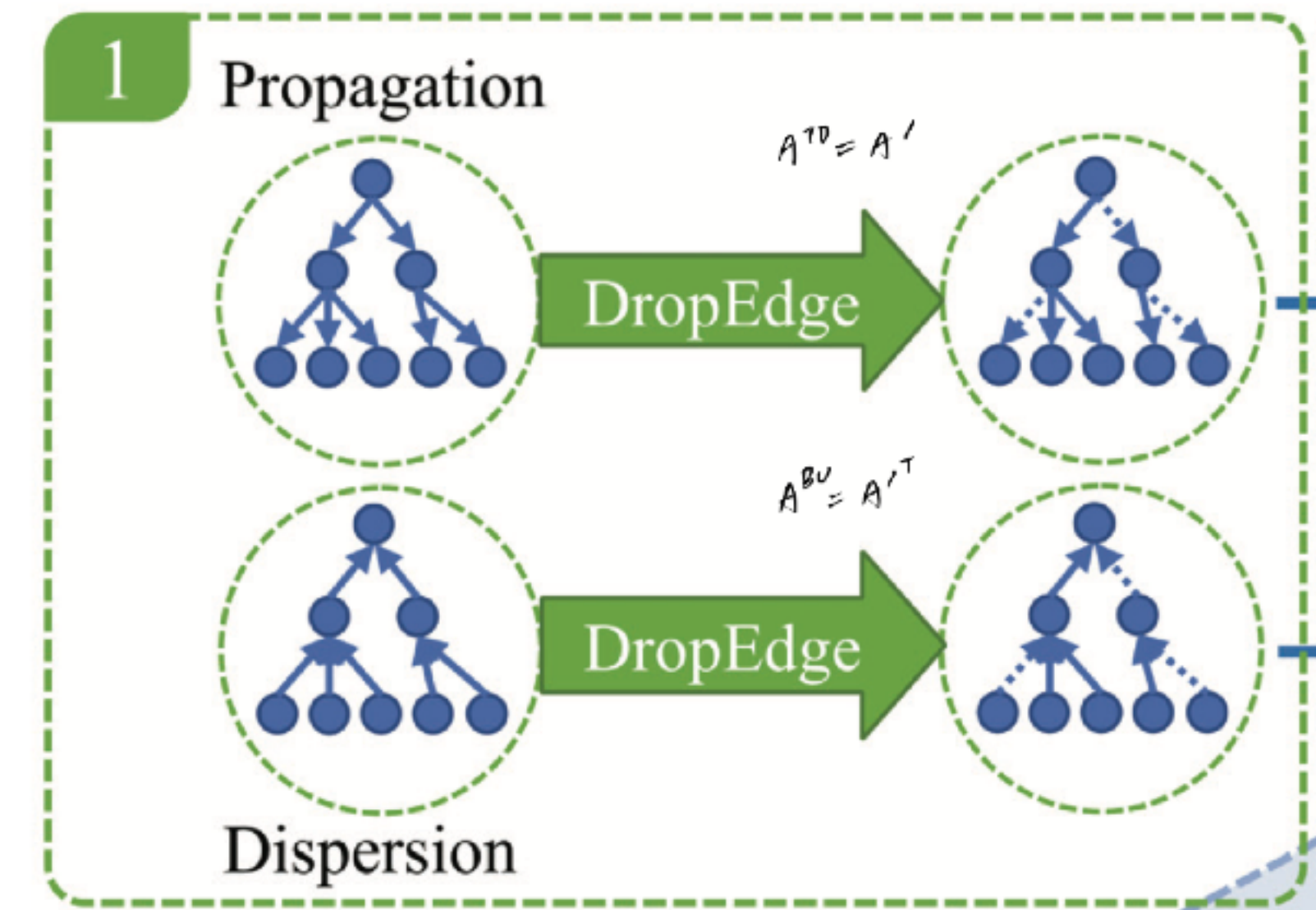
