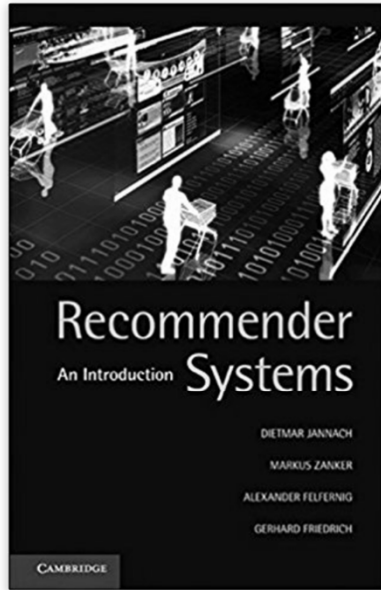


Priporočilni sistemi

- Pregled
- Klasifikacija priporočilnih sistemov
- Organizacija podatkov

Look inside ↴



See all 2 images

Recommender Systems: An Introduction Hardcover – 25 Nov 2010

by Dietmar Jannach (Author), Markus Zanker (Author), Alexander Felfernig (Author), & 1 more

★★★★☆ 10 reviews from Amazon.com

See all 9 formats and editions

Kindle Edition
£48.37

Hardcover
£45.90

Read with Our **Free App**

10 Used from £38.00

22 New from £40.57

Amazon

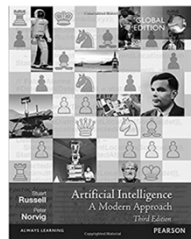
This item can be delivered to your selected dispatch location in **Slovenia**. Details

Note: This item is eligible for **click and collect**. Details

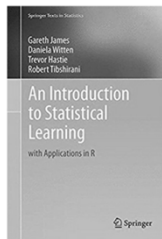
In this age of information overload, people use a variety of strategies to make choices about what to buy, how to spend their leisure time, and even whom to date. Recommender systems automate some of these strategies with the goal of providing affordable, personal, and high-quality recommendations. This book offers an overview of approaches to developing state-of-the-art recommender systems. The authors present current algorithmic approaches for generating personalized buying proposals, such as collaborative and content-based filtering, as well as more interactive and knowledge-based approaches.

Read more

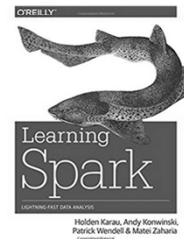
Customers who bought this item also bought



Artificial Intelligence: A Modern Approach, Global Edition
Stuart Russell
★★★★★ 52
Paperback
£45.89 ✓prime



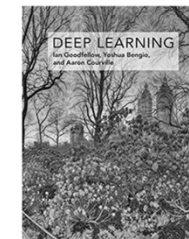
An Introduction to Statistical Learning: with Applications in...
Gareth James
★★★★★ 18
Hardcover
£53.99 ✓prime



Learning Spark: Lightning-Fast Big Data Analysis
Holden Karau
★★★★★ 11
Paperback
£21.75 ✓prime



Machine Learning: A Probabilistic Perspective...
Kevin Murphy
★★★★★ 19
Hardcover
£56.95 ✓prime



Deep Learning (Adaptive Computation and Machine Learning)
Ian Goodfellow
★★★★★ 13
Hardcover
£66.95 ✓prime



eBay

People who viewed this item also viewed

Feedback on our suggestions



SPONSORED
Hot Universal Car
Windscreen Dashboard H...
US \$3.94
Free P&P



SPONSORED
Universal in Car Air Vent
Gravity Mount Holder Sta...
US \$8.18
Free P&P



SPONSORED
360° Universal Car Air Vent
Mount Holder Clip For GP...
US \$3.95
Free P&P



SPONSORED
Durable Universal Car
Windscreen Dashboard H...
US \$3.95
Free P&P



360° Car Air Vent Mount
Cradle Holder Stand For...
US \$3.81
US \$4.05
Free P&P
Almost gone



