

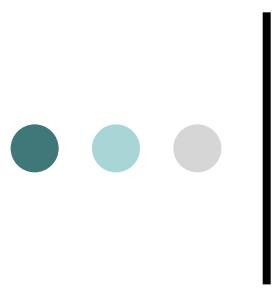


# Recommender Systems & Collective Intelligence

**COMP47580**

**Dr. Michael O'Mahony**

[michael.omahony@ucd.ie](mailto:michael.omahony@ucd.ie)



# Introduction & Module Overview



# Module Organisation

- Lecturers:
  - Lecturer: Dr. Michael O'Mahony
  - TA: Nina Hagemann
- All course material will be available on Moodle (updated weekly):
  - Check the **Announcements** section on Moodle regularly for course updates
  - Course Moodle (<https://csmoodle.ucd.ie/moodle/>):
    - Go to: COMP47580 Recommender Systems & Collective Intelligence - 2018-19
    - Enrolment key: COMP47580-18-19-Sem2
- Please ask questions, provide feedback etc. in class



# Lectures & Labs

## Lectures:

- Wednesdays, 15:00–16:50, Room 135 ENG
- Slides posted on Moodle each week

## Practicals (start Week 3):

- Thursdays, 11:00–12:50, Rooms B002 CSI and B108 CSI
- Assignment discussion, demonstrator support etc.



# Assessment Components

100% continuous assessment throughout the semester.

1. Practical project (40% - starts Week 3, submission Week 7):

- Implementation of recommender systems & running experiments.
- Framework provided. *Proficiency in Java is required.*
- Individual project.

2. In-class test (20% - Week 8/9):

- MCQ exam.

3. Report (40% - handed out Week 8, submission Week 12):

- Analysis and discussion of experimental results from part 1.
- Individual report.



# Assessment Components

- Late submissions policy – when coursework is submitted late the following penalties apply:
  - Coursework submitted at any time up to one week after the due date will have the grade awarded reduced by two grade points (for example, from B- to C) or, for assessment marked as a percentage, the mark reduced by 10 (for example, from 87% to 77%).
  - Coursework submitted more than one week but up to two weeks after the due date will have the grade reduced by four grade points (for example, from B- to D+) or, for assessment marked as a percentage, the mark reduced by 20 (for example, from 87% to 67%).
  - Coursework received more than two weeks after the due date will not be accepted.



# Expectation Setting & Grading

With 100% continuous assessment this module requires a significant level of effort throughout the semester.

Each week involves a mix of lectures, practicals, and project work.

UCD Module Grade Descriptors – see document “Modular Grades Explained” on Moodle

This module uses the recommended School of Computer Science mark-grade mapping scale: <https://www.cs.ucd.ie/Grading/>



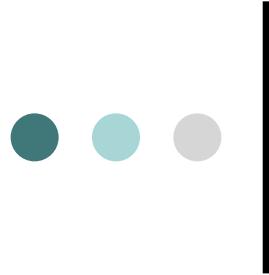
# Plagiarism

- All assessment components are **individual** and not group/team-based.
- Plagiarism is a serious academic issue and the University will examine all alleged instances of plagiarism :
  - It is *really obvious* to us when plagiarism occurs and we actively check for it...
  - Do not copy (any part of) the work (code, reports, etc.) of other students or copy material from online sources, academic papers etc.
  - If you do take a figure or a quote from e.g. a research paper you must cite it – see documents on Moodle.
  - See documents on Moodle.
  - If unsure, please ask!



## Today's Lecture...

- Introduction and overview of the topics that will be covered in the module
- Assessment components – what is involved, prior learning requirements (Java coding skills)

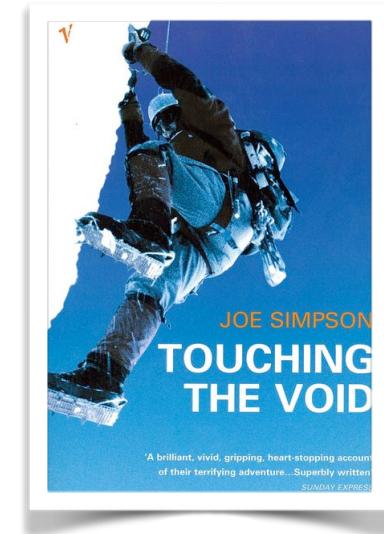


# **Recommender Systems & Collective Intelligence Introduction**



## The Power of Recommendations...

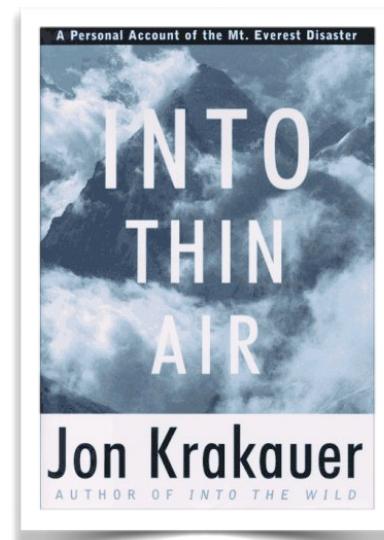
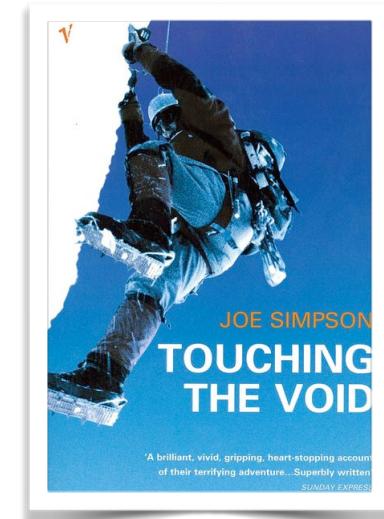
- 1998 – *Touching the Void* by Joe Simpson:
  - A harrowing account of near death in the Peruvian Andes
  - Met with modest success, soon forgotten...





# The Power of Recommendations...

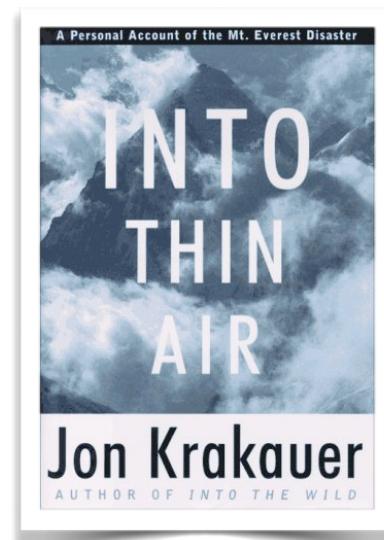
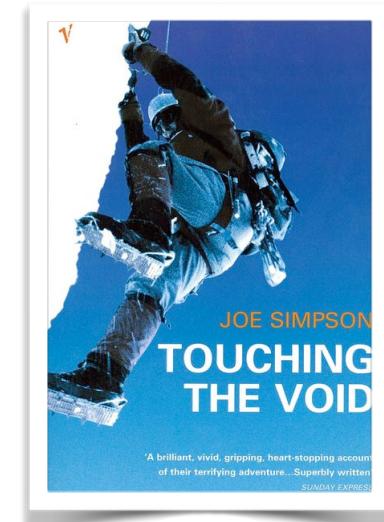
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  - Met with modest success, soon forgotten...
- Fast forward to 2008 – *Into Thin Air* by Jon Krakauer:
  - Another book about a mountain-climbing tragedy
  - A publishing sensation...





# The Power of Recommendations...

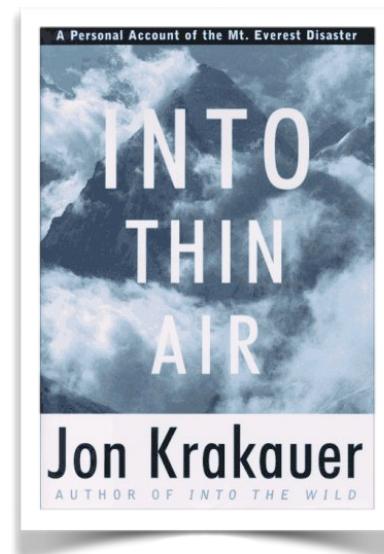
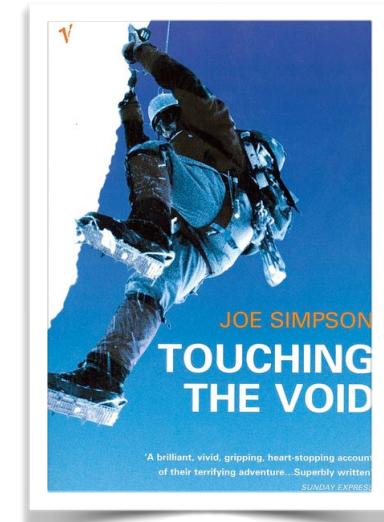
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- Suddenly *Touching the Void* started to sell again!





