

Understanding Artificial Intelligence


Day Two

Recommenders

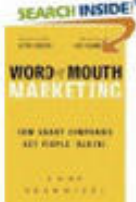
amazon.com

Recommended for You

Amazon.com has new recommendations for you based on [items](#) you purchased or told us you own.



[Wikinomics: How Mass Collaboration Changes Everything](#)



[Word of Mouth Marketing: How Smart Companies Get People Talking](#)



[Made to Stick: Why Some Ideas Survive and Others Die](#)



[Cut to the Chase: and 99 Other Rules to Liberate Yourself and Gain Back the Gift of Time](#)



[Never Cold Call Again!](#)



[The Effective Executive](#)



[7th Heaven](#)



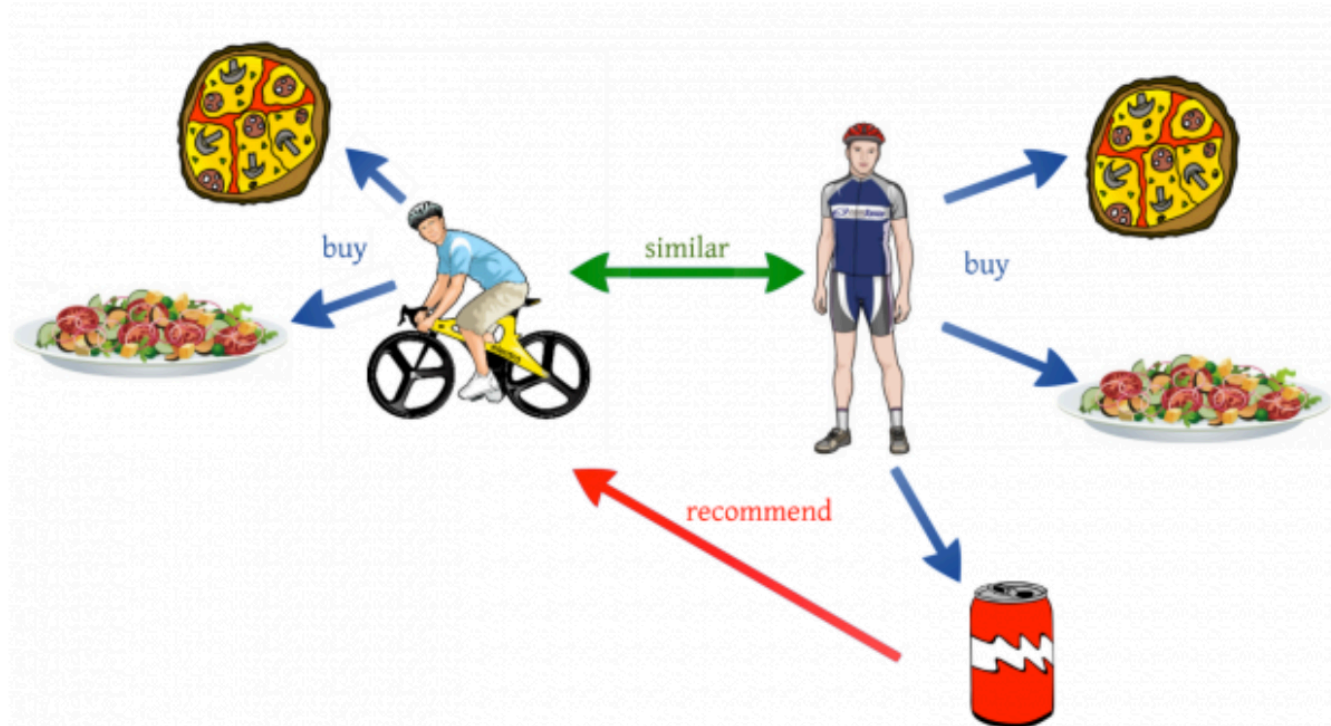
[An Army of Ordinary People](#)

Overview

- “You don’t know what you don’t know”
 - News, music, videos
- Serendipity
 - *Unplanned fortunate discovery*
 - Drive users to return to a platform
 - Social media, online shopping, music
- Filters the entire data set into a subset the user hopefully is interested in

Approach: Collaborative Filtering

- Recommend things liked by other similar people
- Uses explicit (ratings) or implicit (purchase history) data



Example: Amazon Item-to-Item

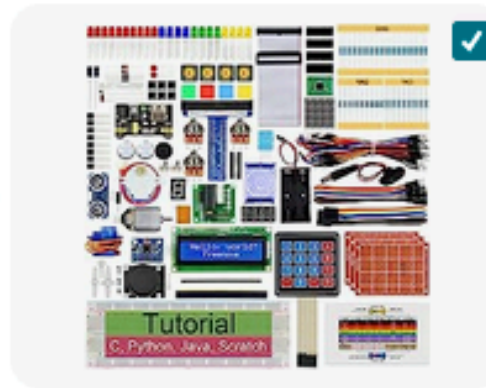
Frequently bought together



This item: CanaKit Raspberry Pi 4 Extreme Kit - 128GB Edition (4GB RAM)

