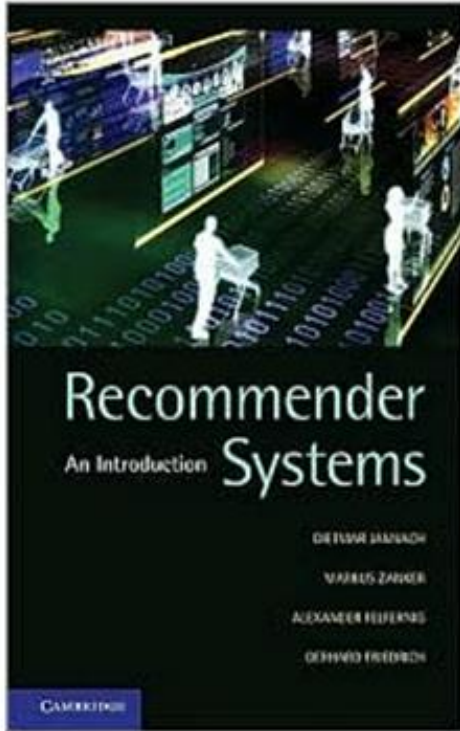


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# Recommender Systems – An Introduction

**Dietmar Jannach, Markus Zanker, Alexander Felfernig, Gerhard Friedrich**  
**Cambridge University Press**

*Which digital camera should I buy? What is the best holiday for me and my family? Which is the best investment for supporting the education of my children? Which movie should I rent? Which web sites will I find interesting? Which book should I buy for my next vacation? Which degree and university are the best for my future?*



## Recommender Systems: An Introduction

by [Dietmar Jannach](#), [Markus Zanker](#), [Alexander Felfernig](#), [Gerhard Friedrich](#)

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# Agenda

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- **Introduction**

- Problem domain
- Purpose and success criteria
- Paradigms of recommender systems
  - Collaborative Filtering
  - Content-based Filtering
  - Knowledge-Based Recommendations
  - Hybridization Strategies

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# Introduction



# Problem domain

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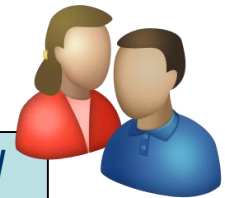
- **Recommendation systems (RS) help to match users with items**

- Ease information overload
- Sales assistance (guidance, advisory, persuasion,...)

*RS are software agents that elicit the interests and preferences of individual consumers [...] and make recommendations accordingly.*

*They have the potential to support and improve the quality of the decisions consumers make while searching for and selecting products online.*

» (Xiao & Benbasat 2007<sup>1</sup>)



- **Different system designs / paradigms**

- Based on availability of exploitable data
- Implicit and explicit user feedback
- Domain characteristics



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(1) Xiao and Benbasat, *E-commerce product recommendation agents: Use, characteristics, and impact*, MIS Quarterly **31** (2007), no. 1, 137–209

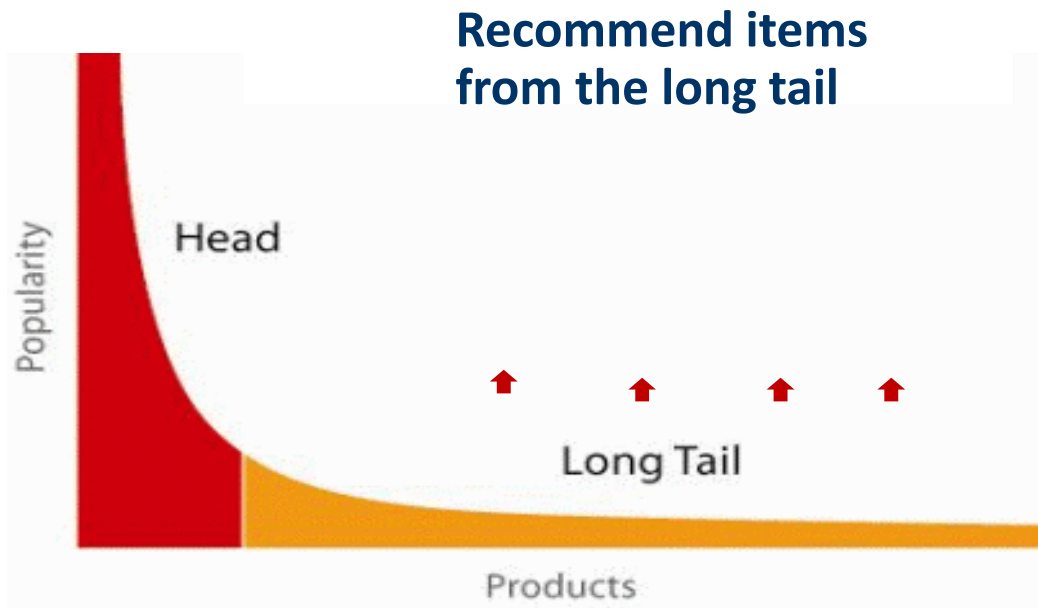
# Purpose and success criteria (1)