360° Universal Car Air Vent
Mount Holder Stand Cradl...
US \$4.22
Free P&P



Word Snack - Your Picnic with Words

APNAX Games
PEGI 3

INSTALL

Contains ads • In-app purchases



Downloads



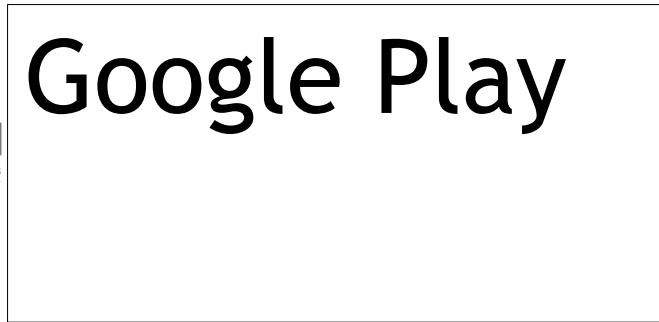
218,317 ±



Word



Similar



MORE

Similar Apps



Word Cookies

4.6★



Word Connect : Word Cookies

4.7★



PicWords 2

4.7★



Word Search Ultimate

4.1★



Szó Piknik - Word Snack

4.7★



Piknik Sl...

4.6★

You Might Also Like

MORE



Word Search

4.3★



Logic Master 1 - Mind Twist

4.6★



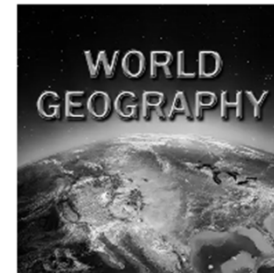
Wordscapes

4.9★



Find the differences 300 level

4.5★



World Geography - Quiz Game

4.7★



PicWord: Game

4.7★



Word Snack - Your Picnic with Words

APNAX Games
PEGI 3

INSTALL

Contains ads • In-app purchases

1
MILLION
Downloads

4.6
★
218,317

W
Word

Similar

Google Play

Based on Your Recent Activity



Sky Force Reloaded

4.7 ★



Prime Peaks

4.7 ★



2048

4.7 ★



Flight Pilot Simulator 3D
Free

4.6 ★



Brain It On! - Physics Puzzles

4.5 ★

Recommended for You



Brain It On! - Physics Puzzles

4.5 ★



Roll the Ball® - slide puzzle

4.5 ★



Galaxy Attack: Alien Shooter

4.6 ★




Flight Pilot Simulator 3D
Free




4.6 ★




Alto's Adventure

4.5 ★

NFL NCAAF NHL NBA Soccer MLB ...

Watch Listen Fantasy ...  

Soccer Home FIFA World Cup World Cup Knockout Bracket Scores Schedule USMNT USWNT Transfers Teams Leagues & Cups More powered by 

SUBSCRIBE NOW

▶ Live & Upcoming Games

FIFA World Cup 2022

- Home
- News, Reaction, Features
- Knockout Bracket
- Fixtures & Results
- The VAR Review
- Squads
- Teams
- Stadiums
- Live Scores
- Tables
- Stats

Quick Links

- 2022 World Cup
- World Cup Knockout Bracket
- Qatar Bracket Challenge
- English Soccer Pick 'Em


Customize ESPN

Sign Up

Log In

Topics

- FIFA World Cup
- Premier League
- Champions League
- MLS
- La Liga




Follow live: Messi penalty opens scoring for Argentina in semifinal

5m

World Cup knockout rounds bracket


GAMECAST STATISTICS COMMENTARY



USMNT FALLOUT CONTINUES

Why Gio Reyna, Gregg Berhalter are both wrong in USMNT controversy

14h




What can the US do better under Berhalter -- or a new coach -- and what will it take?

With the USA's World Cup run over, what is on the to-do

- Ronaldo: Neymar needs psychological support
- Reyna surprised WC fallout not kept 'in house'
- Sources: Atletico's Felix available for transfer
- Odegaard free kick gives Arsenal win over Milan
- Lloris texted Kane after penalty miss in WC exit
- Neymar acquitted of fraud over transfer to Barca
- Michael B. Jordan joins B'mouth ownership group
- Ten Hag: Only Mbappe is better than Rashford


Best of ESPN+



World Cup 2022: One big question for major eliminated nations including England, the US and Brazil

With just four teams remaining at the 2022 World Cup, the inquests have become around major nations that have been sent home. The US need more depth, England need to figure out what went wrong... and Spain need an entire revamp?

Trending Now



World Cup 2022: Knockout rounds bracket

See who's moving on and check out all the matchups in the knockout rounds in Qatar.

[Terms of Use](#)

[Privacy Policy](#)

[Interest-Based Ads](#)

[EU Privacy Rights](#)

[Cookie Policy](#)

[Manage Privacy Preferences](#)

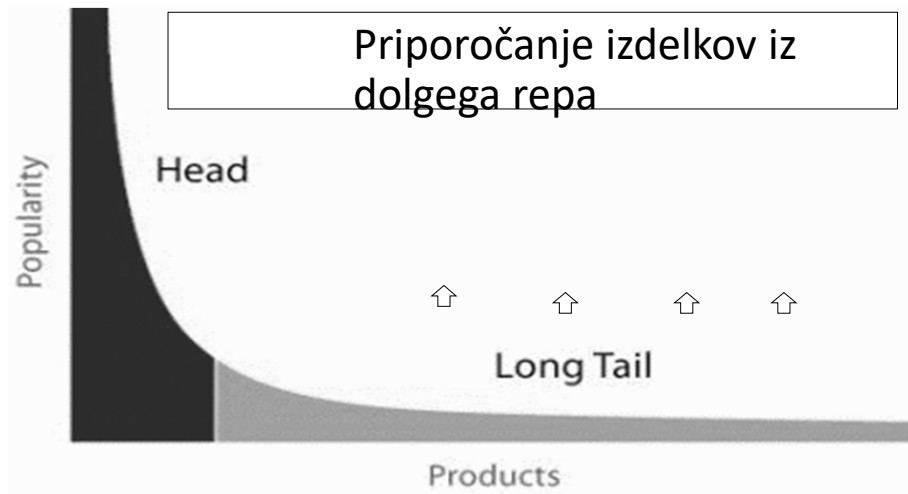
Problem priporočanja

- Priporočilni sistem „uporabnikom“ priporoča „izdelke“
 - Zmanjšuje informacijsko preobremenitev
 - Nudi pomoč pri nakupu (razlaga priporočila)

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.

- Različne paradigme
 - Odvisno od razpoložljivih podatkov
 - Odvisno od implicitnih ali eksplicitnih povratnih informacij
 - Odvisno od problema priporočanja

Kdaj priporočilni sistem dobro deluje?



- Priporoča primerne izdelke, ki jih uporabnik še ne pozna
- O uporabniku mora sistem za dobra priporočila vedeti čimveč!
- MovieLens: 20% filmov ima 74% vseh pozitivnih ratingov (nad 3 na skali 1-5)

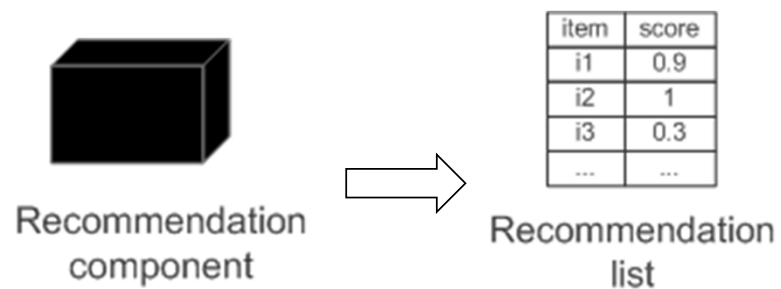
Abstrakcija priporočilnega sistema

- Priporočilni sistem kot funkcija
- Predpostavka:
 - Nekako pridobimo uporabnikove preference (npr. ocene filmov, izdelkov od 1 do 5)
- Ob podanem:
 - Modelu uporabnika (preference, profil, demografski podatki, kontekst)
 - Izdelkih (z ali brez opisanih značilnosti)
- Poišči:
 - Relevantnost vsakega izdelka za vsakega uporabnika in jo uporabi za razvrščanje (rating)

