**A Collaborative Filtering Recommender System in Primary Care: Towards a Trusting Patient-Doctor Relationship**

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**Link to the paper** : <https://ieeexplore.ieee.org/abstract/document/8419395>

**Summary** : They have propose a collaborative filtering recommender system to match patients with doctors in primary care. particular, we model patient trust in primary care doctors using a large-scale dataset of consultation histories. The proposed approach shows higher predictive accuracy than a heuristic baseline, as well as a collaborative filtering approach without the trust measures.

**Data** : Large-scale dataset from a leading private European health care provider that contains 1.07 million consultation records between 382,817 patients and 314 primary care doctors (family doctors and internal medicine specialists) in 16 hospitals over the years 2012-2017. Consultations with primary care doctors are infrequent, resulting in a very sparse patient-doctor interaction matrix (sparsity ratio = 0.989).

**Methodology** :

1. **Collaborative Filtering** :
   1. CF analyses the relationship between users and interdependencies among items to identify preference similarity across individuals.
   2. MF is used here to realize CF.
   3. They will model patient opinions using implicit feedback – when users reflect by their expressed preferences.
   4. Patient-Doctor Interaction Matrix : Graphical user interface, text, application

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   5. Text, letter

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   6. They make use of *Weighted Approximate-Rank Pairwise* (WARP) – because we observe actual patient visits and most of the patients have visited less than three primary care doctor
   7. More specifically, for each perceived interaction yij , WARP samples a negative doctor d, computes the difference between predicted yˆij and yˆid, and performs a gradient update to rank the positive doctor higher if the difference is negative, *i.e.*, a rank violation is found
   8. To model patient trust :

Text, letter

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**Evaluation** : Using hit ratio and precision.

Chart, bar chart

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