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- **Different perspectives/aspects**
  - Depends on domain and purpose
  - No holistic evaluation scenario exists
  
- **Retrieval perspective**
  - Reduce search costs
  - Provide "correct" proposals
  - Users know in advance what they want
  
- **Recommendation perspective**
  - Serendipity – identify items from the Long Tail
  - Users did not know about existence

# When does a RS do its job well?

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- "Recommend widely unknown items that users might actually like!"
- 20% of items accumulate 74% of all positive ratings
- Items rated  $> 3$  in MovieLens 100K dataset

## Purpose and success criteria (2)

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- **Prediction perspective**
  - Predict to what degree users like an item
  - Most popular evaluation scenario in research
  
- **Interaction perspective**
  - Give users a "good feeling"
  - Educate users about the product domain
  - Convince/persuade users - explain
  
- **Finally, conversion perspective**
  - Commercial situations
  - Increase "hit", "clickthrough", "lookers to bookers" rates
  - Optimize sales margins and profit



# Recommender systems

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- **RS seen as a function**
- **Given:**
  - User model (e.g. ratings, preferences, demographics, situational context)
  - Items (with or without description of item characteristics)
- **Find:**
  - Relevance score. Used for ranking.

- 
- **Relation to Information Retrieval:**
    - IR is finding material [...] of an unstructured nature [...] that satisfies an information need from within large collections [...].
      - » (Manning et al. 2008<sup>1</sup>)

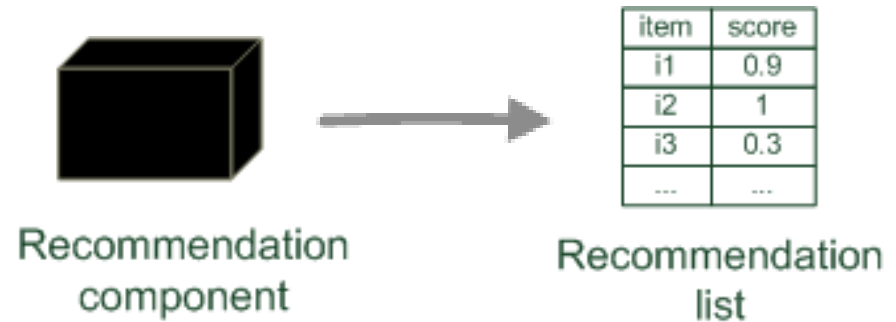
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(1) Manning, Raghavan, and Schütze, *Introduction to information retrieval*, Cambridge University Press, 2008