# The Power of Recommendations...

- 1998 – *Touching the Void* by Joe Simpson:
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  - Met with modest success, soon forgotten...
- Fast forward to 2008 – *Into Thin Air* by Jon Krakauer:
  - Another book about a mountain-climbing tragedy
  - A publishing sensation...
- Suddenly *Touching the Void* started to sell again!
  - Why? Amazon!
  - Amazon noticed patterns in buying behaviour, suggested *Touching the Void* to consumers who liked *Into Thin Air*
  - People liked the recommendation and wrote positive reviews...
  - More recommendations, more sales, positive feedback loop...
  - *Touching the Void* would have disappeared if not for Amazon...
  - Now *Touching the Void* outsells *Into Thin Air* by 2 to 1!





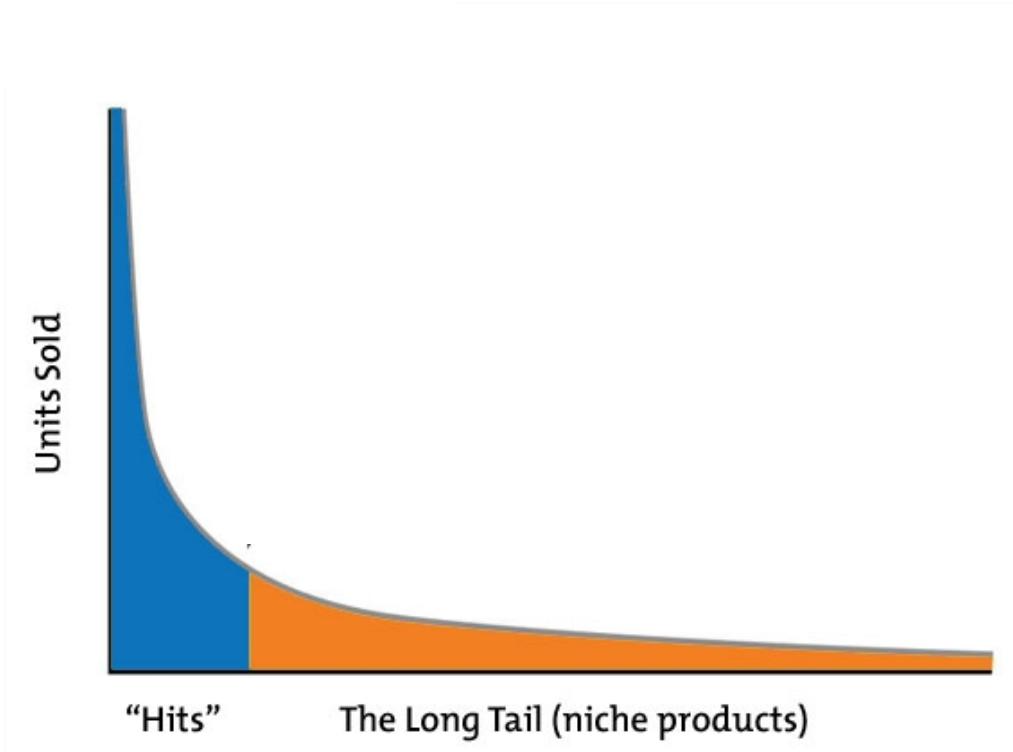
# The Long Tail

- Traditional high street stores:
  - Limited by available shelf space – need to generate a return from all stocked items
  - Stock popular items (best-sellers, blockbuster movies etc.)
  - Limited choice for consumers
- Online stores:
  - Can carry much more inventory – both *hits* and *misses* (niche products) – than high street stores
  - Not limited by space considerations and benefit from more efficient distribution channels (e.g. streaming)
  - A miss sold is just another sale, with (potentially) similar margins as a hit
  - Much more choice available to consumers



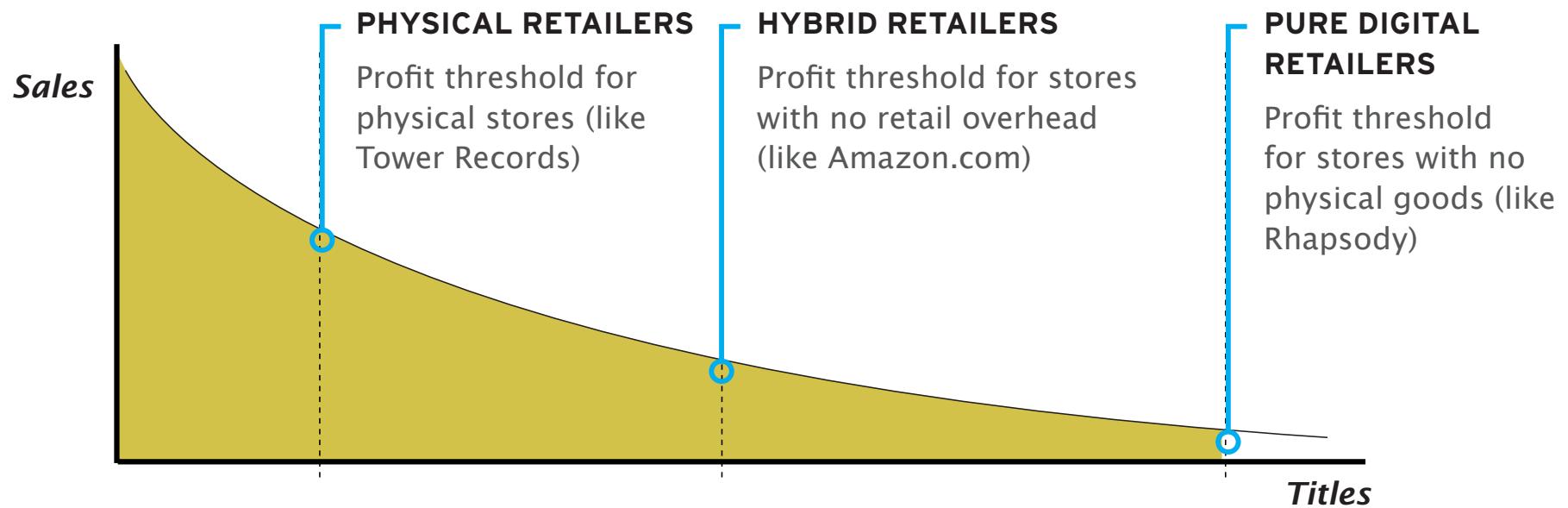
## The Long Tail

- Popularity no longer has a monopoly on profitability:
  - Selling less or more (misses) vs more of less (hits)
  - Chris Anderson - see reading on Moodle





# Bit Player Advantage





## Blockbuster - A (Brief) History...

- 1985 – first Blockbuster store opens in Dallas, Texas...
- At peak (circa 2004), Blockbuster employed about 60,000 people in over 9,000 stores...
- In 2000, the company declined an opportunity to purchase a new-ish company called Netflix for a modest \$50 million...
- Fast forward to 2010... due to competition from Netflix et al., Blockbuster lost significant revenue... filed for bankruptcy...





# Recommender Systems

- Recommender systems help to drive demand down the long-tail; benefits to both consumers and retailers alike
- Consumers:
  - Many more products from which to choose – information overload
  - Recommender systems enable *findability* – assist consumers to find niche products that match their personal tastes
- Retailers:
  - Turning browsers into buyers, promoting cross-selling, customer loyalty
  - Increased sales
- Recommender systems now in widespread use...



## Netflix Prize

- Open Recommender Systems Competition
  - Netflix movie ratings data
  - Reduce recommendation error by > 10%
- Datasets
  - Training Data – 100m ratings, 500k users, 18k movies.
  - Test Data – 2.8m ratings
- Prizes
  - Annual progress prizes of \$50k
  - Overall competition prize of \$1M
- Winner – BellKor's Pragmatic Chaos
  - 10.10% error reduction





# Recommender Systems

- Personalised vs. non-personalised
- Recommendation Approaches:
  - Collaborative, content-based, social, context-aware, demographic, hybrid, group RS, conversational RS...
- Recommendation Knowledge:
  - User profiles (implicit/explicit preferences)
  - Product metadata (e.g. specs)
  - UGC – consumer reviews, tweets, FB posts/likes...
- Recommendation Output:
  - Ranked product/item suggestions
  - Predictions for products
  - Explanations



Let's look at some  
recommendations on Amazon...