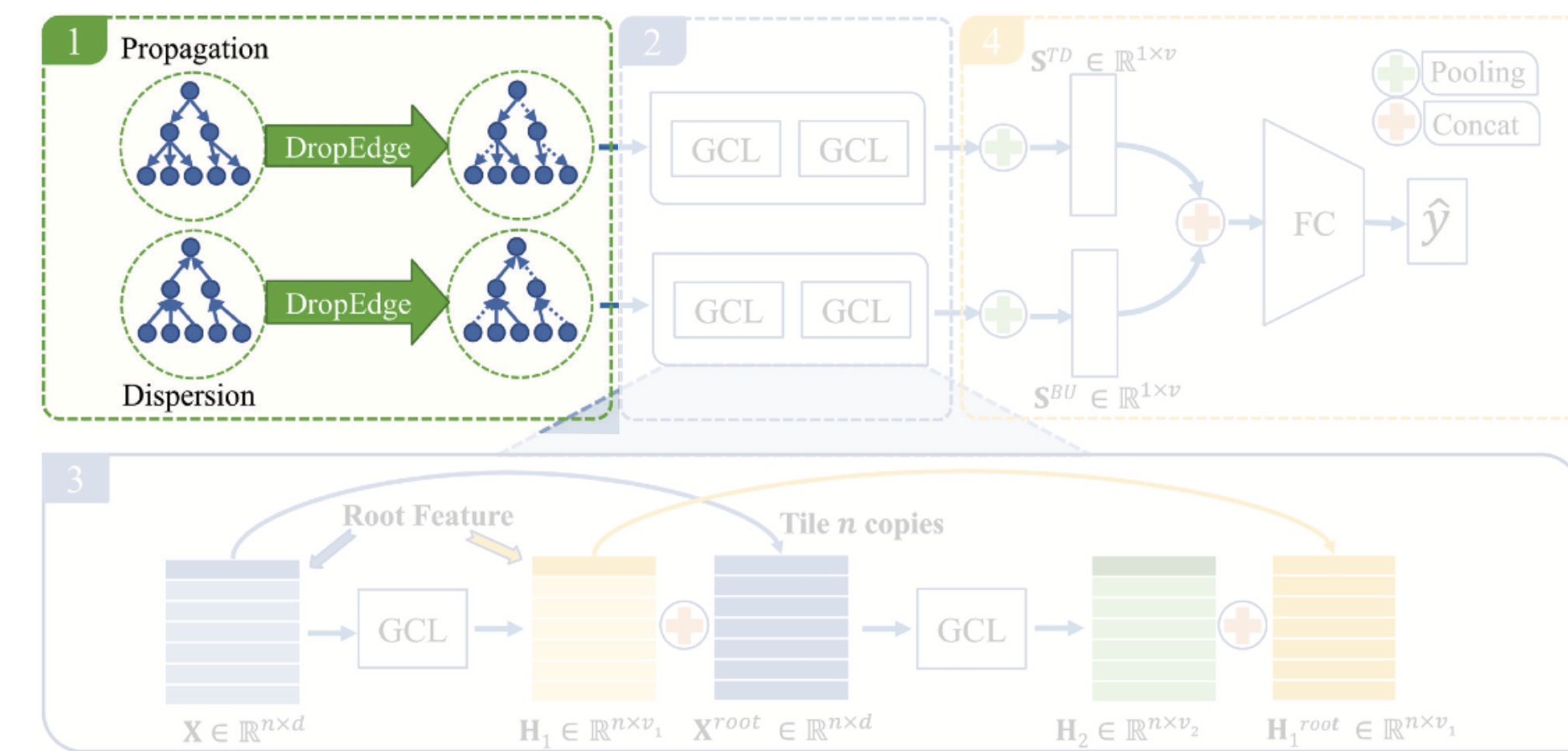