# Paradigms of recommender systems

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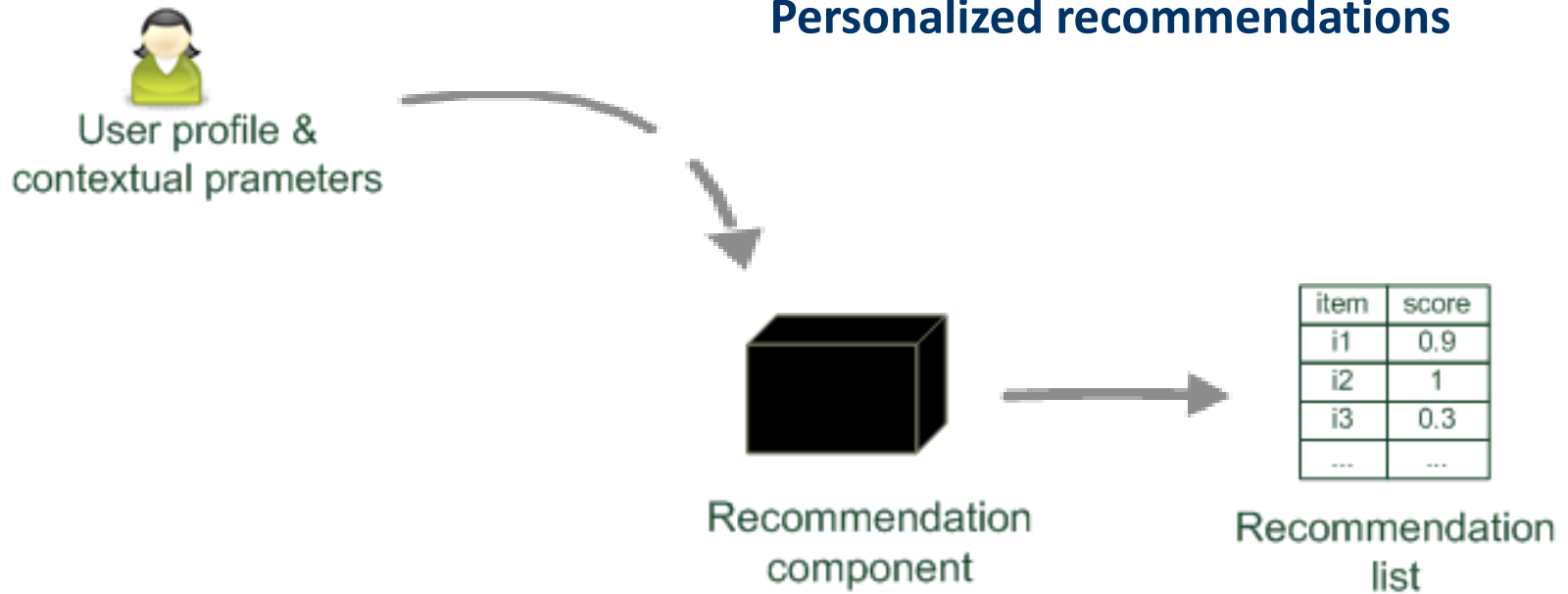
**Recommender systems reduce information overload by estimating relevance**



# Paradigms of recommender systems

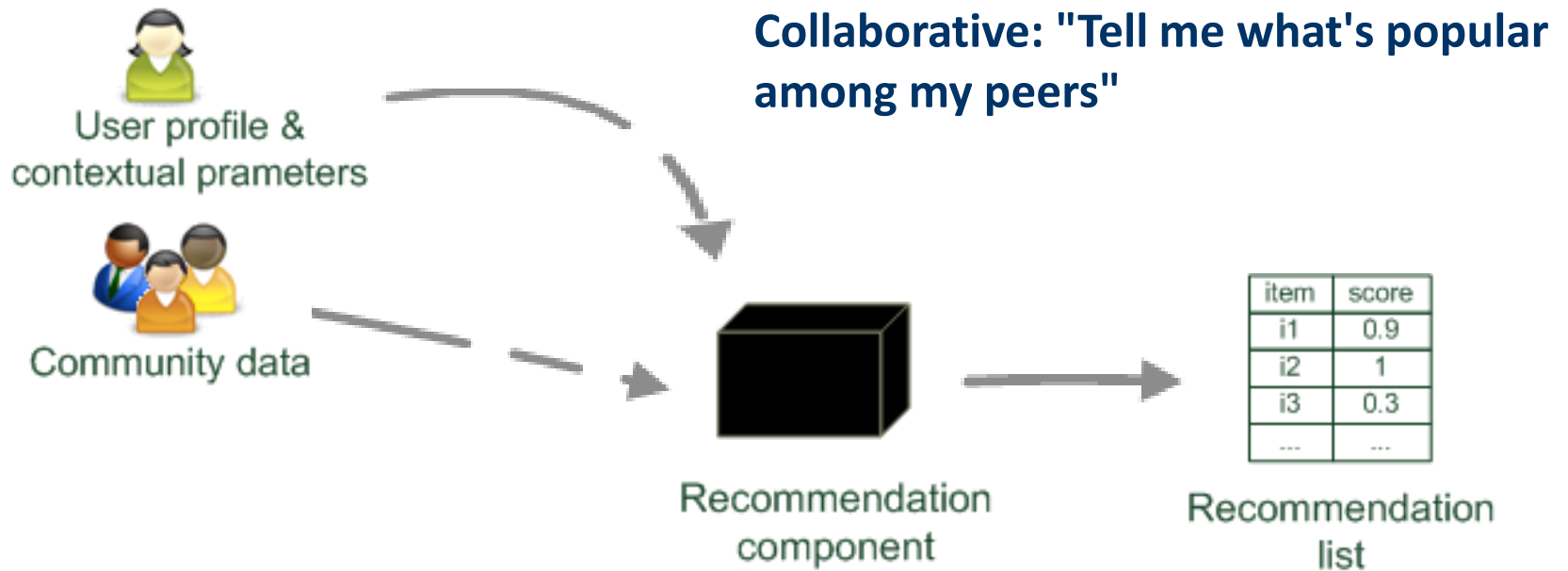
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## Personalized recommendations