# Amazon Example...

## Recommender Systems: An Introduction 1st Edition

by Dietmar Jannach (Author), Markus Zanker (Author), Alexander Felfernig ▾ (Author), Gerhard Friedrich ▾ (Author)

★★★★★ 8 customer reviews

[Look inside](#) ↴



### Recommender Systems An Introduction

DETMAR JANACH  
MARKUS ZANKER  
ALEXANDER FELFERNIG  
GERHARD FRIEDRICH

CAMBRIDGE

ISBN-13: 978-0521493369

ISBN-10: 0521493366

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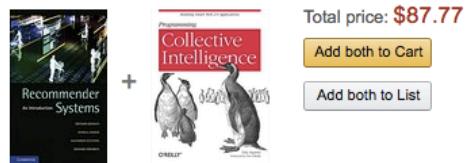
amazonstudent

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FOR COLLEGE STUDENTS** [Learn more](#)



# Amazon Example...

## Frequently Bought Together



- This item: Recommender Systems: An Introduction by Dietmar Jannach Hardcover \$63.64
- Programming Collective Intelligence: Building Smart Web 2.0 Applications by Toby Segaran Paperback \$24.13

## Customers Who Bought This Item Also Bought

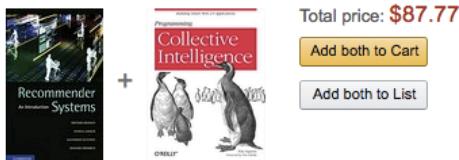
Page 1 of 15

 Programming Collective Intelligence: Building Smart Web 2.0 Applications Toby Segaran ★★★★★ 118 Paperback \$24.13 ✓Prime	 Recommender Systems Handbook Francesco Ricci ★★★★★ 1 Hardcover	 Advanced Analytics with Spark: Patterns for Learning from Data at Scale Sandy Ryza ★★★★★ 15 #1 Best Seller in Website Analytics Paperback \$23.81 ✓Prime	 Algorithms of the Intelligent Web Haralambos Marmanis ★★★★★ 18 Paperback \$29.03 ✓Prime	 Learning Spark: Lightning-Fast Big Data Analysis Holden Karau ★★★★★ 40 Paperback \$29.01 ✓Prime	 Building a Recommendation System with R Suresh K. Gorakala ★★★★★ 5 Paperback \$29.99 ✓Prime	 Data Science for Business: What you need to know about data mining and... Foster Provost ★★★★★ 125 Paperback \$30.39 ✓Prime
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- Programming Collective Intelligence: Building Smart Web 2.0 Applications by Toby Segaran Paperback \$24.13

*Non-personalised recommendations*

## Customers Who Bought This Item Also Bought

Programming Collective Intelligence: Building Smart Web 2.0 Applications by Toby Segaran (Paperback, \$24.13 Prime)

Recommender Systems Handbook by Francesco Ricci (Hardcover, \$23.81 Prime)

Advanced Analytics with Spark: Patterns for Learning from Data at Scale by Sandy Ryza (Paperback, #1 Best Seller in Website Analytics, \$23.81 Prime)

Algorithms of the Intelligent Web by Haralambos Marmanis (Paperback, \$29.03 Prime)

Learning Spark: Lightning-Fast Big Data Analysis by Holden Karau (Paperback, \$29.01 Prime)

Building a Recommendation System with R by Suresh K. Gorakala (Paperback, \$29.99 Prime)

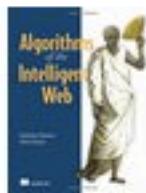
Data Science for Business: What you need to know about data mining and... by Foster Provost (Paperback, \$30.39 Prime)

Page 1 of 15



# Amazon Example...

## What Other Items Do Customers Buy After Viewing This Item?



[Algorithms of the Intelligent Web](#) Paperback

Haralambos Marmanis

 18

\$29.03 



[Programming Collective Intelligence: Building Smart Web 2.0 Applications](#) Paperback

Toby Segaran

 118

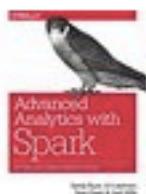
\$24.13 



[Recommender Systems Handbook](#) Hardcover

Francesco Ricci

 1



[Advanced Analytics with Spark: Patterns for Learning from Data at Scale](#) Paperback

Sandy Ryza

 15

\$23.81 

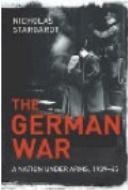


# Amazon Example...

Your Recently Viewed Items and Featured Recommendations

Inspired by your browsing history

Page 2 of 9 | Start over



[The German War: A Nation Under Arms, 1939-45](#)  
Nicholas Stargardt  
 30  
Kindle Edition £12.34

[The Silent Deep: The Royal Navy Submarine...](#)  
James Jinks  
 68  
Kindle Edition £12.34

[Silo 49: Dark Till Dawn](#)  
Ann Christy  
 29  
Kindle Edition £1.99

[SPQR: A history of Ancient Rome](#)  
Mary Beard  
 120  
Kindle Edition £8.99

[The Great Swindle](#)  
Pierre Lemaître  
 29  
Kindle Edition £5.99

[Silo 49: Deep Dark](#)  
Ann Christy  
 31  
Kindle Edition £1.99



# Amazon Example...

*Personalised  
recommendations*

Your Recently Viewed Items and Featured Recommendations

Inspired by your browsing history

Page 2 of 9 | Start over

<>

The German War: A Nation Under Arms, 1939-45  
Nicholas Stargardt  
★★★★★ 30  
Kindle Edition £12.34

The Silent Deep: The Royal Navy Submarine...  
James Jinks  
★★★★★ 68  
Kindle Edition £12.34

Silo 49: Dark Till Dawn  
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★★★★★ 29  
Kindle Edition £1.99

SPQR: A history of Ancient Rome  
Mary Beard  
★★★★★ 120  
Kindle Edition £8.99

The Great Swindle  
Pierre Lemaitre  
★★★★★ 29  
Kindle Edition £5.99

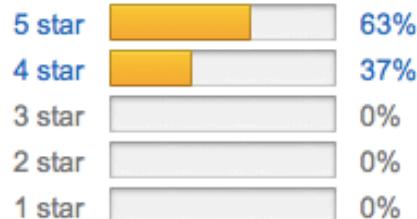
Silo 49: Deep Dark  
Ann Christy  
★★★★★ 31  
Kindle Edition £1.99

## Customer Reviews



8

4.6 out of 5 stars



Share your thoughts with other customers

[Write a customer review](#)[See all 8 customer reviews](#)

### Most Helpful Customer Reviews

11 of 12 people found the following review helpful

**The Best Introductory Book about Recommendations**

By H. Lee on March 13, 2011

Format: Hardcover | **Verified Purchase**

I am referring to this book for my lectures and this book is fascinating.

First of all, this book is really well-written. The authors explained recommendation technology concepts in an easy-to-follow way. At the same time, they didn't miss the most up-to-date research topics.

Second, all the writers are world's leading researchers of recommendations.

Therefore, they are good to lead readers to more focal points. I like the bibliographic notes at the end of each chapter.

Lastly, by introducing toy examples in every chapter, readers are able to easily comprehend each technology. Actually, this part is my favorite. I think this book is between a reference book of recommendation-related rationales and practical programming books like Manning series or O'Reilly's.

I already made my mind to choose this book as a textbook of my course in the next semester.

[Comment](#)

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Save on Country music, too!

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Tell us what you like and we'll make several recommendations. Great for buying gifts or broadening your musical horizons.

To start, enter the names of up to three artists below and click on the **Recommend** button.

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enya  
Recommend

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Introduction to Recommender Systems Artist search Search Classical

Done Internet

# movielens

Non-commercial, personalized movie recommendations.

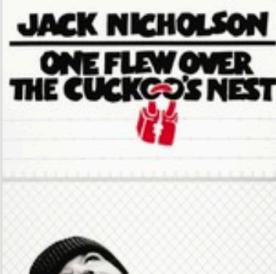
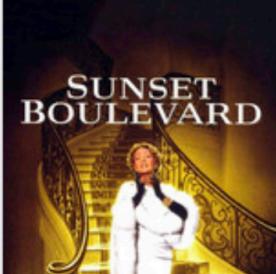
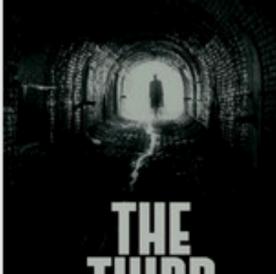
## recommendations

MovieLens helps you find movies you will like. Rate movies to build a custom taste profile, then MovieLens recommends other movies for you to watch.