\$169⁹⁹ ✓prime

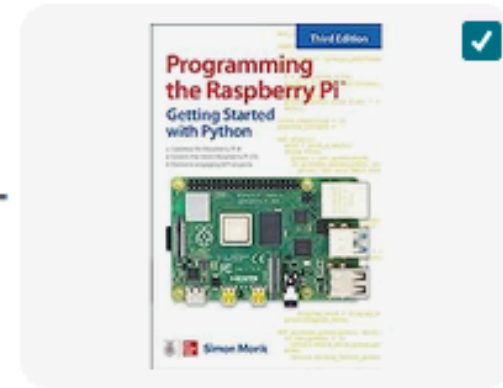
+



FREENOVE Ultimate Starter Kit for Raspberry Pi 4 B 3 B+ 400, 558-Page Detailed Tutorial,...

\$49⁹⁵ ✓prime

+



Programming the Raspberry Pi, Third Edition: Getting Started with Python

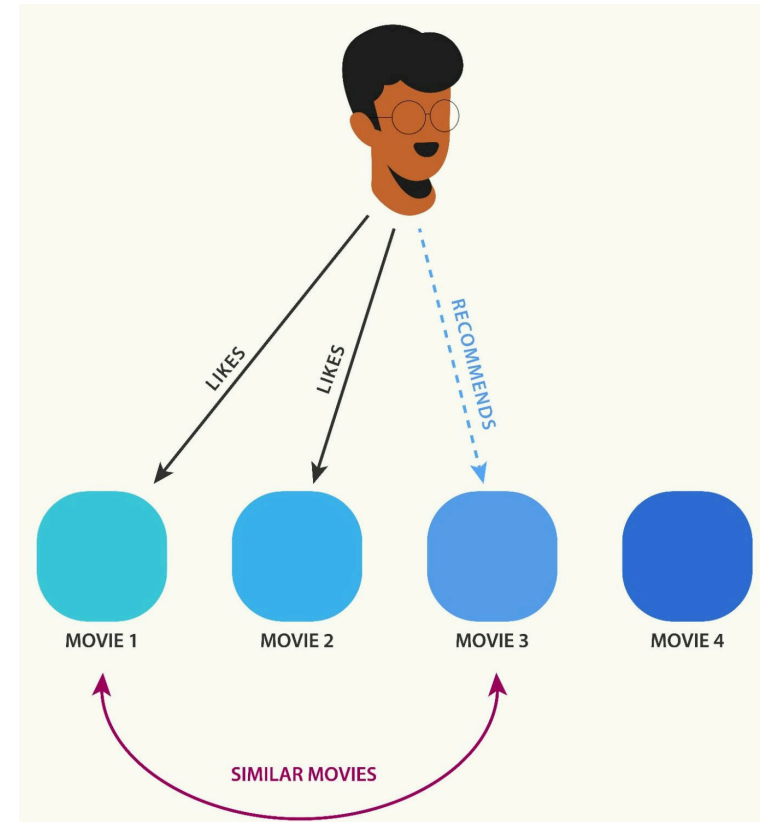
\$15⁰⁰ ✓prime

Problems

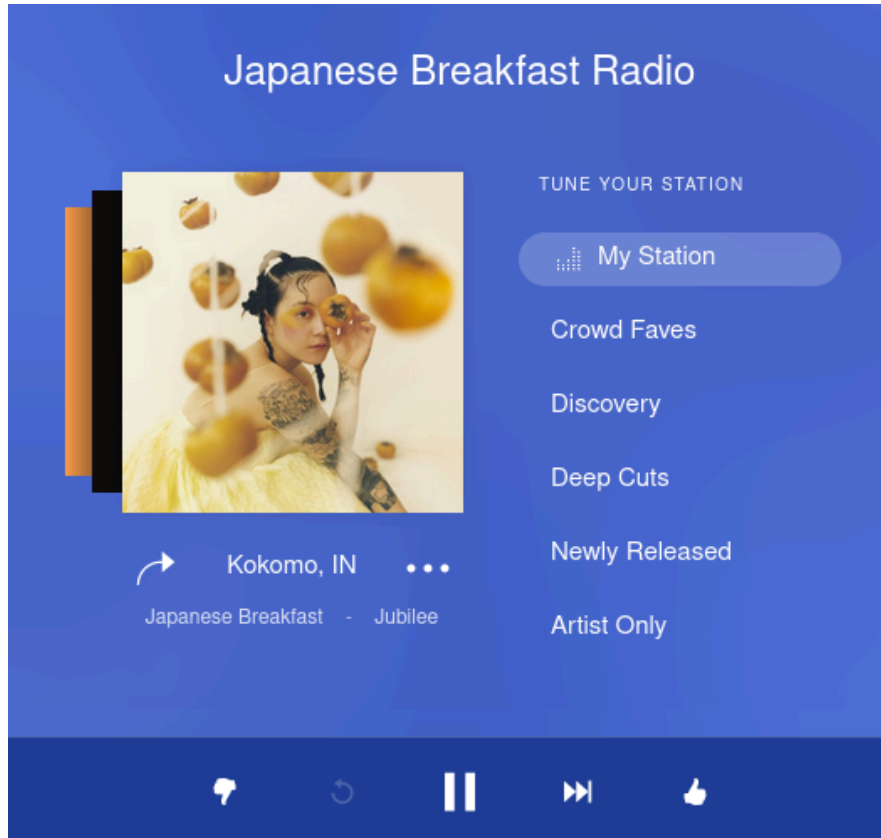
- **Cold Start** — For new people, not enough data to make good recommendations
- **Scalability** — High-dimensional data, with many people it's challenging to find similar people
- **Sparsity** — Doesn't work well if most items have no rating or preference data