Methodology

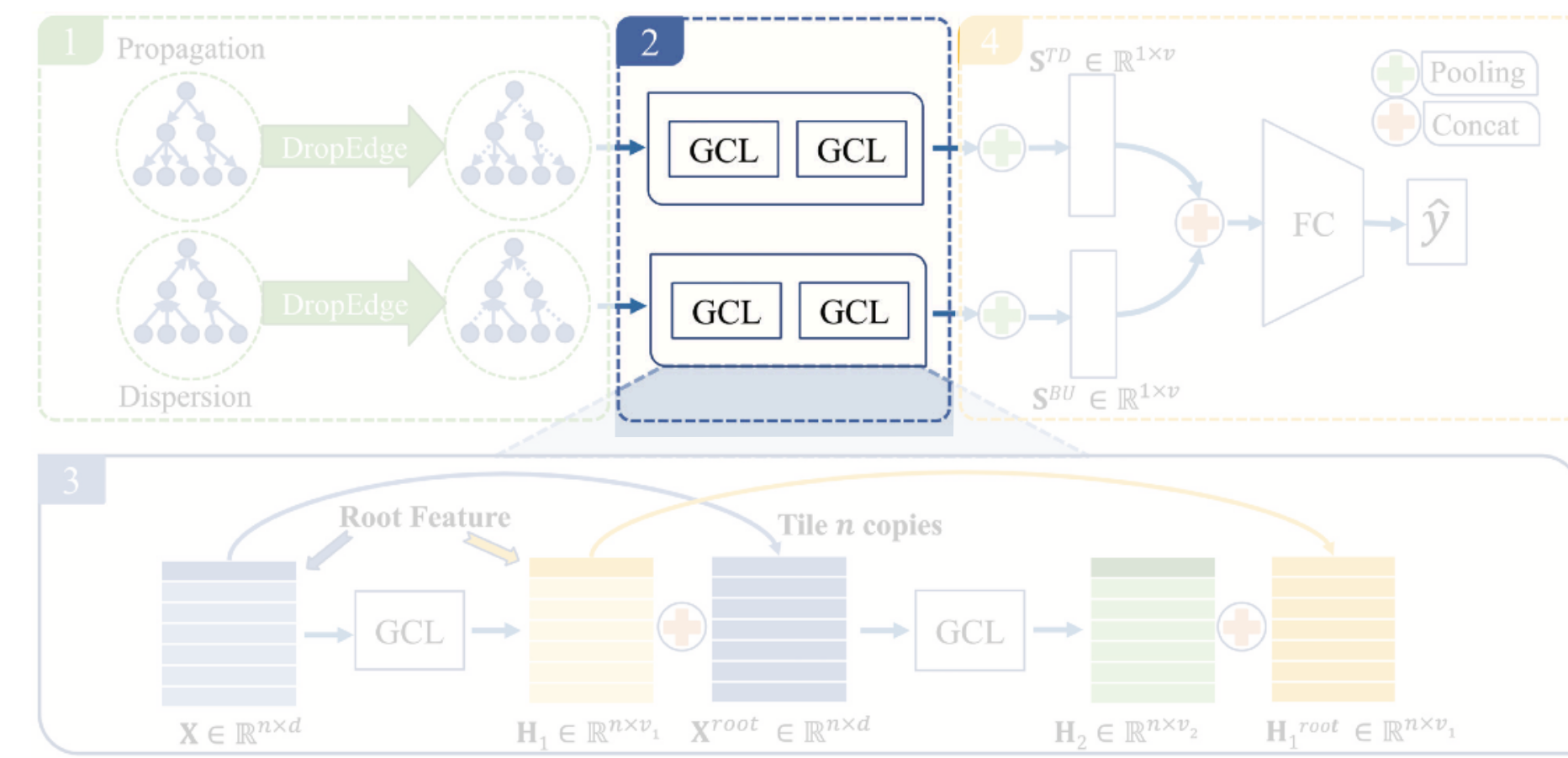
Construct Propagation and Dispersion Graphs

- \mathbf{A} only contains the edges from upper nodes to lower nodes
- At each training epoch, get \mathbf{A}' via DropEdge to **avoid overfitting**
- Bi-GCN consist of two components, the **adjacency matrices** are different:
 - TD-GCN: $A^{TD} = \mathbf{A}'$
 - BU-GCN: $A^{BU} = \mathbf{A}'^T$
 - TD-GCN and BU-GCN adopt the **same feature matrix \mathbf{X}** .



Methodology

Calculate the High-level Node Representations



- Top-down propagation and bottom-up propagation features are obtained by TD-GCN and BU-GCN.

- TD-GCN and BU-GCN has two layers, the equations for TD-GCN as below:

- $\mathbf{H}_1^{TD} = \sigma \left(\hat{\mathbf{A}}^{TD} \mathbf{X} \mathbf{W}_0^{TD} \right)$

- $\mathbf{H}_2^{TD} = \sigma \left(\hat{\mathbf{A}}^{TD} \mathbf{H}_1^{TD} \mathbf{W}_1^{TD} \right)$

- Bottom-up hidden features $\mathbf{H}_1^{BU}, \mathbf{H}_2^{BU}$ for BU-GCN in the same manner as above.