## top picks

[see more](#)

based on your ratings, MovieLens recommends these movies

<b>Band of Brothers</b> 2001 R 705 min 	<b>Casablanca</b> 1942 PG 102 min 	<b>One Flew Over the Cuckoo's Nest</b> 1975 R 133 min 	<b>The Lives of Others</b> 2006 R 137 min 	<b>Sunset Boulevard</b> 1950 NR 110 min 	<b>The Third Man</b> 1949 NR 104 min 	<b>Pathetic</b> 1957 
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≡ ★★★★★ ★★★★★ ★★★★★ ★★★★★ ★★★★★

# When Recommendations Go Wrong!!

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Home > News > News - Digital Media

December 6, 2002 5:38 PM PST

## Amazon blushes over sex link gaffe

By Stefanie Olsen  
Staff Writer, CNET News

[Post a comment](#)

In a incident that highlights the pitfalls of online recommendation systems, Amazon.com on Friday removed a link to a sex manual that appeared next to a listing for a spiritual guide by well-known Christian televangelist Pat Robertson.

The two titles were temporarily linked as a result of technology that tracks and displays lists of merchandise perused and purchased by Amazon visitors. Such promotions appear below the main description for products under the title, "Customers who shopped for this item also shopped for these items."

Amazon's automated results for Robertson's "Six Steps to Spiritual Revival" included a second title by Robertson as well as a book about anal sex for men.

"It seemed to us that this is a rather curious juxtaposition of the two titles," said Amazon spokeswoman Patty Smith, explaining the company's decision to remove the link.

"Amazon conducted an investigation and determined these results were not that of hundreds of customers going to the same items while they were shopping on the site," Smith said.

Amazon removed the link to the sex manual earlier Friday after being notified of the listing. A section that shows direct suggestions by other customers still contained links to the book as of late Friday.

The linking casts a spotlight on potential pitfalls of technology that flags online shopping behavior for promotional purposes.

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REVIEWS AND PREVIEWS

REVIEW AND PREVIEWS

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---

Moving to IPv6: Now for the hard part (FAQ)

Google wants to fight smartphone battle on Web

Hotmail launches accounts you can throw away

Netflix rises as studios' DVD money plunges

cnet Recently Viewed Products My Lists My software updates Follow CNET on Twitter CNET on Facebook Like 132K log in | join CNET



# When Recommendations Go Wrong!!

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The New York Times

Technology

Search All NYTimes.com

Go

[COLLECTIONS](#) > [BOOK REVIEWS](#)

ADS BY GOOGLE

**ALL  
YOU  
CAN EAT**  
in Dublin  
  
**Here**  
  
from

## Amazon Glitch Unmasks War Of Reviewers

By AMY HARMON  
Published: February 14, 2004

Close observers of Amazon.com noticed something peculiar this week: the company's Canadian site had suddenly revealed the identities of thousands of people who had anonymously posted book reviews on the United States site under signatures like "a reader from New York."

The weeklong glitch, which Amazon fixed after outed reviewers complained, provided a rare glimpse at how writers and readers are wielding the online reviews as a tool to promote or pan a book -- when they think no one is watching.

John Rechy, author of the best-selling 1963 novel "City of Night" and winner of the PEN-USA West lifetime achievement award, is one of several prominent authors who have apparently pseudonymously written themselves five-star reviews, Amazon's highest rating. Mr. Rechy, who laughed about it when approached, sees it as a means to survival when online stars mean sales.

"That anybody is allowed to come in and anonymously trash a book to me is absurd," said Mr. Rechy, who, having been caught, freely admitted to praising his new book, "The Life and Adventures of Lyle Clemens," on Amazon under the signature "a reader from Chicago." "How to strike back? Just go in and rebut every single one of them."

ADS BY GOOGLE

 SIGN IN TO E-MAIL  
 PRINT  
 SINGLE-PAGE

127  
HOURS



## Some Considerations...

- Domain
- Purpose
- Recommendation Context
- Recommendation Knowledge
- Recommendation Output
- Performance
- Privacy and Trustworthiness
- Interfaces



# Recommendation Algorithms



# Collaborative Filtering (CF)

- CF – automates the “word-of-mouth” process
- Assists users to make choices based on the preferences of other users
- Preferences – explicit (e.g. 5 star rating scale) vs. implicit (e.g web pages visited, songs listened to)...
- The underlying heuristic: people who agreed or disagreed on items in the past are likely to agree or disagree on future items
- Recommendations are made for users by e.g. combining the preferences of similar users in the system
- CF algorithms – user-based, item-based, matrix factorisation...
- Widely-used approach



# Automated Collaborative Filtering (ACF)

- Let's look at a typical problem...
- Suppose we had the following preference data...

	The Quiet Man	Casino	Star Wars	Top Gun	Dallas: The Movie
Eamon	3		3	4	2
Sharon	4	1	4	2	4
John	5	2		2	5
Trisha	2	5	3		1
Mike	?	2	4	1	5

- Q – based on this preference data, would user *Mike* like or dislike *The Quiet Man*?



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Trisha	2	5	3		1
Mike	?	2	4	1	5

- Q – based on this preference data, would user *Mike* like or dislike *The Quiet Man*?



# Content-based Recommendation

- Items are recommended which are similar in content (e.g. terms in a document, metadata, catalogue features) to previously selected items
- A *more like this* approach to recommendation
- Distinguish between traditional content-based (unstructured) and case-based (structured) approaches...



# Content-based Recommendation

Typical scenario – recommending documents, e.g. news articles...

**Independent.ie** 



**Miss Panti: RTE pay out €85,000 in 'homophobe' row**  
Six people received compensation from the company following accusation



**Ronan O'Gara and wife Jessica expecting another child**  
The Irish rugby great is to be father once again



**Garda probe into crush that hurt girl at Copper Face Jacks**  
Up to 1,500 young people descended on club



**FG's 'dirty dozen' gang up on Hogan at party meeting**  
Phil Hogan was confronted by angry backbenchers over Irish Water



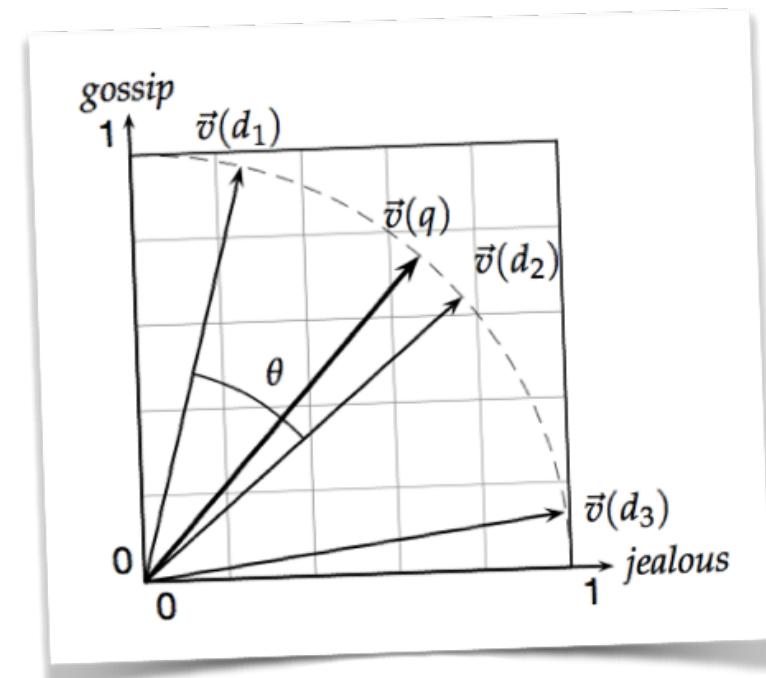
**'I just felt that I wasn't asking too much of him'**  
Kimmage resigned as writer of Brian O'Driscoll's autobiography



**Gardai launch investigation after skull found on beach**  
Garda investigation after skull was found washed up on a beach in Galway.

# Content-based Recomendation

- Content-based recommendation:
  - Recommending news articles, web pages etc.
  - Use techniques from Information Retrieval (IR) – items (i.e. documents) represented as term-vectors in a multi-dimensional vector-space (unstructured representation).
  - Document-document similarity given by the cosine of the angle between their vectors.
  - Generating recommendations – rank recommendation candidates by similarity to items previously purchased/visited/watched etc. by the target user



$$\text{sim}(d_1, d_2) = \frac{\vec{V}(d_1) \cdot \vec{V}(d_2)}{|\vec{V}(d_1)| |\vec{V}(d_2)|}$$



# Case-based Recomendation

- Case-based recommendation:
  - A form of content-based recommendation
  - Represent items using a well-defined set of features & feature values (structured representation)
  - Use techniques from Case-based Reasoning (CBR):
    - Feature-based representation – numeric and non-numeric features
    - Facilitates more sophisticated similarity assessments
  - Generating recommendations (as before) – rank recommendation candidates by similarity to items previously purchased/visited/watched etc. by the target user



## Epson Expression Home XP-235 All-in-One Inkjet Printer

£44.00 & FREE Delivery in the UK. [Details](#) | In stock. Dispatched from and sold by Amazon. Gift-wrap available.



