The key of recommender systems is to predict whether users are likely to interact with items based on the historical interactions [5, 12, 20, 56], including clicks, add-to-cart, purchases, etc. As a widely used solution, collaborative filtering (CF) techniques are developed to model historical user-item interactions, assuming that users who behave similarly are likely to have similar preferences towards items.

To better exploit the user-item interactions as well as the high-order connectivity therein, graph collaborative filtering models such as NGCF [46] and LightGCN [20] propose to explicitly propagate the user embedding e 𝑘 𝑢 and item embedding e 𝑘 𝑖 according to the user-item interaction through the propagation.

**Despite their success, prior manner of modeling user-item relationships is insufficient to discover the heterogeneous reliability of interactions among instances in recommender systems. The key reason is that most existing deep recommender systems uniformly treat all the interactions. Therefore, it is desired to design a new collaborative filtering method that adaptively propagates the embedding in recommender systems, which can lead to more accurate and robust recommendations.**

Graph Trend filtering Networks (GTN) to capture and learn the adaptive importance of the interactions in recommender systems.

Proposed the following embedding smoothness objective for user-item graph in recommendations:

