e-Coaching the Elderly
Recommender Systems in Health

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Pervasiveness of AI

- Availability of Big Data
- Increase of Computing Power (esp. GPUs)
- Novel Algorithms – Machine Learning, Deep Learning, Recommendation
- Novel Frameworks – increase in accessibility

- Artificial Intelligence permeates all fields of application
  - Economics, Engineering, Bio-Technology, Pharmacology, etc.

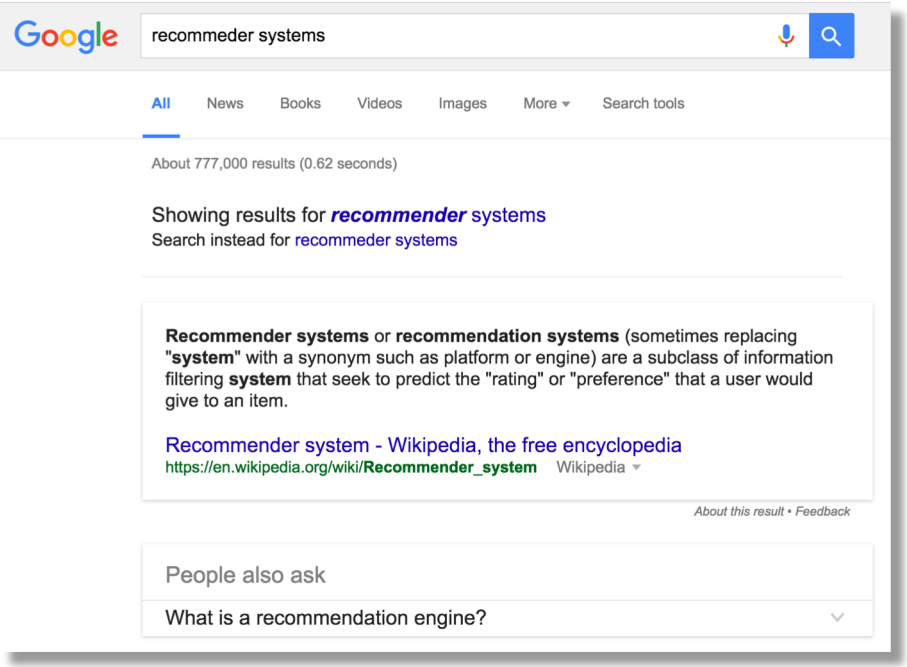
- Application in health is very diverse
  - Utilization in medicine and research
  - Utilization in therapy

- Recommender Systems in Health
  - Finding user preferences and adapting content – “Personalization”

Recommender systems are everywhere

Applications and domains

- E-Commerce, tourism, information retrieval, e-Learning, people recommendation, group recommendation, search, media and communications



Two target user groups

- Doctors
  - Decision support for diagnosis, adjusting therapy, finding health information
- Patients
  - Adjusting the therapy to the individual needs of the patients
    - Recommending healthy foods, sports alternatives, behavior nudging
  - Feedback from users is utilized by all users
    - If I like recommendations A, B, C I might also like D, because other users did…
- Different Recommendation Algorithms
  - Social Recommendation, Trust-based, Content-based, collaborative filtering, etc.
- Benefit of health recommendation systems
  - Everyone benefits from all data
  - …or do they?

Challenges

Problems with health recommender systems

- Privacy Concerns
  - Different perspectives on privacy from different users
    - Contributors and Consumers?
    - Who uses my data for what purpose?
    - Will I still agree with my data being stored in the algorithm in 10 years?
    - Distributed Recommendation Systems, homomorphic encryption

- Malicious Attacks
  - Forging preferences by utilization of fake users
  - Uncovering user data by preference elicitation

- Responsibility?
  - The algorithm designer? The other users? The user?
  - Human-in-the-loop?

- Filter Bubbles
  - Will I get similar therapy as others, just because of what I have previously used ?

Ageing

User diversity increases with

- Age amplifies user differences
  - Perceptual performance, prior experience, attitudes
- Mental models of underlying technology are often misleading
  - No conceptual model of digital data storage, use, utilization
  - Misperceptions of artificial intelligence
- Different concepts of ageing
  - Dignified ageing
  - Technology as means of staying young
  - Technology-dependence amplified the loss of independence
- Tools must be context-aware, user centered design, configurable, personalized
- Motives and Barriers – Inclusive, affordable, and social