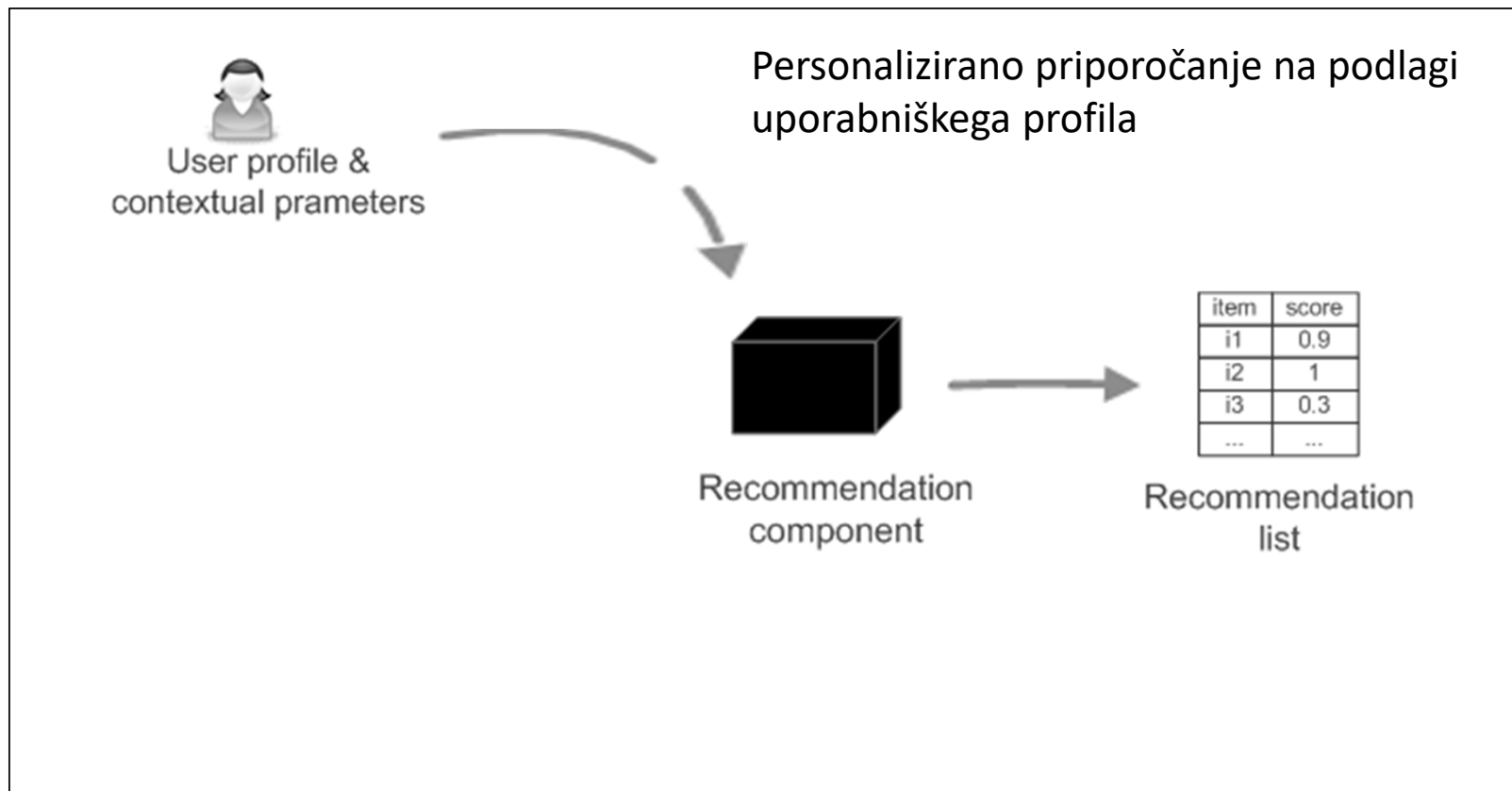
Paradigme priporočilnih sistemov



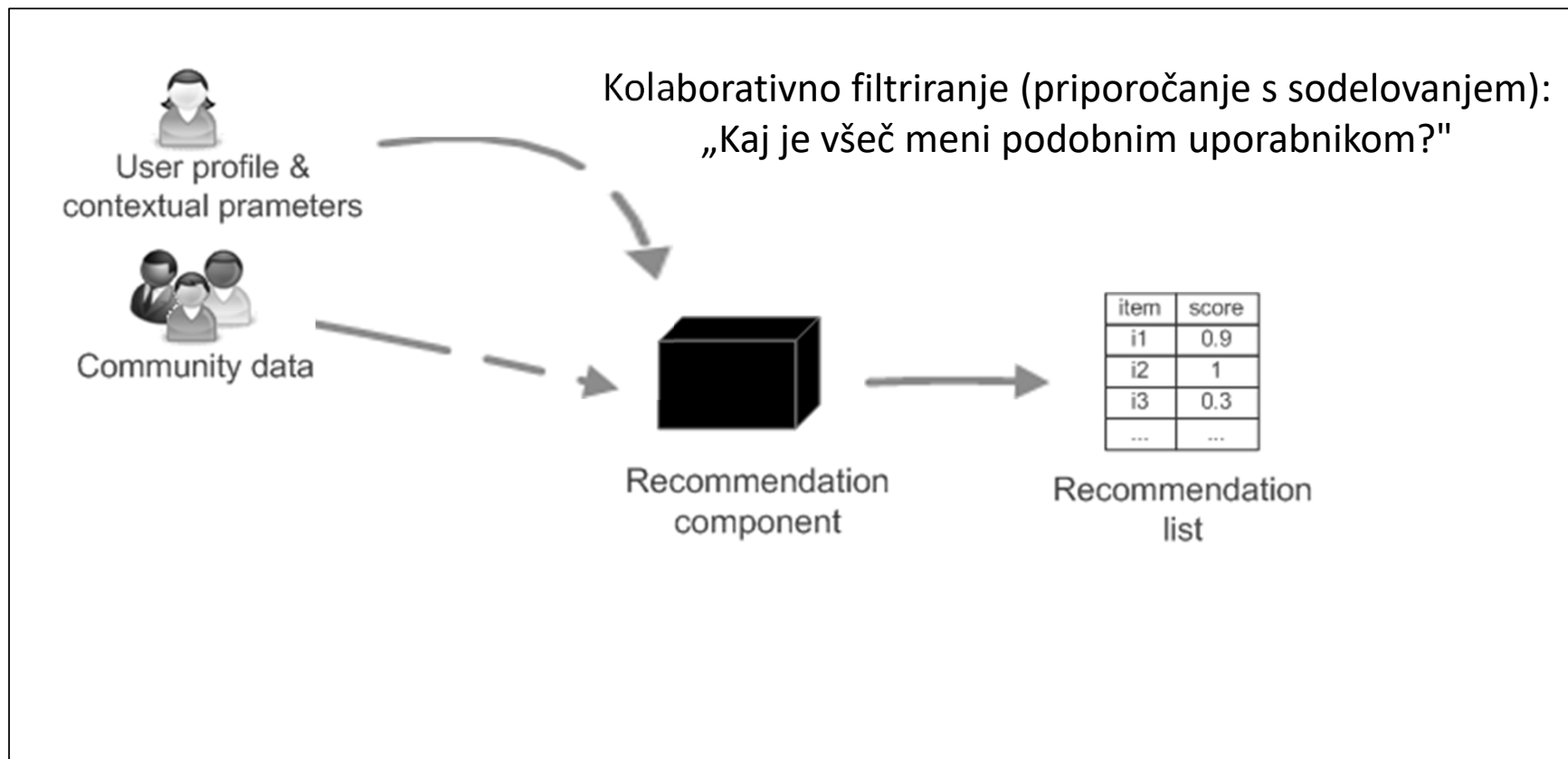
Zmanjševanje informacijske preobremenitve s priporočanjem relevantnih izdelkov. Kako?



