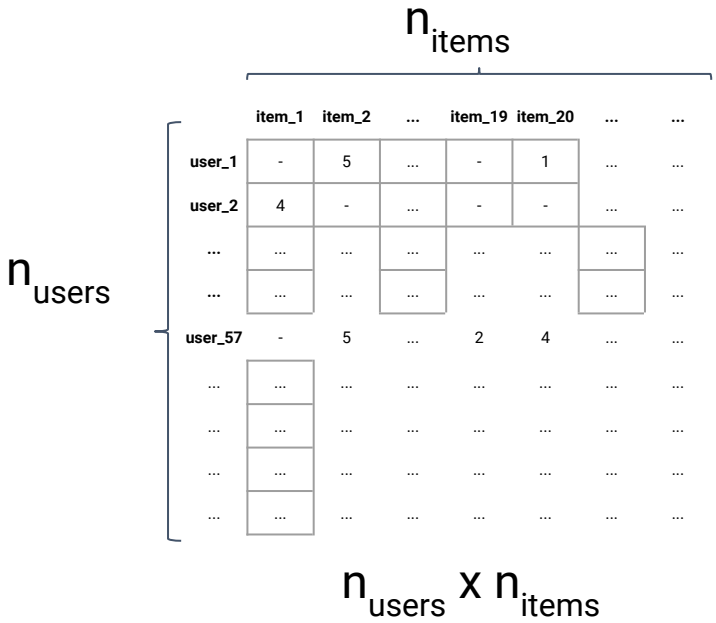
Scalability Challenge for User Based Collaborative Filtering

Scalability Challenge

- Scalability - Nearest neighbor require computation that grows with both the number of users and the number of items.



Analytics Vidhya

Scalability Challenge

- As user rates new items:
  - Rating vector of user will change
  - As a result, similarity with other users will also change
- Finding similar users in advance is difficult!
- Most user-based CF methods find neighbors when predictions are needed
- Faces issues of scalability

Item-based Collaborative Filtering

- Item-based filtering does not solve the scalability problem itself

- Pre-processing approach by Large Scale E-Commerce
  - Calculate all pair-wise item similarities in advance
  - Item similarities are supposed to be more stable than user similarities

- Scalability with respect to memory
  - Up to N^2 pair-wise similarities to be memorized (N = number of items) in theory
  - In practice, this is significantly lower (items with no co-ratings)
  - Further reductions are possible by limiting the neighborhood size