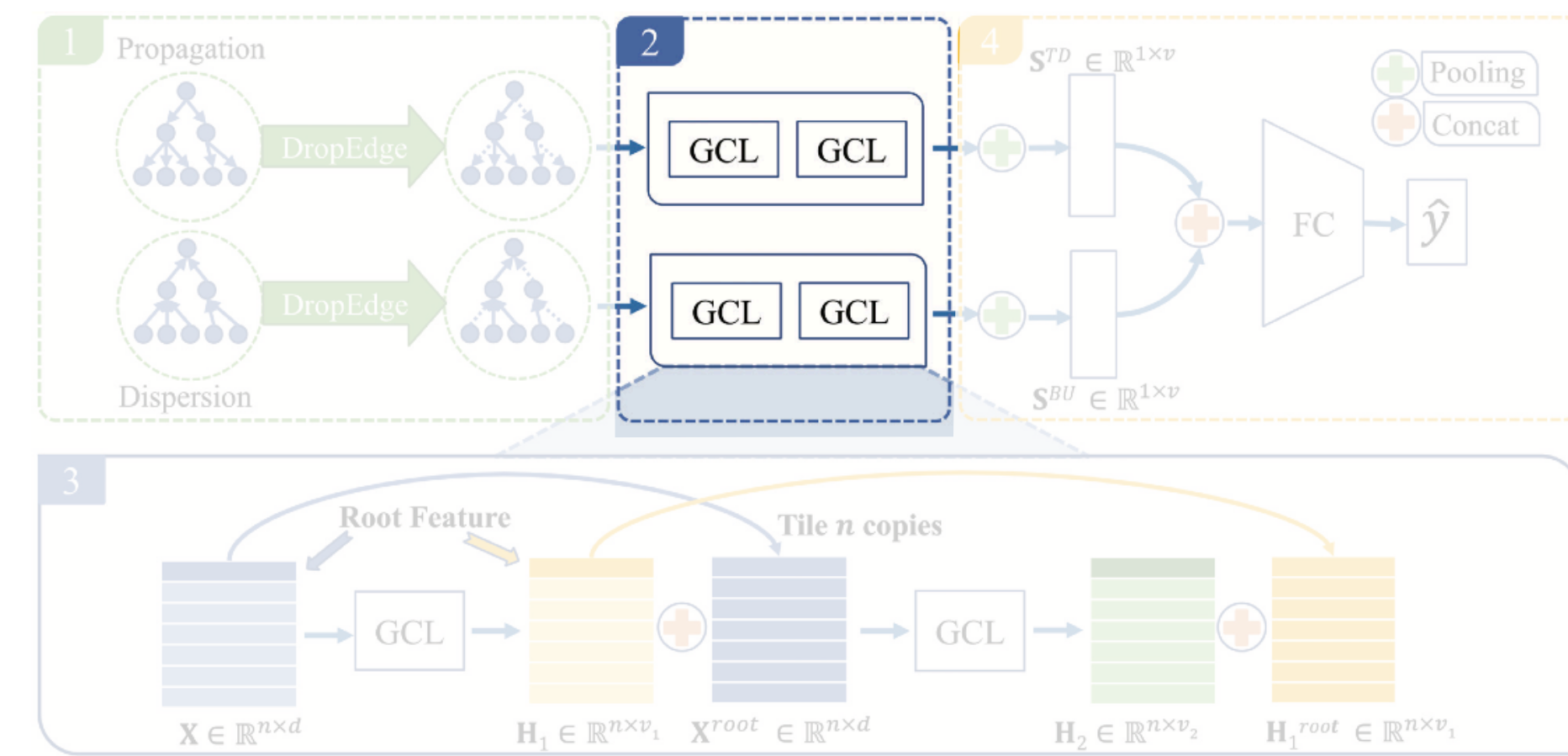


Methodology

Calculate the High-level Node Representations



