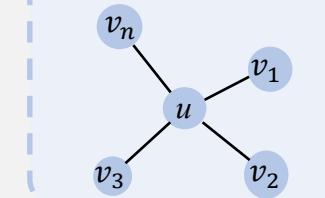
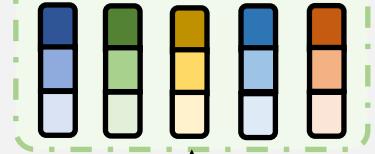


## Social Graph Construction

Social Graph  $\mathcal{G}$



Node Features  $e_u, E_V$



Mean Pooling

Text Encoder

Text Data

Friend's Reviews  $\mathcal{H}_V$

Cold Start User Review  $\mathcal{H}_u$

GNN

Embedding  $e' u$

Edge Weights

Friend Reviews Embedding

User Reviews Embedding

Friend Review  $j$

User Review

## Soft Prompt Constructor

User-Level Graph Embedding

[Graph Embedding]: <sp\_token\_start>  $z_u$  <sp\_token\_end>

Friend-wise Text Embedding & Weighting

[Friend Review Text  $j$ ]: "Great service and amazing food..."

[Review Stars]: 4.0

[Friend Influence Score]: [Edge Weight]

[Review Embedding  $j$ ]: <sp\_token\_start>  $r_j$  <sp\_token\_end>

User Review

[Review Text]: " I really enjoyed the atmosphere of this place... "

[Review Stars]: 5.0

[Review Embedding]: <sp\_token\_start>  $r_u$  <sp\_token\_end>

$h_v, \mathcal{H}_u$

## Inference

System Prompt

Target Business Info

[Graph Embedding]

[Friend Review  $j$ ]

[Friend Influence Score]

[Review Embedding  $j$ ]

[User Review]

[Review Embedding]:

Target Review Stars

LLM

Review Text  $y$