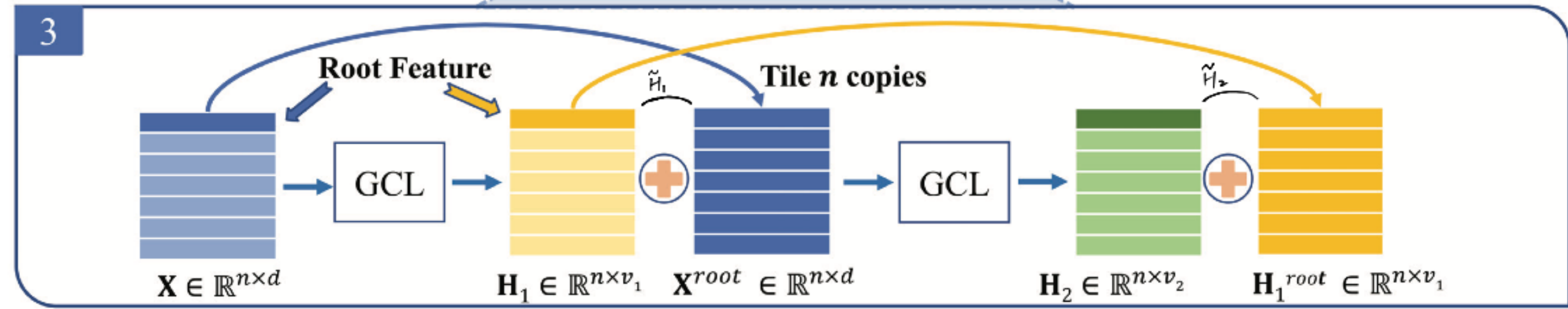
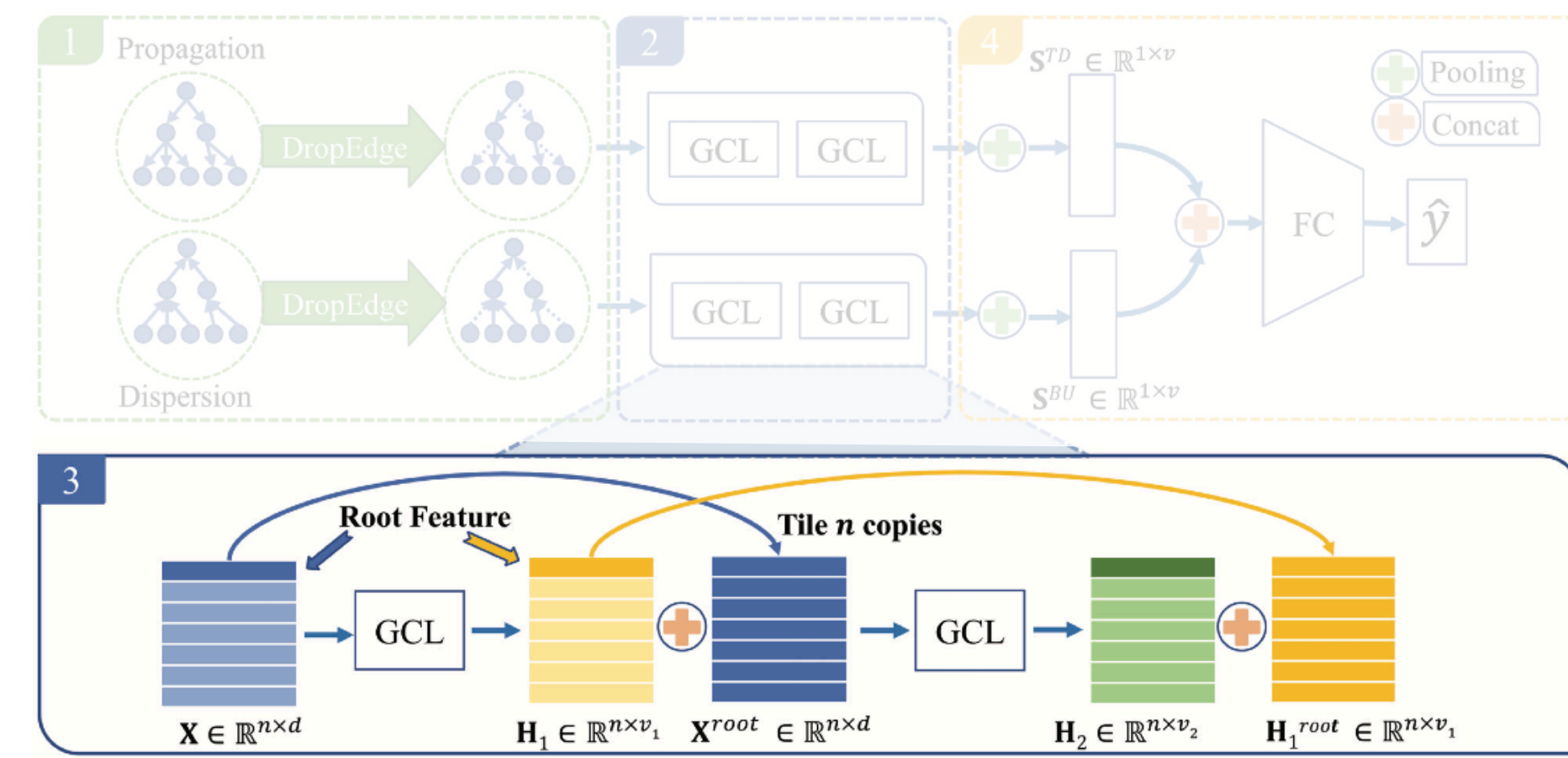


# Methodology

## Root Feature Enhancement

- $\mathbf{H}_1^{TD} = \sigma \left( \hat{\mathbf{A}}^{TD} \mathbf{X} \mathbf{W}_0^{TD} \right)$
- $\tilde{\mathbf{H}}_1^{TD} = \text{concat} \left( \mathbf{H}_1^{TD}, \mathbf{X}^{root} \right)$
- $\mathbf{H}_2^{TD} = \sigma \left( \hat{\mathbf{A}}^{TD} \tilde{\mathbf{H}}_1^{TD} \mathbf{W}_1^{TD} \right)$
- $\tilde{\mathbf{H}}_2^{TD} = \text{concat} \left( \mathbf{H}_2^{TD}, (\mathbf{H}_1^{TD})^{root} \right)$
- $\tilde{\mathbf{H}}_1^{BU}, \tilde{\mathbf{H}}_2^{BU}$  are obtained in the same manner as above.



# Methodology

## Representations of Propagation and Dispersion for Rumor Classification

- Employ **mean-pooling** operators to **aggregate information** from these two sets of the node representations.
- $$\mathbf{S}^{TD} = \text{MEAN}(\tilde{\mathbf{H}}_2^{TD}), \mathbf{S}^{BU} = \text{MEAN}(\tilde{\mathbf{H}}_2^{BU})$$
- Then **concatenate the representations** of propagation and dispersion to merge the information as
  - $$\mathbf{S} = \text{concat}(\mathbf{S}^{TD}, \mathbf{S}^{BU})$$
- Finally the label of the event  $\mathbf{y}$  is calculated via several **fully connected layers** and **softmax layer**:
  - $$\mathbf{y} = \text{Softmax}(\text{FC}(\mathbf{S}))$$