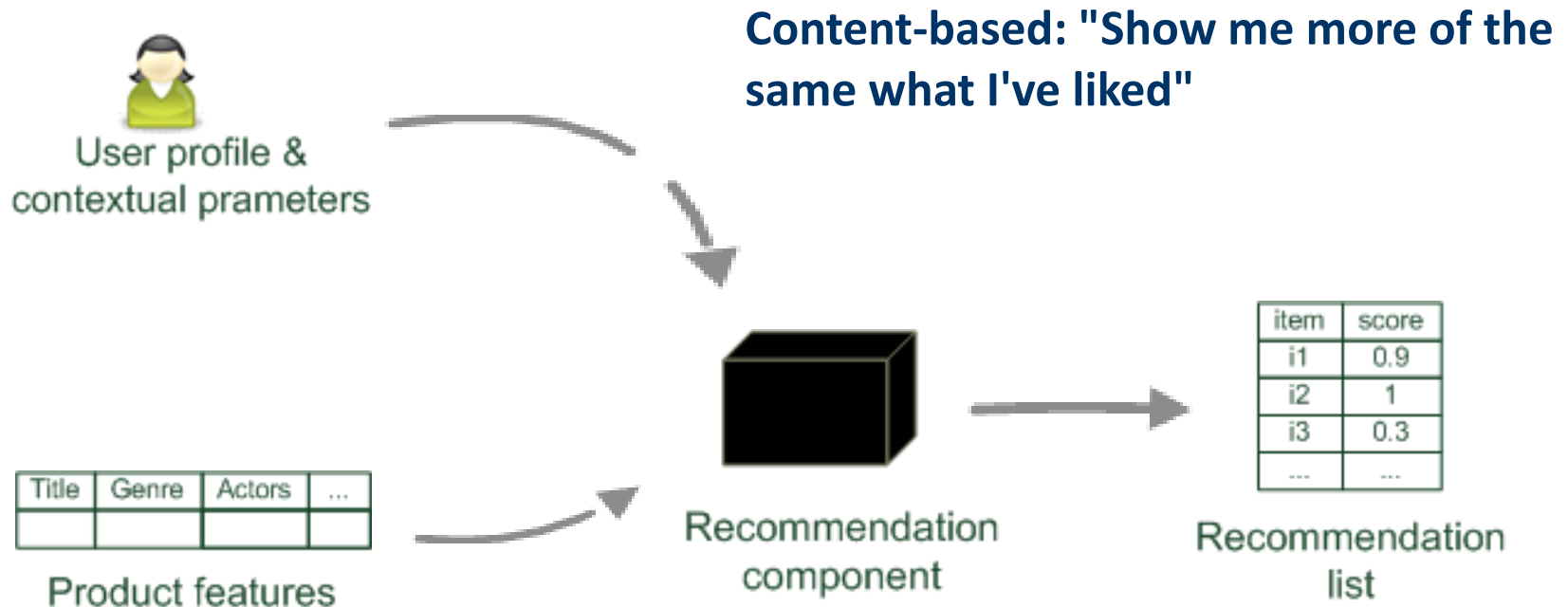
# Paradigms of recommender systems

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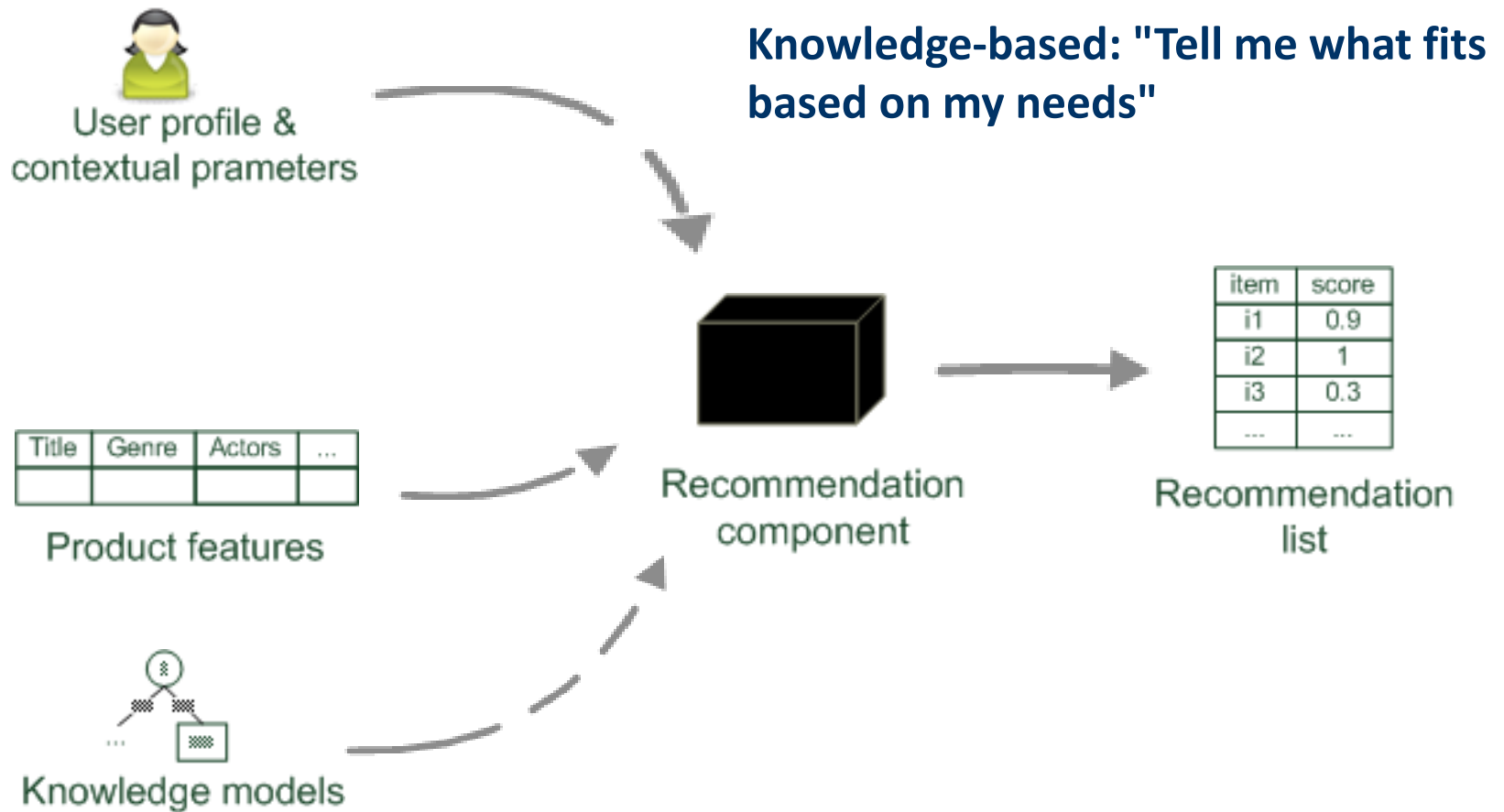
# Paradigms of recommender systems

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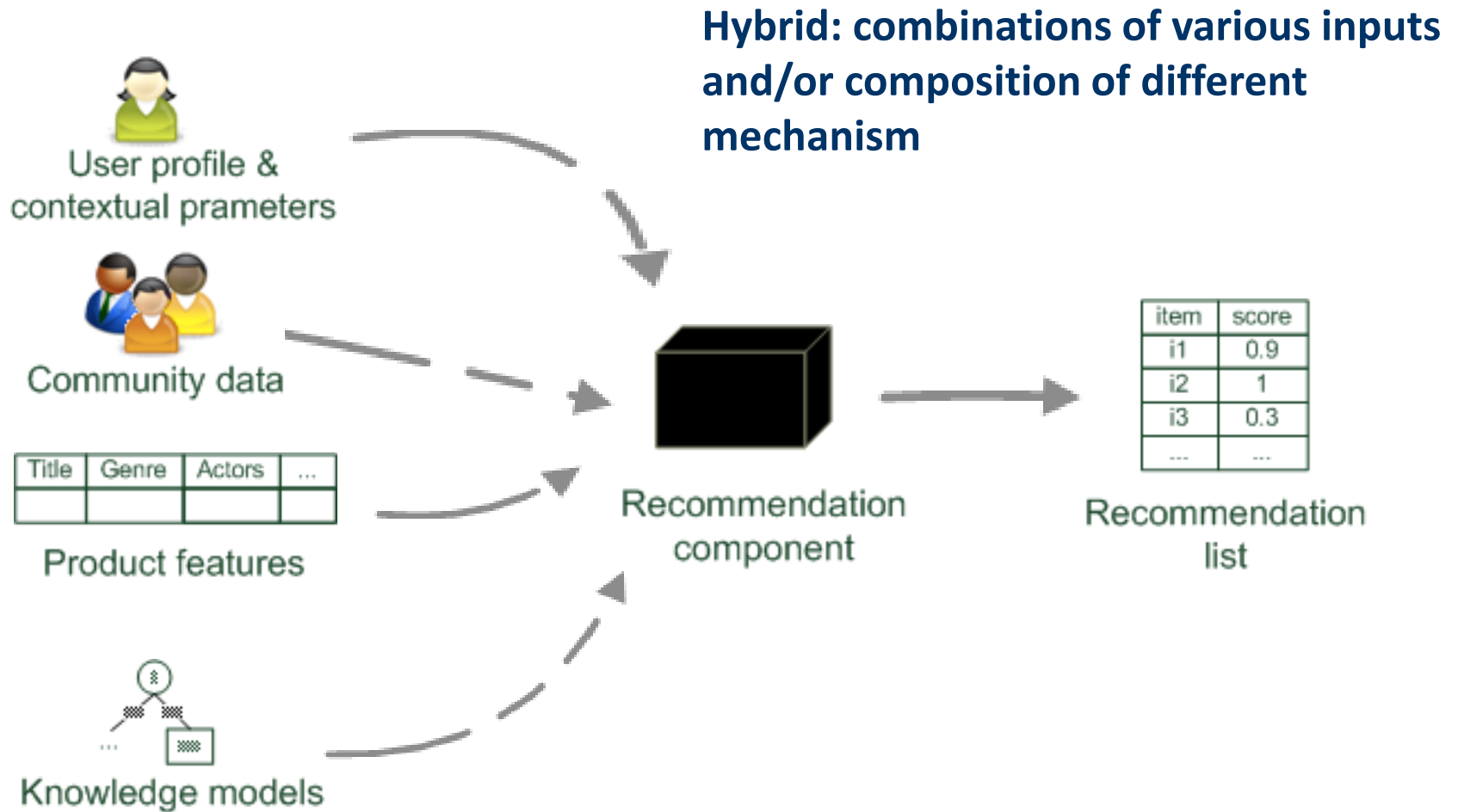


# Paradigms of recommender systems

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# Paradigms of recommender systems



# Outlook

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- **Part I (Basic Concepts)**

- Basic paradigms of collaborative,
- content-based, and
- knowledge-based recommendation,
- as well as hybridization methods.
- Explaining the reasons for recommending an item
- Experimental evaluation

- **Part II (Recent Research Topics)**

- How to cope with efforts to attack and manipulate a recommender system from outside,
  - supporting consumer decision making and
  - potential persuasion strategies,
  - recommendation systems in the context of the social and semantic webs, and
  - the application of recommender systems to ubiquitous domains
-