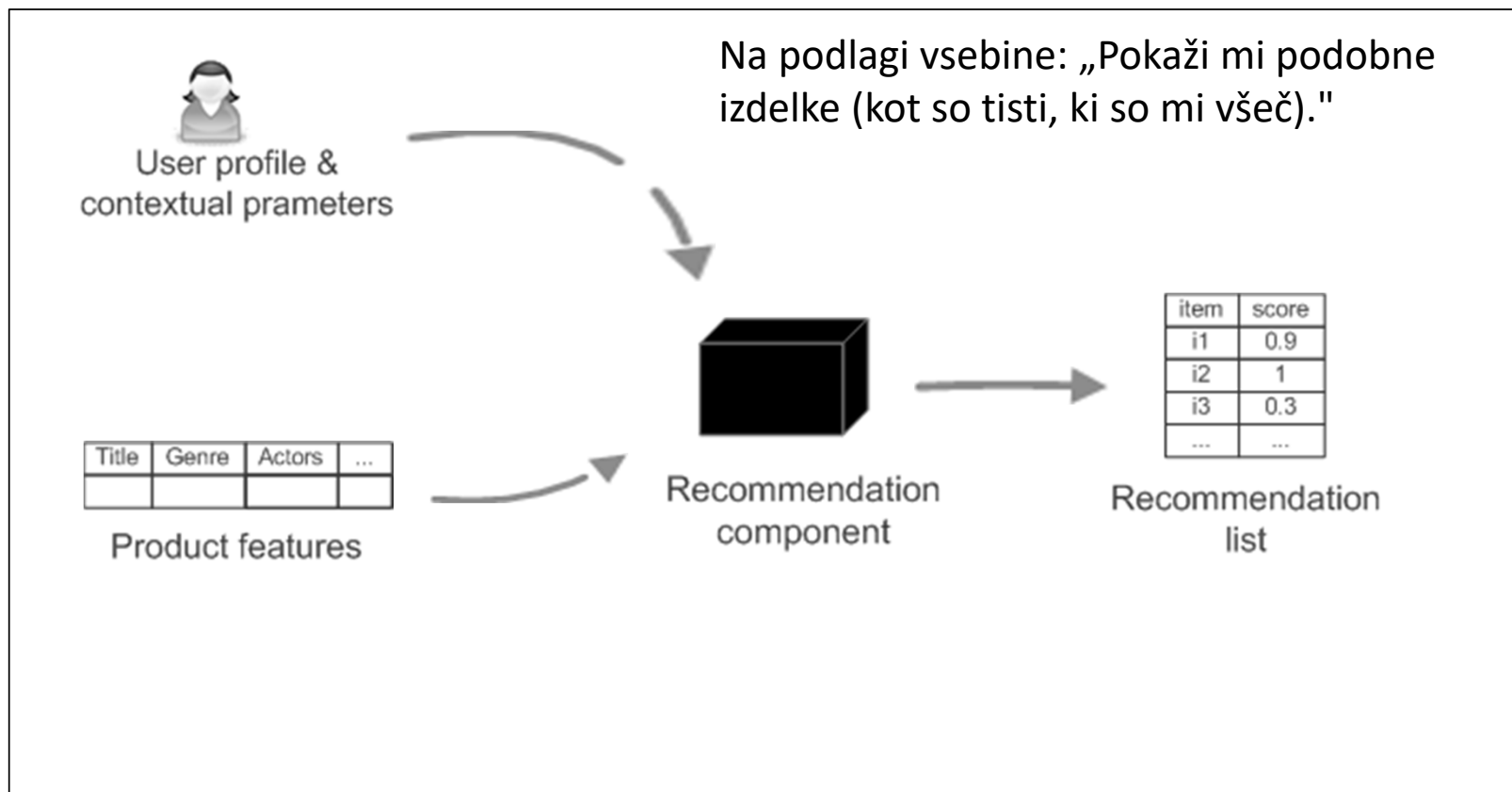
Paradigme priporočilnih sistemov



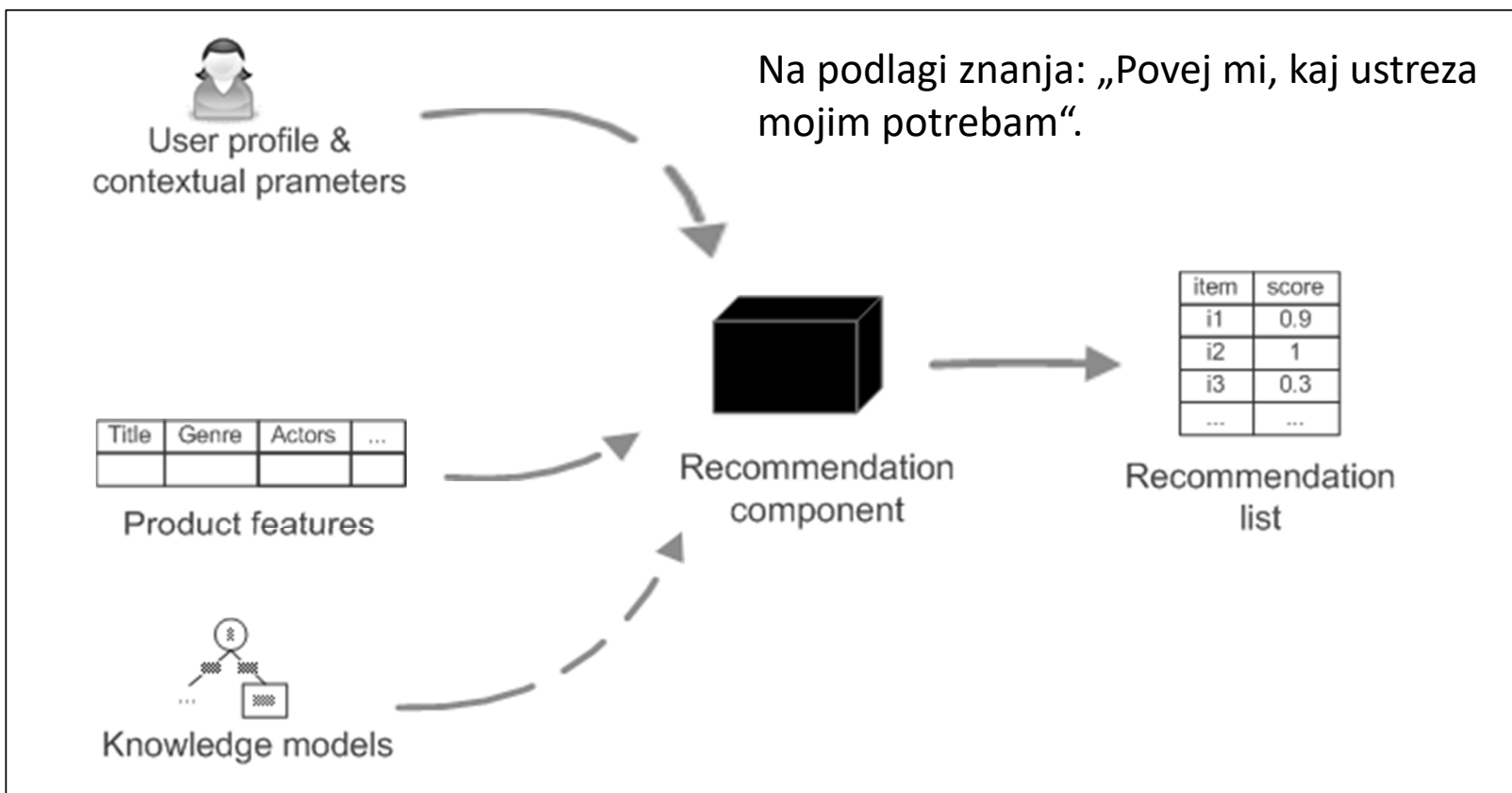
Paradigme priporočilnih sistemov



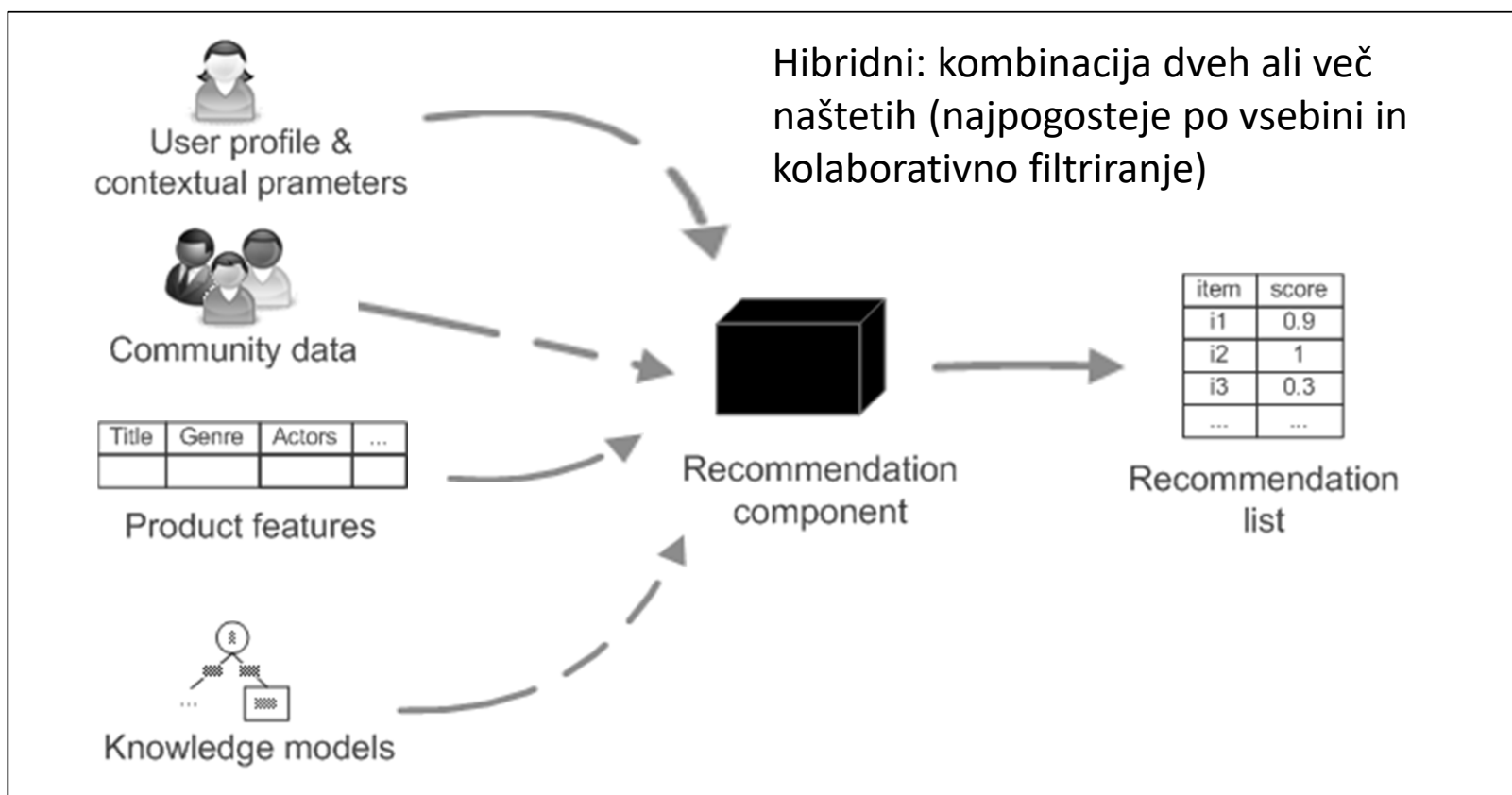
Paradigme priporočilnih sistemov



Paradigme priporočilnih sistemov



Paradigme priporočilnih sistemov



Preferenčna matrika (utility matrix)

izdelki

uporabniki

1	3	4			?
	3	5			5
		4	5		5
		3			
		3			
2			2		2
				5	
	2	1			1
	3			3	
1					

Preferenca
Ocena
Rating

Priporočanje na podlagi podobnosti med uporabniki ali izdelki (memory based)

- Podobnost med uporabniki: Pearsonov korelacijski koeficient (ali kosinusna podobnost, za izdelke)

$$sim(a, b) = \frac{\sum_{p \in P} (r_{a,p} - \bar{r}_a)(r_{b,p} - \bar{r}_b)}{\sqrt{\sum_{p \in P} (r_{a,p} - \bar{r}_a)^2} \sqrt{\sum_{p \in P} (r_{b,p} - \bar{r}_b)^2}}$$

- Izračun preference:

a, b : uporabnika
 p : izdelek

$$pref(a, p) = \bar{r}_a + \frac{\sum_{b \in N} sim(a, b) * (r_{b,p} - \bar{r}_b)}{\sum_{b \in N} sim(a, b)}$$

(na podlagi najbližjih sosedov $b \in N$)

Priporočanje na podlagi modela (model based)



- Napovedni modeli s področja podatkovnega rudarjenja
 - Regresija
 - SVM
 - Bayesovski modeli
 - Nevronske mreže
 - Latentni faktorji (matrična faktorizacija)
- Napovedujemo pričakovano preferenco (rating)

Organizacija podatkov za priporočanje

- Predstavitev preferenc/ratingov
 - Gosta (skoraj prazna) preferenčna matrika
 - Tipično manj kot 0,01% definiranih vrednosti
 - Amazon: 300 milijonov uporabnikov, 350 milijonov izdelkov (vključno z Marketplace)
 - Manj potratno: redka (dolga, vitka) preferenčna matrika
 - Princip ključ-vrednost – slovar: *preferenca(user, item, rating)*
- Tipične operacije:
 - Izračun podobnosti
 - Iskanje najbližjih sosedov
 - Izračun, uporaba napovednega modela
 - Matrična faktorizacija

Priporočanje v podatkovni bazi



- Preprosta integracija v poljuben informacijski sistem
 - Priporočilo kot rezultat operacije (poizvedbe, funkcije, procedure) v PB
- Izbor organizacije podatkov in primerne metode na nivoju PB
 - Gosta ali redka predstavite?
 - Preproste metode (npr. Slope One) – linearni model z enim faktorjem
 - <https://stackoverflow.com/questions/2440826/collaborative-filtering-in-mysql>
 - Nerelacijske PB (grafi)
 - Napovedni model znotraj SUPB?