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Programming Assignment

Explanation of Pixie-Inspired Algorithms

Pixie-inspired recommendation systems are a graph-based system for recommending content for a given user. Graphs are constructed in a very particular manner; both users and content are represented as nodes, with edges representing whether or not a user has interacted or rated a content node. Constructing the graph in such a manner ensures that similar users and content nodes are grouped close by.

This grouping means that random-walk algorithms can be used for recommendation systems. Given either a user or content node, we can randomly select a neighbor at each step of the walk, and visit it. Keeping track how many times we visit a given node allows us to build a knowledge base of nodes within a neighborhood— the more times a node is visited, the more "similar" it is to the one we started from, and the more likely we are to recommend it to the user.

In the original paper that described the algorithm, a Pixie-walk algorithm was used in Pinterest to make recommendations in this manner. They put forward that Pinterest is essentially a giant human-curated bipartite graph of pins and boards, and then used this theory to implement an algorithm similar to the one described above (in their implementation, each pin was given a specific weight). Because of the nature of the graph, both pins and boards could be recommended to users; additionally, the algorithm was fast, and highly scalable, compared to traditional recommendation systems.