Pixie Inspired Algorithm

Pixie Inspired Random Walk algorithms refers to a type of recommendation system which uses graph method, particularly inspired by the Pinterest's Pixie recommendation system to find related items fast and scalable.

Pixie is Pinterest's real time recommendation engine that was developed to handle large scale, and real time personalization. The pixie system uses a graph of pins, boards, users and runs biased random walks from a user's interest to find the relevant content. These algorithms start from a user's current interest or a seed item and explore the graph by randomly selecting and visiting the neighbouring items. It repeatedly traverses through the graph, and keep a track of the items which are frequently visited, and recommends the most relevant and interesting items to the user.

The recommendation system is built on a graph where items such as products, movies, users are nodes, and relationships between the items such as the users who interacted with the movies are considered as edges (such as the views, ratings, likes). The graph can be heterogeneous i.e., it can have different types of nodes and edges. The algorithm starts from a seed node i.e., they simulate the random walks based on a user's history (for example, movie which are viewed or rated by a particular user), and randomly selects a neighbouring node to visit. It uses a biased and personalized walks also. It simulates the biased walk towards certain node types or relevance to the users.

This process repeats for a certain number of walk-length specified and it will keep track of how often each node (movies) are visited. Items that are most often visited during the random walk will have the highest visit count, and those items will be relevant and recommended to the user. This is fast even on massive graphs. It is used in various real time recommendations as the users interacts.

Real-world applications:

1. **Product Recommendations**
   For example: Amazon, eBay
   Algorithm helps to recommend the products to the users based on the user's recently viewed items, purchase history and wish lists.

2. **News Recommendations**
   For example: Google Discover, Flipboard.
   Algorithm helps to recommend news/articles to the user based on user's reading habits and interests.