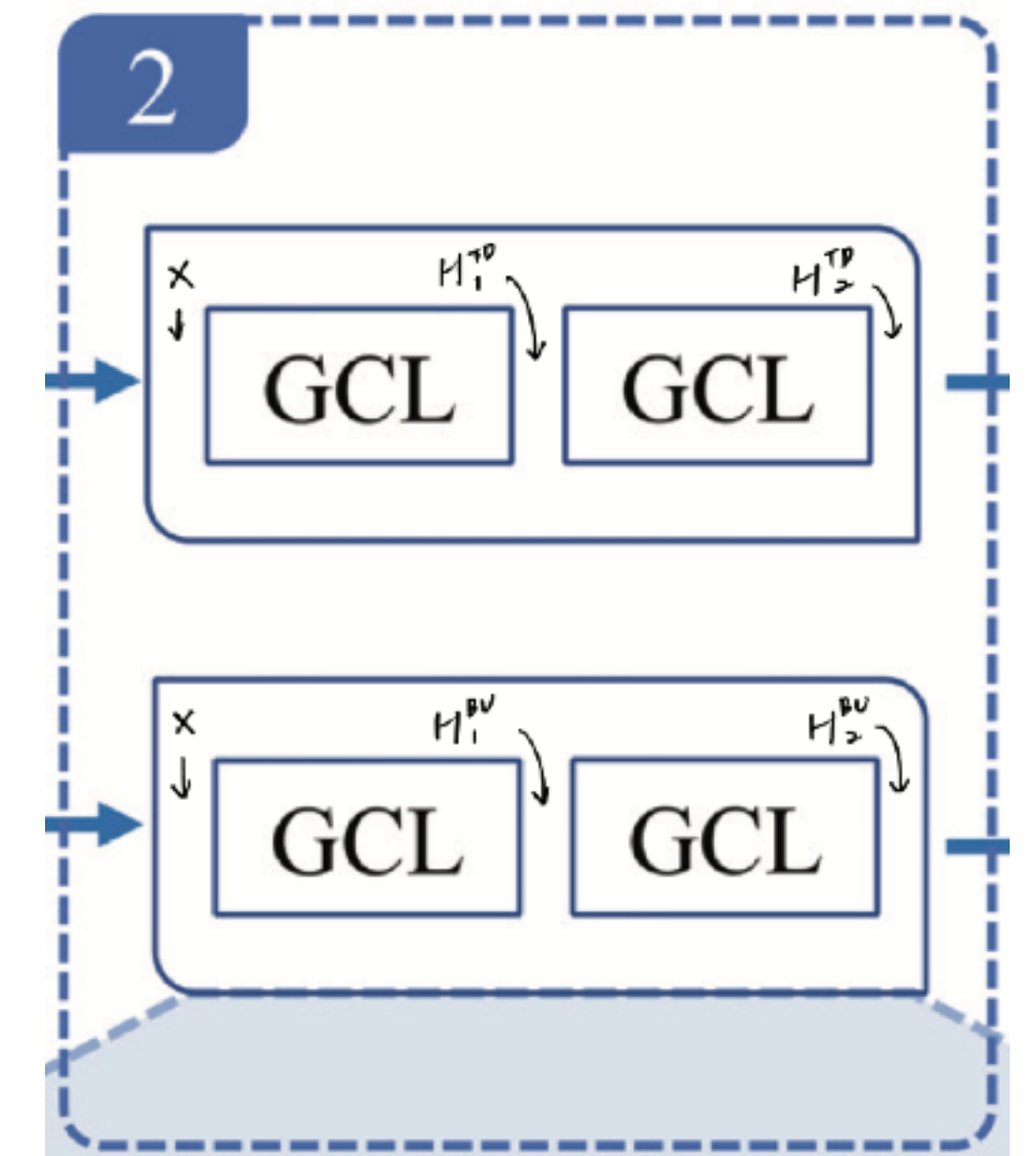
- Top-down propagation and bottom-up propagation features are obtained by TD-GCN and BU-GCN.

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

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

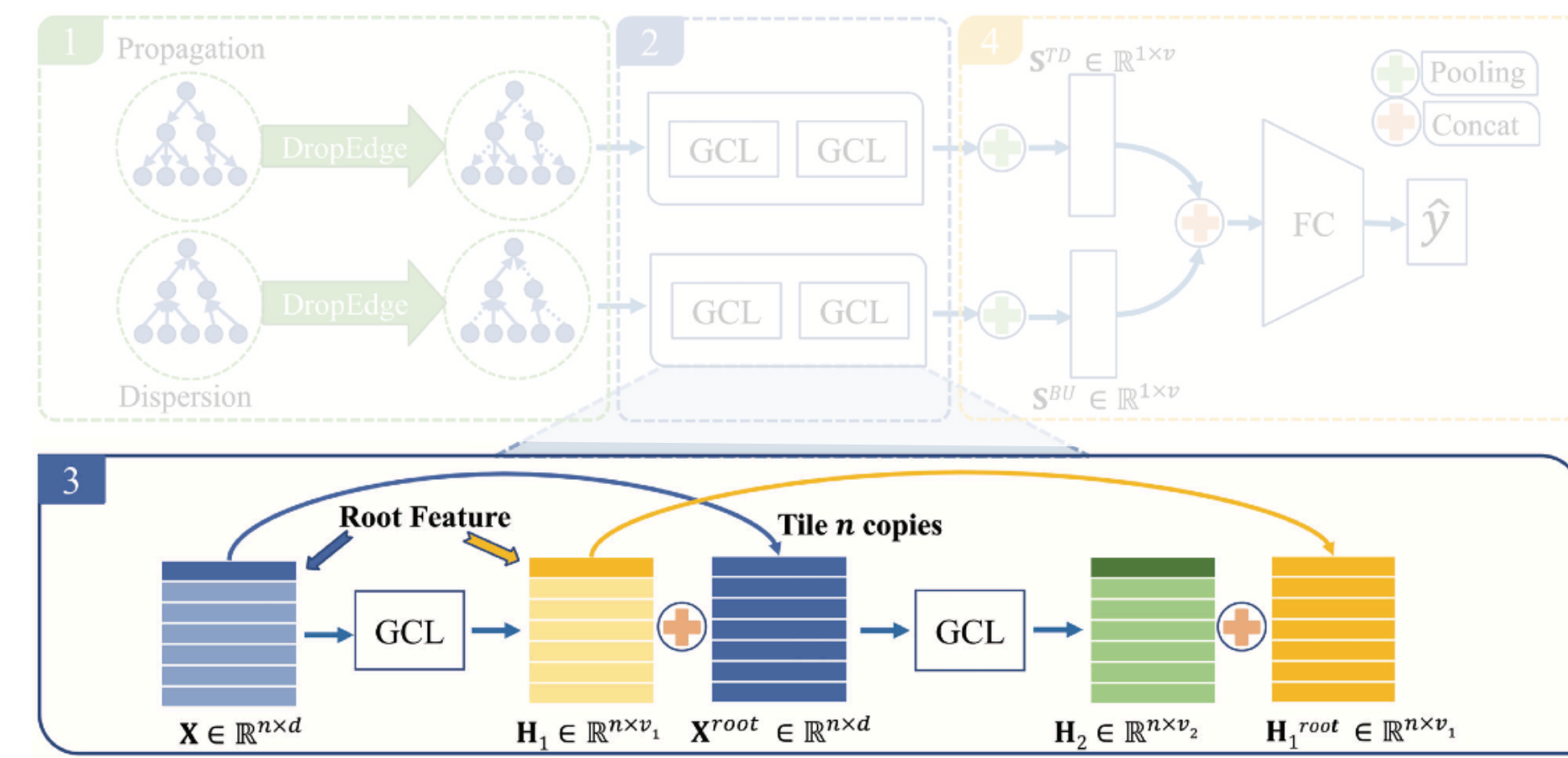
- $\mathbf{H}_2^{TD} = \sigma \left(\hat{\mathbf{A}}^{TD} \mathbf{H}_1^{TD} \mathbf{W}_1^{TD} \right)$

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



Methodology

Root Feature Enhancement



- **Source post** of a rumor event always has **abundant information** to make a wide impact.
- Proposed an operation of **root feature enhancement** to improve the performance of rumor detection.
- For k -th GCL, concatenate the hidden feature vectors of every nodes with the hidden feature vector of the root node from $(k - 1)$ -th GCL to construct new feature matrix

$$\tilde{\mathbf{H}}_k^{TD} = \text{concat} \left(\mathbf{H}_k^{TD}, \left(\mathbf{H}_{k-1}^{TD} \right)^{root} \right), \mathbf{H}_0^{TD} = \mathbf{X}$$