Approach: Content-Based Filtering

- Uses attributes of the items and user's preferences
- Tunes the model from results
- Some preferences are weighted as more important than others



Example: Pandora Radio



- Attributes of songs from Music Genome Project
- Likes, dislikes, skips used to model user preferences

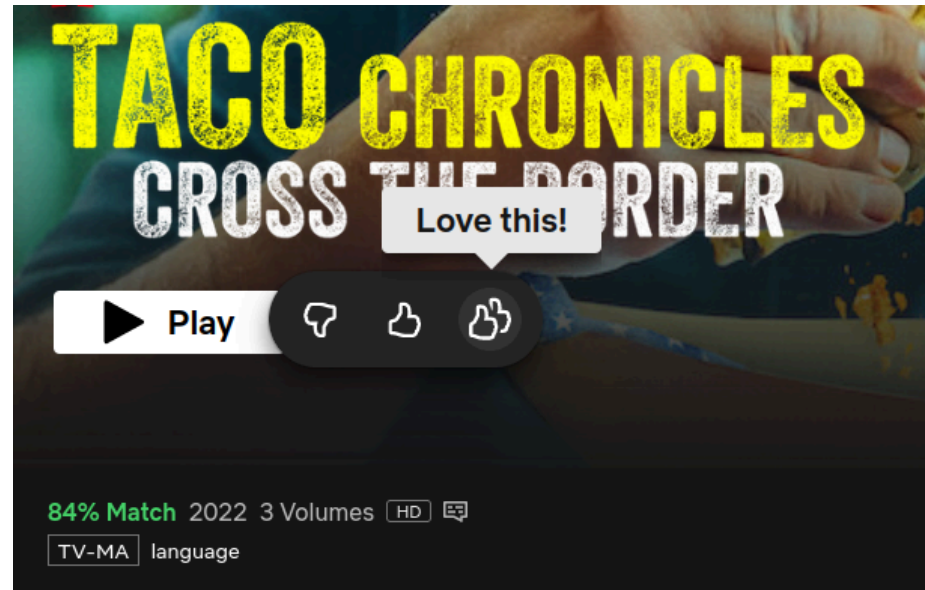
Based on what you've told us so far, we're playing this track because it features prominent use of synth, mellow rock instrumentation, major key tonality, extensive vamping and electronica influences.

Problems

- Doesn't work well across categories
 - Movie preferences don't clearly translate to news
- Can continue to recommend the same kind of thing
 - Variety is desirable for many domains, like music
- Requires accurate and detailed item attributes
 - Amazon sells tens of millions of different products

Hybrid Approaches

Most real-life systems use a combination of collaborative, content-based, and custom filtering.



Example: Netflix

- Collaborative filtering: Recommends based on other people who liked similar shows
- Content-based filtering: Recommends based on genre, categories, actors, release year, etc.
- Custom filtering: Time of day you watch, what device, how long you watch
- Asked to choose titles you like at signup (cold start)
- Recent preferences given more weight

Examples

- What are some examples of recommender systems in your daily life?
- How do these systems use collaborative or content-based filtering?
- Would that product be better or worse without a recommender system?

Group Exercise

- Read the provided article: <https://tinyurl.com/aicase2023>
- Split into groups and discuss:
 - ▶ What harmful outcomes can recommender systems affect on individuals? On society?
 - ▶ What responsibility should organizations that use recommender systems have to mitigate harm?
 - ▶ How can society mitigate the possible harms?
- We'll talk about what each group discussed as a class

Sentiment Analysis

- What is sentiment analysis
- Kinds of inputs and outputs we're looking for
- Example: Brand image/ad campaign effectiveness,
(duolingo?) <https://www.determ.com/blog/5-use-cases-of-real-time-sentiment-analysis-for-brand-building/>
<https://keyhole.co/blog/duolingo-social-media-strategy/>
- Techniques: Bag of words, challenges in grammar
https://en.wikipedia.org/wiki/Sentiment_analysis

Sentiment Analysis

- Exercise: Stump a sentiment analyzer: <https://monkeylearn.com/sentiment-analysis-online/>
- Can you make something that shows as negative when it is really positive?
- Can you make something that shows as positive when it is really negative?
- What happens if you have mixed emotions?