Epson Expression Home XP-235  
All-in-One Inkjet Printer



Epson Home XP-335 Expression  
All-in-One Inkjet Printer

Customer Rating	(74)	(89)
Price	£44.00	£44.99
Delivery	FREE Delivery	FREE Delivery
Sold by	<a href="#">Amazon.co.uk</a>	<a href="#">Amazon.co.uk</a>
Connectivity Technology	WiFi	USB 2.0, Wireless LAN
Resolution	1200 Dots Per Inch	1200 Dots Per Inch
Ink Colour	Multicoloured	Multicoloured
Dimensions	14.5 cm x 30 cm x 39 cm	14.5 cm x 39 cm x 30 cm
Item Weight	Information not provided	4.2 kg
Maximum Printspeed Black White	26 ppm	33 ppm
Model Year	Information not provided	2015
Scanner Type	Flatbed	Flatbed

Add to Basket

Add to Basket



# Sources of Recommendation Knowledge

- Transactional & Behavioural Data
  - Clicks, purchases, likes, rating, actions (save to wish-list)
- Content & Meta Data
  - Features and tags, structured and unstructured
- Experiential Data
  - User-generated opinions. Based on real subjective experiences vs. objective catalog metadata
  - Examples: consumer reviews, blog posts, tweets, FB posts/likes etc.
  - This content is plentiful but is typically unstructured and noisy
  - Can it be leveraged for recommendation?
  - What advantages might it have?



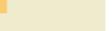
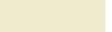
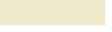
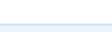
# Consumer Reviews

- Reviews are ubiquitous and abundant:
  - Most large sites now host millions of user-generated reviews.
- Reviews are independent (usually) and (often) insightful:
  - Real user reviews help us to understand the reality of a product or service, its pros and cons, rather than simply highlighting the manufacturer's marketing promises.
- Reviews help us to make better decisions:
  - Reviews matter. Research shows that reviews help users to make better decisions. They increase conversion rates and improve satisfaction.

*Sites like Amazon harness the reviews and opinions of millions of users to take full advantage of the appetite for opinions among shoppers*

**Harry Potter and the Deathly Hallows (Book 7)**

4,235 Reviews      Average Customer Review  (4,235 customer reviews)

5 star:		(3,366)
4 star:		(482)
3 star:		(207)
2 star:		(79)
1 star:		(101)

Share your thoughts with other customers      [Create your own review](#)

Search Customer Reviews    
 Only search this product's reviews

**The most helpful favorable review**

870 of 961 people found the following review helpful

 **A stunning and thoroughly satisfying conclusion**  
This is arguably the most "hyped" book in history, and if J.K. Rowling had to sneak down to the kitchen for a glass of red wine to calm her nerves while writing The Goblet of Fire (as she said she did), one wonders what assuaged her while writing Harry Potter and the Deathly Hallows. The collective breath of tens of millions of readers has been held for two years...and...  
[Read the full review >](#)

Published on July 21, 2007 by Jonathan Appleseed

› See more [5 star, 4 star](#) reviews

**The most helpful critical review**

429 of 534 people found the following review helpful

 **Harry Potter and the Deus ex Machina**  
I know many people won't like this review, so I prepare myself at the outset for a barrage of unhelpful votes. I am not planning any major spoilers, but be warned: this review is mainly meant for the consumption of people who've read the book. After all, how many people out there are really planning to base their decision to read this on the opinion of a few internet...  
[Read the full review >](#)

Published on July 21, 2007 by kaduzy

› See more [3 star, 2 star, 1 star](#) reviews

Vs.



# Opinion Mining

**Customer Reviews**  
**Apple MacBook Air MD231LL/A 13.3-Inch Laptop (NEWEST VERSION)**

310 Reviews

5 star:	(228)
4 star:	(39)
3 star:	(12)
2 star:	(13)
1 star:	(18)

Average Customer Review  
★★★★★ (310 customer reviews)

Share your thoughts with other customers  
Create your own review

See most helpful viewpoints

< Previous | 1 2 3 ... 31 | Next >

8 of 9 people found the following review helpful

★★★★★ New to Mac, January 15, 2013

By William Cannon (Lake Charles, LA USA) - [See all my reviews](#)

Amazon Verified Purchase ([What's this?](#))

This review is from: Apple MacBook Air MD231LL/A 13.3-Inch Laptop (NEWEST VERSION) (Personal Computers)

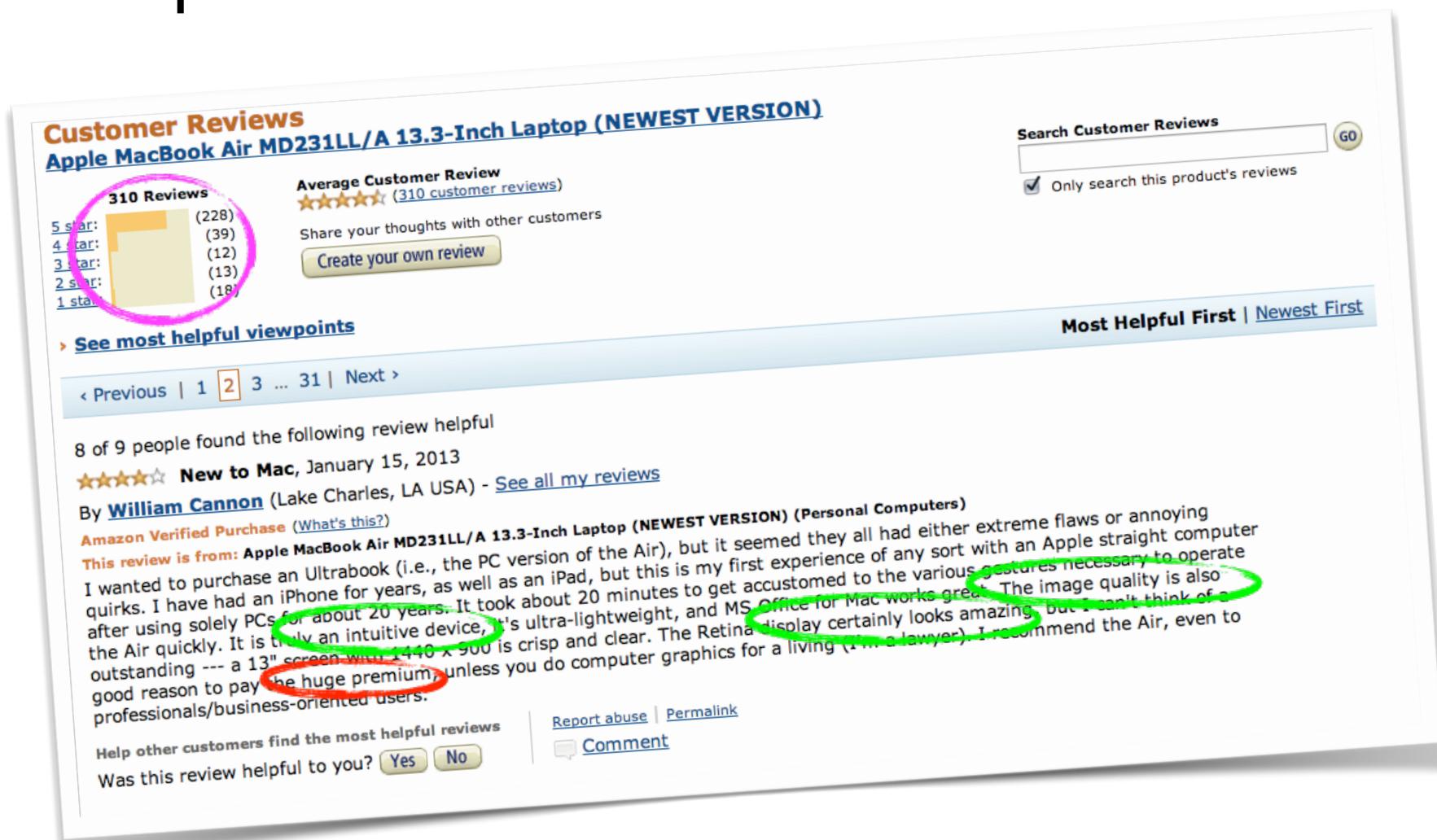
I wanted to purchase an Ultrabook (i.e., the PC version of the Air), but it seemed they all had either extreme flaws or annoying quirks. I have had an iPhone for years, as well as an iPad, but this is my first experience of any sort with an Apple straight computer after using solely PCs for about 20 years. It took about 20 minutes to get accustomed to the various gestures necessary to operate the Air quickly. It is truly an intuitive device. It's ultra-lightweight, and MS Office for Mac works great. The image quality is also outstanding --- a 13" screen with 1440 x 900 is crisp and clear. The Retina display certainly looks amazing, but I can't think of a good reason to pay the huge premium unless you do computer graphics for a living (I'm a lawyer). I recommend the Air, even to professionals/business-oriented users.

Help other customers find the most helpful reviews  
Was this review helpful to you?

Report abuse | Permalink  
Comment

Search Customer Reviews  
Only search this product's reviews  GO

Most Helpful First | Newest First





# Opinion Mining

1,406 of 1,427 people found the following review helpful

★★★★★ **A great little DSLR worth your consideration.**, May 25, 2011

By [S. Vogt](#)

Amazon Verified Purchase ([What's this?](#))

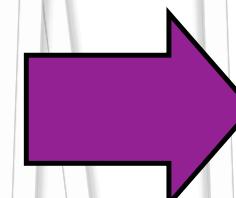
This review is from: Canon EOS Rebel T3 12.2 MP CMOS Digital SLR with 18-55mm IS II Lens and EOS HD Movie Mode (Black) (Camera)

Updated 2/24/13

Even though this camera is two years old now, it still is a wonderful, simple DSLR to use which gets the most important thing right and remains an excellent value for the money.

The camera has a glossy plastic finish which doesn't exactly exude quality or make it feel like a high-end camera. But construction on this camera is very tight. The plastic is light-weight but its not flimsy like you would expect. There is no rubberized handgrip, which I think was a mistake to omit this on this camera. Especially since its predecessor (and its competitors) have them. Outside of that, the hand grip is a very nice size. The one upshot to the lightweight plastic is that the camera feel very light with the kit lens attached.

to the camera with the kit lens attached



DSLR:	++
Value:	++
Build Quality:	-
Weight:	+
Grip:	+
Image Quality:	+
Resolution:	-
Price:	+
Battery Life:	---

## Compare to ‘catalog’ features ...

Canon EOS Rebel T3 12.2 MP CMOS Digital SLR with 18-55mm IS II Lens and EOS HD Movie Mode (Black)  
by [Canon](#)

(514 customer reviews)

List Price: \$499.00  
Price: To see product details, add this item to your cart. You can always remove it later.  
**FREE Shipping.** [Details](#)  
[Special Offers Available](#)

**In Stock.**  
Ships from and sold by [Amazon.com](#). Gift-wrap available.

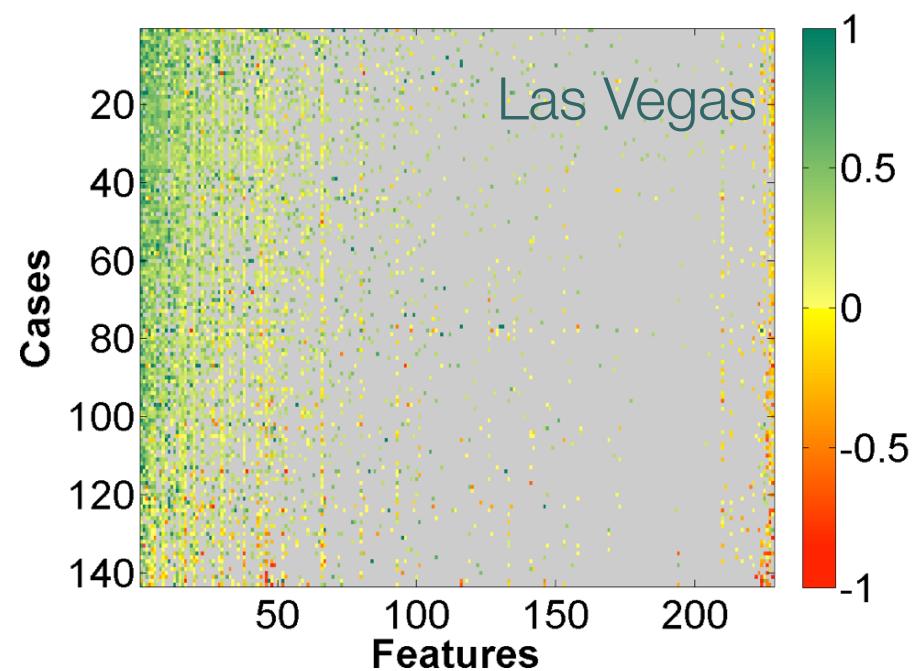
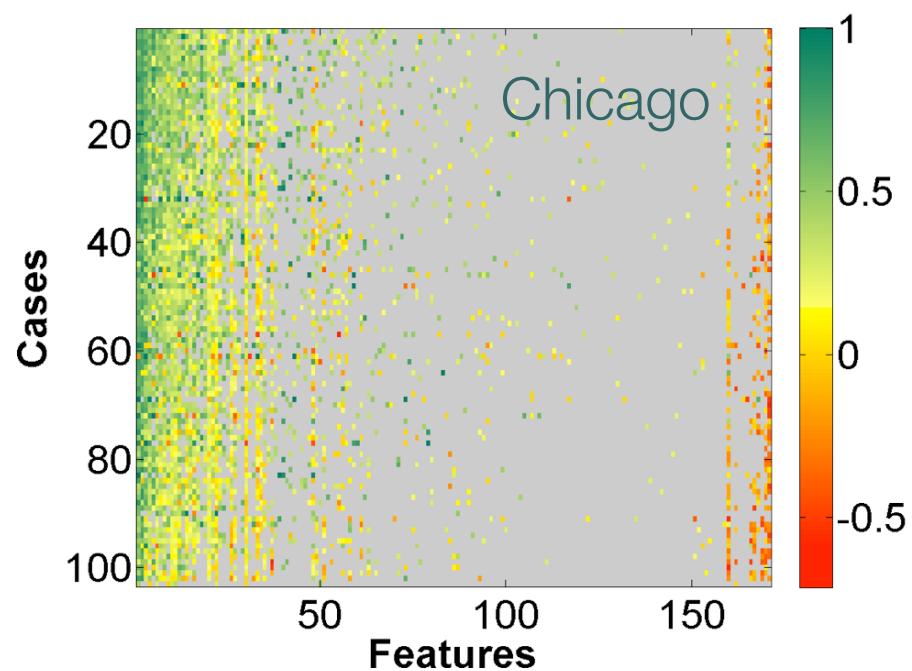
- 12.2 MP CMOS sensor and DIGIC 4 Image Processor for high image quality and speed.
- ISO 100 - 6400 for shooting from bright to dim light.
- Improved EOS HD Movie mode with expanded recording and with in-camera video editing options.
- High speed, reliable 9-point AF system utilizing a high precision, f/5.6 cross-type center point.
- Enhanced metering with a 63-zone, Dual-layer metering system for accurate metering between exposures.

[40 new](#) [70 used](#) from \$355.00  
[23 refurbished](#) from \$349.99

...technical, sparse, non-experiential



# Hotel Sentiment Heatmaps





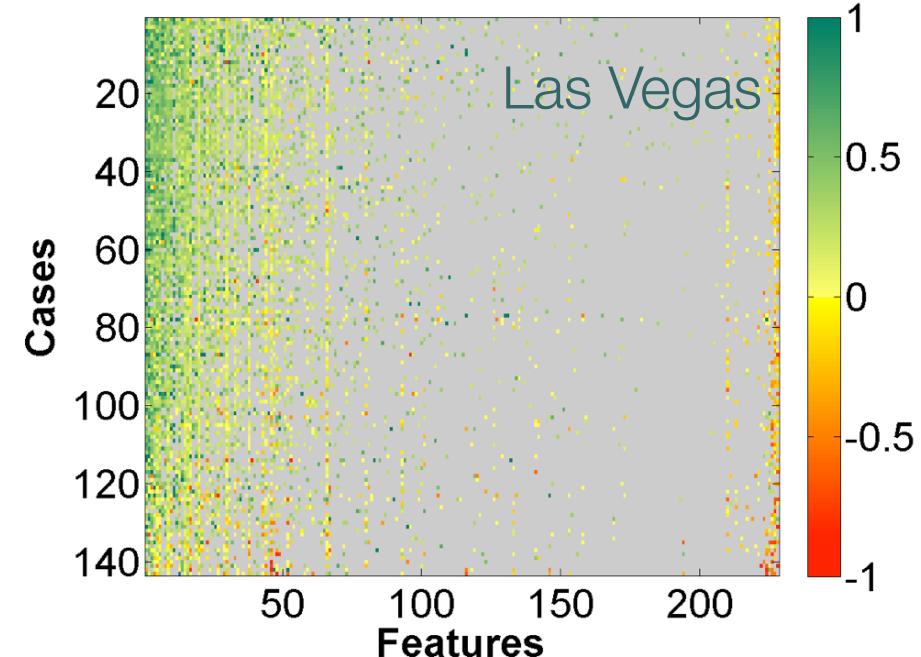
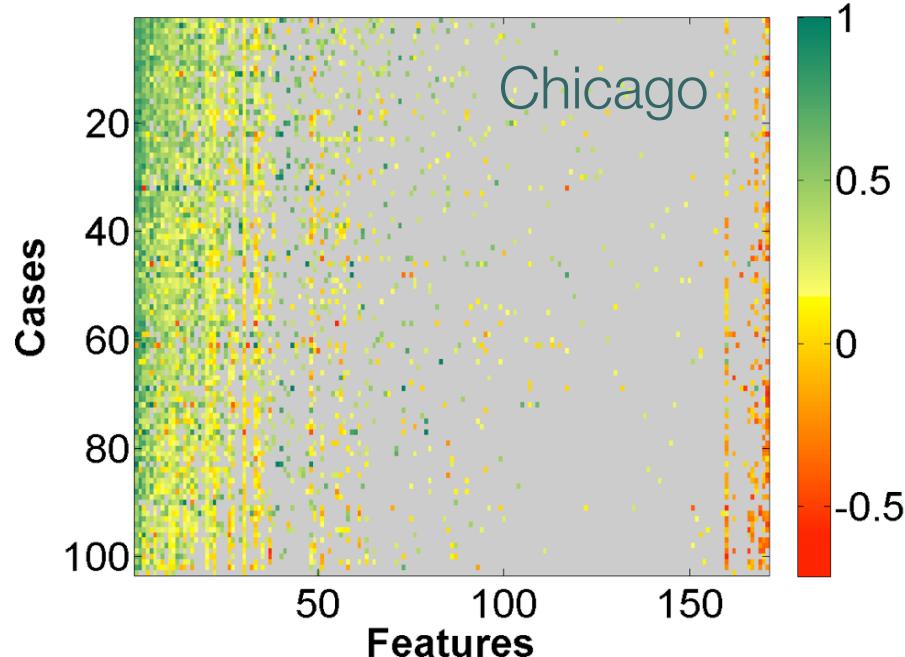
# Hotel Sentiment Heatmaps

+ 'ves  
staff  
*location*  
bed  
service  
breakfast

- 'ves  
*noise*  
*elevators*  
*carpet*  
*health club*  
*public transport*

+ 'ves  
staff  
*location*  
price  
view  
service

- 'ves  
*noise*  
*carpet*  
*hallways*  
*construction*  
*air conditioner*





# Experiential Data

- How can such experiential data be used?
  - Recommend similar but better products to users – e.g. suggest cameras with similar specifications to what the user previously viewed but with e.g. better build quality and battery life
  - Provide personalised *explanations* for recommendations – e.g. previously you selected 3 star hotels which are centrally located, clean, with excellent Wi-Fi and friendly staff – here are some 3 star hotels which match your preferences
  - Create faceted case descriptions to capture different user contexts (e.g. professional vs amateur photographers, families vs business travelers)
  - Combining review and catalog features with other types of data (e.g. reviews from friends, reputation/influence etc.)



# Conversational Recommendation

- Previous approaches – examples of single-shot models (a la Google)
- Limited to single interaction between user and recommender system
- What happens if the user is not satisfied?



# Conversational Recommendation

- Engage users in extended dialogue
- Have multiple interactions (recommendation cycles) with users
- Small number of recommendations displayed during each cycle (in some instances, just one):
  - System elicits user preferences (different approaches) on displayed items
  - Leverage feedback to inform recommendations made in subsequent cycle
- Help users to more effectively navigate complex product spaces
- Think online “sales assistant”



# QWIKSHOP Application

**QWIKSHOP.COM**

HOME : ABOUT THIS PROJECT : CONTACT

Digital Cameras

Shop for: Digital Cameras, Holidays, PCs



Item Found: CASE2

Specifications

6.3 Megapixel CMOS sensor  
7-point wide-area AF  
High-performance DIGIC processor  
100-1600 ISO speed range  
Compatible with all Canon EF lenses and EX Speedlites  
PictBridge, Canon Direct Print and Bubble Jet Direct compatible - no PC required

Adjust your preferences in real time and let us find the right product for you!

Manufacturer	<input checked="" type="checkbox"/> Canon	<input type="checkbox"/>
Model	<input checked="" type="checkbox"/> EOS-300D	<input type="checkbox"/>
Price (\$)	<input type="button" value="▼"/> 871.0	<input type="button" value="▲"/>
Format	<input checked="" type="checkbox"/> SLR	<input type="checkbox"/>
Resolution (M Pixels)	<input type="button" value="▼"/> 6.29	<input type="button" value="▲"/>
Optical Zoom (X)	<input type="button" value="▼"/> 10.0	<input type="button" value="▲"/>
Digital Zoom (X)	<input type="checkbox"/> 0.0	<input type="button" value="▲"/>
Weight (grams)	<input type="button" value="▼"/> 645.0	<input type="button" value="▲"/>
Storage Type	<input checked="" type="checkbox"/> Compact Flash	<input type="checkbox"/>
Storage Included (MB)	<input type="checkbox"/> 0.0	<input type="button" value="▲"/>

We have more matching products with the following..

1. Less Optical Zoom & More Digital Zoom & A Different Storage Type (139)
2. A Lower Resolution & A Different Format & Cheaper (169)
3. A Different Manufacturer & Less Optical Zoom & More Storage (167)

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# Serendipity

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Serendipity - Your Wedding Dress Destination

**Browse: Weddings**

- [Wedding Dresses](#)
- [Bridesmaid Dresses](#)
- [Mother of the Bride Dresses](#)
- [Wedding Accessories](#)
- [Bridal Veils and Wedding Veils](#)
- [Prom Dresses](#)

**Your Basket**

Items in your basket:

There are no items in your basket.

Impression - 2663	Impression - 2624	Impression - 2648
Recommended Price \$690	Recommended Price \$730	Recommended Price \$550
<b>Our Price \$495</b>	<b>Our Price \$515</b>	<b>Our Price \$425</b>
<a href="#" style="color: orange; border: 1px solid orange; padding: 2px 10px;">Add To Basket</a>	<a href="#" style="color: orange; border: 1px solid orange; padding: 2px 10px;">Add To Basket</a>	<a href="#" style="color: orange; border: 1px solid orange; padding: 2px 10px;">Add To Basket</a>


  
◀ Pic 1/4 ▶

Impression - 2624
Recommended Price \$730
<b>Our Price \$515</b>
<a href="#" style="color: orange; border: 1px solid orange; padding: 2px 10px;">Add To Basket</a>


  
◀ Pic 1/3 ▶

Impression - 2648
Recommended Price \$550
<b>Our Price \$425</b>
<a href="#" style="color: orange; border: 1px solid orange; padding: 2px 10px;">Add To Basket</a>


  
◀ Pic 1/4 ▶

**Filters**

Size	<input type="text" value="PleaseSelect"/>
Neckline	<input type="text" value="Bateau"/> <input type="text" value="Bateau, Scalloped"/> <input type="text" value="Drape"/>
Designer	<input type="text" value="Alfred Angelo"/> <input type="text" value="Bonny"/> <input type="text" value="DeVinci"/>
Waist / Silhouette	<input type="text" value="A-Line"/> <input type="text" value="A-Line, Empire"/> <input type="text" value="Ballgown"/>
Colour	<input type="text" value="Antique"/> <input type="text" value="Black"/> <input type="text" value="Blue"/>
Price	Min: <input type="text" value="No Limit"/> Max: <input type="text" value="No Limit"/>
<a href="#" style="color: blue;">Update</a>	

[more...](#)

Preference	Preference	Preference
Designer	Impression	Impression
Colors	<input type="text" value="Ivory/Champagne"/>	<input type="text" value="Ivory"/>
Sizes	<input type="text" value="2"/>	<input type="text" value="2"/>
Neckline	Strapless	Strapless
Waist/Silhouette	Mermaid	Mermaid
Pieces/Separates	One-piece	One-piece
Train Length	Sweep	Sweep
Fabric	Lace	Lace
Formality	Formal	Formal
Sleeve length	Strapless	Strapless
Hem Line	Floor Length	Floor Length
Lace	Couture	Couture



# Evaluation

- How do we know if the recommender system delivers high quality suggestions?
- What do we mean by high quality?
- Examples of evaluation criteria:
  - Relevance – do recommendations satisfy user(s) preferences?
  - Coverage – the percentage of recommendations sought that a system is able to deliver
  - Novelty & serendipity – recommend items the user is unaware of but would like
  - Diversity – ensuring that top-N lists are not comprised of self-similar items
  - Robustness – are recommender systems vulnerable to manipulation?



# Evaluation Methodology

- Off-line evaluation:
  - Suitable for testing core recommendation algorithm components
  - Use real-world rating datasets
- Live-user trials:
  - Analysis of real usage and recommendation feedback.
  - A/B testing to evaluate different algorithms/techniques.
  - Facilitates a holistic approach to system evaluation.



# Collective Intelligence



# Collective Intelligence

- Harnessing the wisdom of the crowd.
- How/why/when does it work? What are the applications?
- Examples: recommender systems, CAPTCHAs, Games with a Purpose...



# Examples...

- CAPTCHAs

- Distinguish between computers and humans
- Authenticating human voters in online polls, preventing spam in blogs and other social media, protecting website/email registrations
- OCR/handwriting recognition
- Challenges



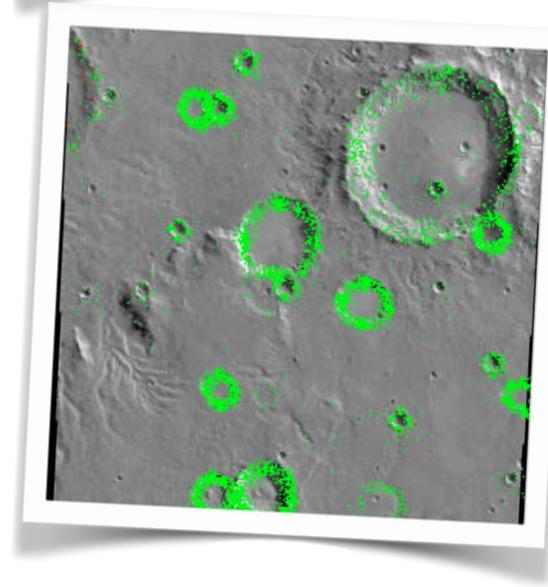
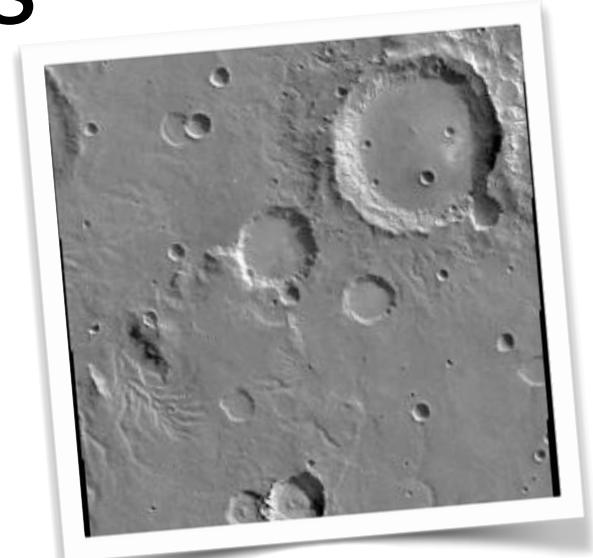
- Games with a Purpose

- Incentives for participation. Games & fun + collective intelligence => Games-with-a-purpose (GWAPs).
- Solve problems that AI approaches struggle with.



# NASA's Clickworkers

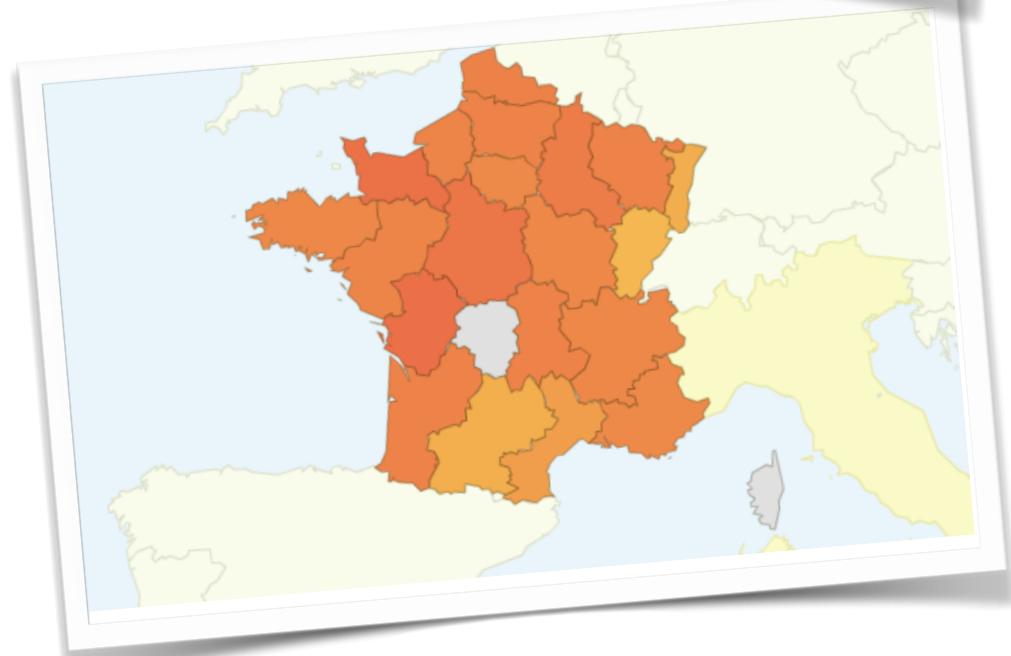
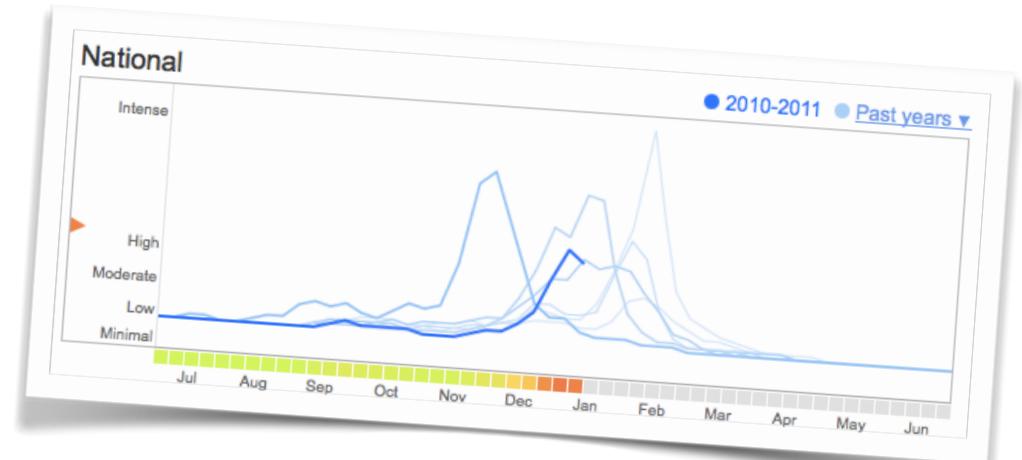
- The life of a planetary geologist at NASA
  - identifying and measuring geological landforms (craters, ridges, valleys) from satellite imagery.
  - Tedium, error-prone, labour-intensive ⇒ 80k landforms ≈ 2 person-years
- The Clickworkers Experiment
  - NASA put the entire Viking-Mars image database online and invited amateur astronomers to perform the same analysis task online.
  - Individual contributions were aggregated.
  - Within a month the entire DB was completed to a comparable degree of accuracy by a few thousand contributors ... 37% were one-time contributors!





# Predicting/Tracking Influenza

- Google Flu Trends
- Geo-coded search terms as indicators of human activity...
  - “flu remedy”
  - “cure flu”
  - “flu shot”
  - etc.
- Strong correlation between flu-related searches and illness.





**... and much more!**



# Assessment Components

100% continuous assessment throughout the semester.

1. Practical project (40% - starts Week 3, submission Week 7):

- Implementation of recommender systems & running experiments.
- Framework provided. *Proficiency in Java is required.*
- Individual project.

2. In-class test (20% - Week 8/9):

- MCQ exam.

3. Report (40% - handed out Week 8, submission Week 12):

- Analysis and discussion of experimental results from part 1.
- Individual report.



# Practical Project

Involves implementing algorithms and running experiments to compare and contrast the performance of various recommender system algorithms.

Coding:

- A framework developed in Java will be provided and the task will involve extending this framework to implement additional algorithms and to run experiments.
- Proficiency in the Java programming language is required. It's important to be comfortable with OO concepts such as inheritance, polymorphism etc.

Demonstrators will be available during practicals hours for support (during Weeks 3–7).



# Automated Collaborative Filtering (ACF)

- Let's look at a typical problem...
- Suppose we had the following preference data...

	The Quiet Man	Casino	Star Wars	Top Gun	Dallas: The Movie
Eamon	3		3	4	2
Sharon	4	1	4	2	4
John	5	2		2	5
Trisha	2	5	3		1
Mike	?	2	4	1	5

- Q – based on this preference data, would user *Mike* like or dislike *The Quiet Man*?



**Interested??**



## Next Topic

- Non-personalised recommender systems:
  - User preference data, aggregated opinion recommenders, product association recommenders, content-based approaches, etc.