

Recommendation Play @Flipkart

Recommendation Systems aim to predict the user's intent and help connect them to products they need or may be interested in, in an automated fashion

Item-Item Recommendations

Home > Books > Indian Writing > Literature & Fiction > Can Love Happen Twice?



Can Love Happen Twice? (Paperback)

by Ravinder Singh

★★★★☆ 603 Ratings | 257 Reviews

Publisher: Penguin (2011)

Price: ~~Rs. 125~~ **Rs. 75**

Discount: Rs. 50 **40% Off**

(Prices are inclusive of all taxes)

Free Shipping if total order amount is Rs. 300 or more. Add Rs. 30 otherwise.

Buy This Now

with Cash

Can Love Happen Twice? (Paperback)

by Ravinder Singh

★★★★☆ 631 Ratings | 265 Reviews

Book Summary of Can Love Happen Twice?

Does cupid strike just once, or can people fall in love all over again when they meet someone new?

This is the central theme that's explored in Can Love Happen Twice, Ravinder Singh's second novel.

Can Love Happen Twice takes the story forward from where the author's previous novel, I Too Had A Love Story, left its protagonists. The book traces Ravin's life after his success as a novelist, and he's in a good position to write about love.

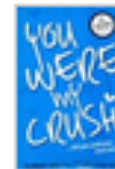
Customers Who Bought This Book Also Bought



I Too Had A Love Story

by Ravinder Singh

Price: ~~Rs. 100~~ **Rs. 75**



You Were My Crush! Till You Said You Love Me!

by Durjoy Datta

Price: ~~Rs. 100~~ **Rs. 80**



Few Things Left Unsaid

by Sudeep Nagarkar

Price: ~~Rs. 100~~ **Rs. 75**



If It's Not Forever. It's Not Love.

by Durjoy Datta

Price: ~~Rs. 100~~ **Rs. 80**




Life Is What You Make It

by Preeti Shenoy

Price: ~~Rs. 100~~ **Rs. 80**



Frequently Bought Together



Nikon D3100 SLR (Black) with (AF-S 18-55mm VR Kit Lens)

★★★★★ 152 Ratings | 18 Reviews

- 14.2 Megapixels
- CMOS
- Interchangeable lens camera, SLR
- with 3.0 inch Low-temperature Polysilicon TFT LCD Screen

with 2 year Nikon India Warranty and Free Transit Insurance

Price: ~~Rs. 30950~~ **Rs. 29950**

Discount: Rs. 1000
(Prices are inclusive of all taxes)

FREE Home Delivery

Buy This Now

See Related

See all: SLR Cameras

Like

Rate this product ★★★★★
Write a review

Summary of Camera: Nikon D3100 SLR

Nikon D3100 is an entry-level DX-format camera, ideal for photographers preparing to refine their skills in DSLR cameras. This camera has a CMOS image sensor of dimensions 23.1 x 15.4 mm, which enables you to capture **fabulous images at 14.2 megapixels**. The swift EXPEED 2 processing engine of this digital SLR supports an aspect ratio of 3:2. You can record your memories and **shoot full HD movies on the Nikon D3100** at 1920 x 1080 resolution (24 fps).

Body





This Nikon DSLR is **compact and easy to carry** at 445 g (without battery). The rubber panel on the rear of the camera gives you a firm thumb grip, while the **ergonomically designed body** with rounded edges lets you hold the camera steady. This Nikon digital SLR has a secure **Mode dial which features 13 operating modes**. The base of this dial has a lever that lets you switch between Single, Continuous, Self-timer and Quiet modes with one simple flick of the finger.

The camera works on a rechargeable Li-Ion EN-EL14 battery capable of clicking **550 images when fully**

30 DAY Guarantee
Know More »

EMI Payment Options
via HDFC, ICICI, Citibank, Credit

Frequently Bought Together With This Camera

-  **Nikon AF Zoom-Nikkor 70-300mm f/4-5.6G**
Price: ~~Rs. 6185~~ **Rs. 5999**
-  **Nikon AF-S DX Nikkor 55-300 mm f/4.5-5.6G**
Price: ~~Rs. 20155~~ **Rs. 19550**
-  **Nikon AF-S DX VR Zoom-Nikkor 55-200 mm f/1.8D Lens**
Price: ~~Rs. 14150~~ **Rs. 13725**
-  **Nikon AF Nikkor 50mm f/1.8D Lens**
Price: ~~Rs. 6290~~ **Rs. 6101**

Why Recommendation Important?

Product discovery is an important step in users interaction with an ecommerce website and recommendation systems play a very useful part in the discovery

This becomes ever so important with increasing size of the catalog, making it harder for every user to express their intent through well formed queries

Recommendation Types

- Help Find: other similar products

smartphones when on samsung galaxy sIII, other budget phones when at nokia 101

- Help Decide

People who viewed this ended up buying

- Complete the purchase experience

memory card for mobiles, cases for camera

- Excite or wow

New Chetan Bhagat Novel, Printer ink after 6 months

Recommendation System

=

Data

+

Algorithms

Data for Recommendations

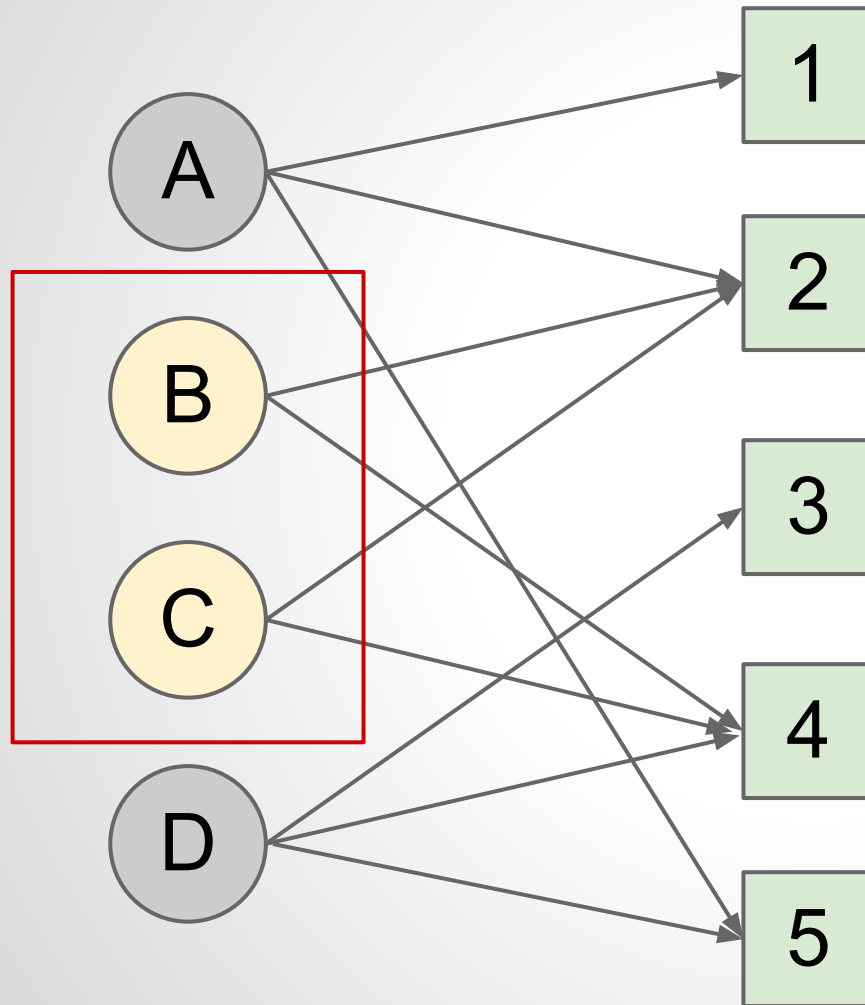
- Users interactions on the website
- Anything which reflects his/her interest on the items (browse, order, compare, review, etc)
- Any data that is applicable to all users of the website

Algorithms for Recommendations

- Collaborative Filtering
 - Item to Item
 - User to User
- Content Based Filtering
 - Meta data - music genres, brands, authors
 - Titles - books on java, accessories for nikon D90

Users

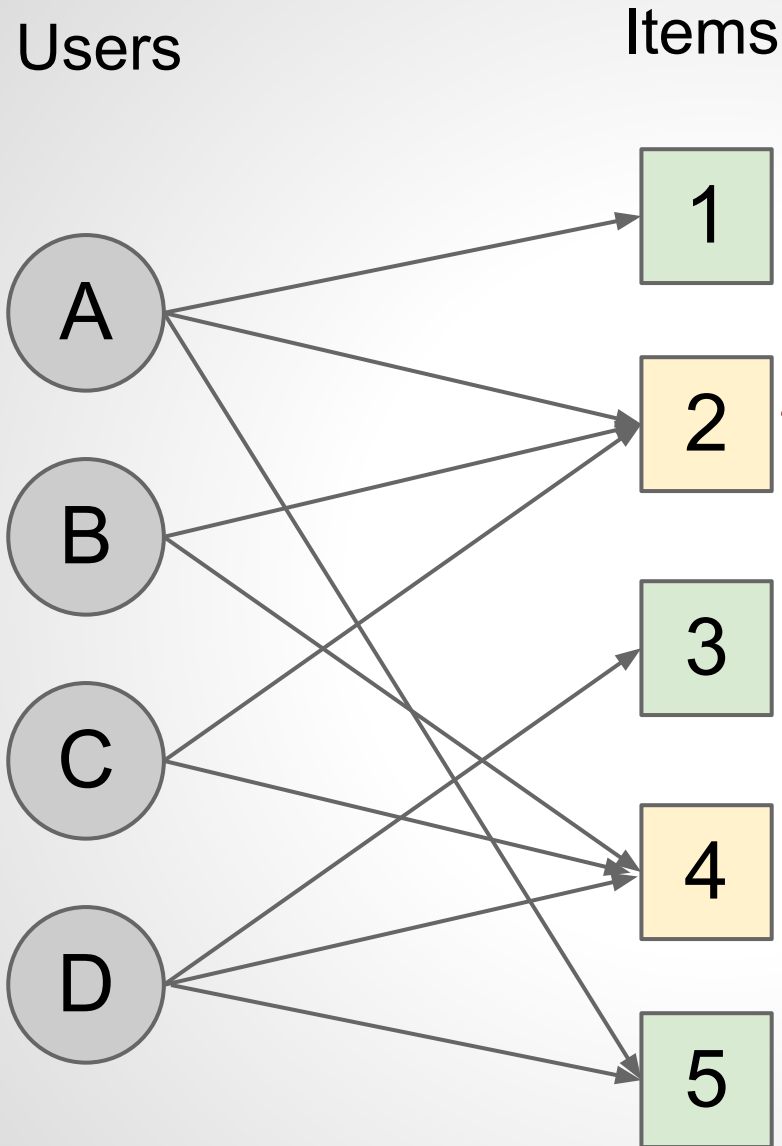
Items



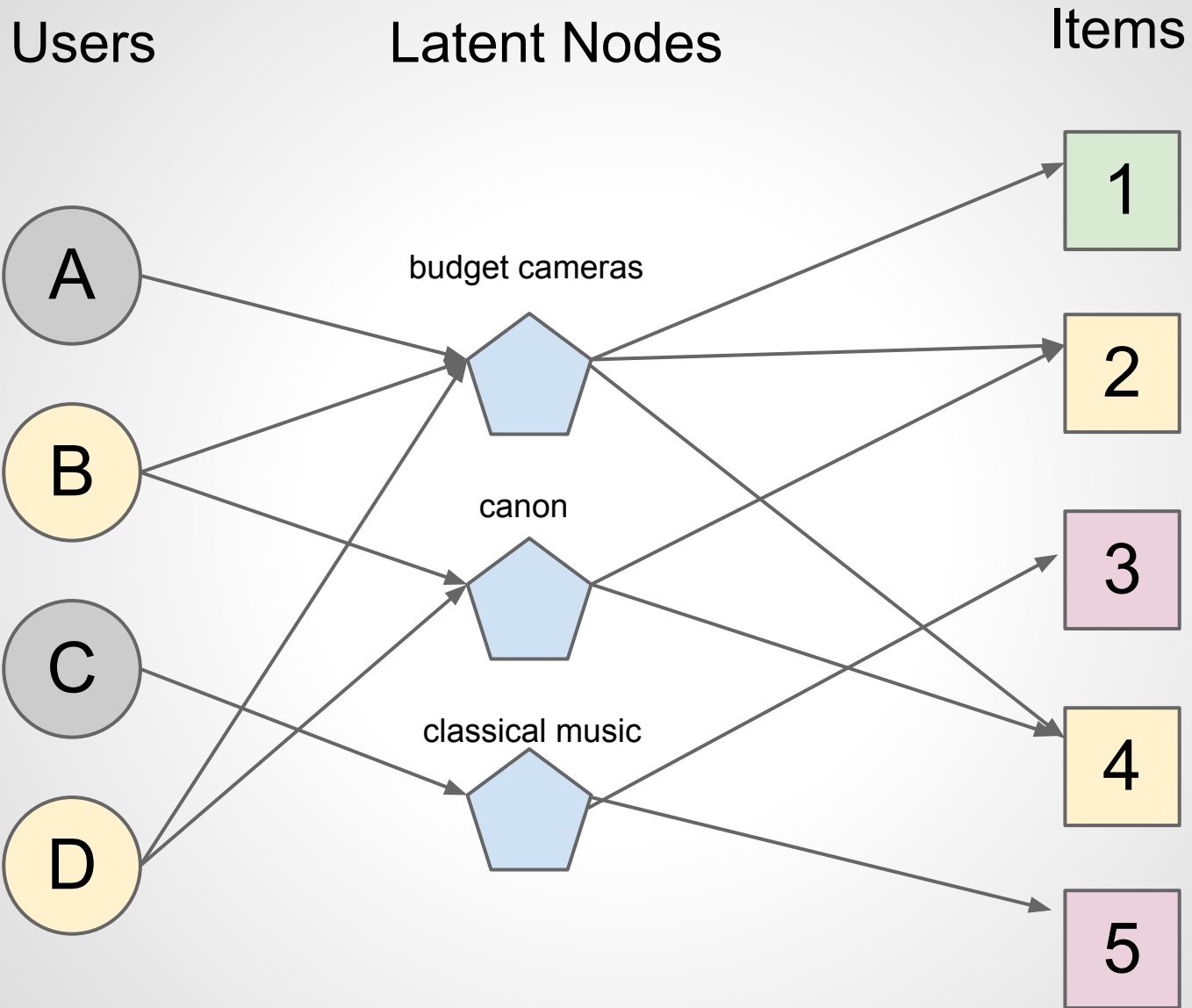
User to User

- For user u , find the set of users $S(u)$ that have similar preference as u
- Recommend popular items among users in $S(u)$ to user u .

Item to Item



- For item i , find the set of items $S(i)$ that are touched together
- For every user u , find set of items $N(u)$ they have browsed/bought before
- For every item x in $N(u)$ add $S(x)$ to the recommendation set
- Sort and show the recommendation set



Deeper Dive

Item Item Collaborative Filtering

Collaborative Filtering

- Filtering for patterns using collaboration among multiple entities: agents, viewpoints, data sources, etc
- Automates the process of "word of mouth"

Data Modeling

- Bought History.
 - Items bought together in the same transaction.
 - Items bought by the User.
- Browse History
 - Items browsed together successively with in **5** mins.
- Compare History
- 30 secs music sample etc..

Algorithm

B1 -> P1, P2 , P3, P4

B2 -> P2, P3, P4

B3 -> P1, P2, P4

Recommendation

P1 -> P2, P4, P3

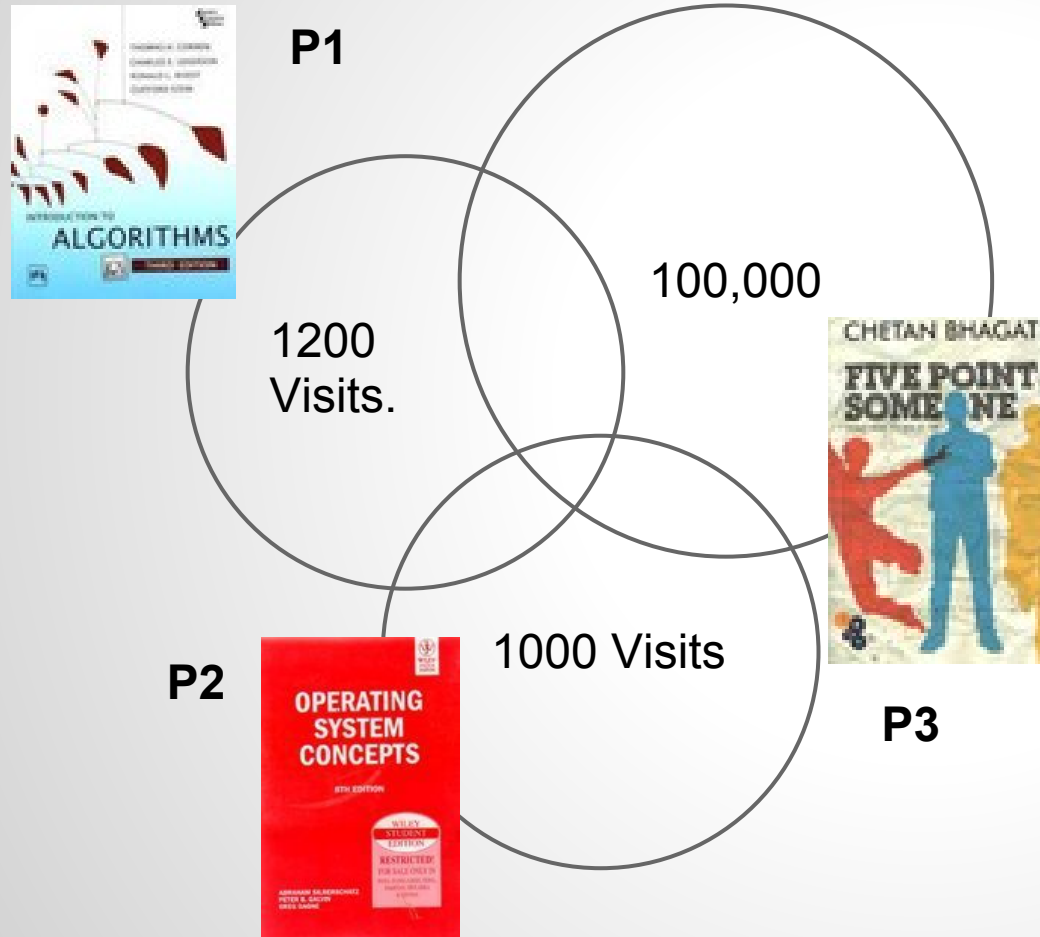
P2 -> P4, P1, P3

P3 -> P2, P4, P1

P4 -> P2, P1, P2

Item/ Item	P1	P2	P3	P4
P1	-	2	1	2
P2		-	2	3
P3			-	2
P4				-

Recommendation Score



**Recommendation Score
between the Products.**

P1, P2 is

Intersection count = 150

P1, P3

Intersection count = 200

**After removing the
popularity skew,**

P1, P2 is

Score = $150 / 1000 = 0.15$

P1, P3 is

Score = $200 / 100000 = 0.002$

Formula:

$$\text{Recommendation Score} = (i * i) / (n1 * n2).$$

Where,

i = count of occurrences of items $i1$, $i2$ together.

$n1$ = # of occurrences of the item $i1$ alone.

$n2$ = # of occurrences of the item $i2$ alone.

Computations Scale

- # of Product Page visits = 6 Million/day.
- # of sessions = 30 Million/Week.
- Size of data crunched for full index = 2TB

Scaling with Map Reduce

- Calculate 'i' by forming pairs and counting
 - Calculate 'n1' by making P1 as the key
 - Calculate 'n2' by making P2 as the key
 - Took 2 hours on 6 months of data
 - Scales Horizontally
-
- Previous/Conventional approach
 - Hash the pairs to form huge number of small files, sort and collate
 - Would have taken 20x the time (2 days)
 - Not horizontally scalable

Item-Item Recommendations

Home > Books > Indian Writing > Literature & Fiction > Can Love Happen Twice?



[View Larger Image](#)



Rate this product ★★★★★

[Write a review](#)

Can Love Happen Twice? (Paperback)

by Ravinder Singh

★★★★★ 603 Ratings | 257 Reviews

Publisher: Penguin (2011)

Price: ~~Rs. 125~~ **Rs. 75**

Discount: Rs. 50 **40% Off**

(Prices are inclusive of all taxes)

In Stock.

Delivered in **2-3 business days.**

[See Details](#)

**Free Shipping if total order amount is Rs. 300 or above.
Add Rs. 30 otherwise.**

Buy This Now



with an option to pay
Cash on Delivery

[Add to My Wishlist](#)

30 DAY Replacement Guarantee
[Know More »](#)

36 12 months EMI Payment Options
on HDFC, ICICI, Citibank Credit Cards only
[Know More »](#)

Customers Who Bought This Book Also Bought



I Too Had A Love Story

by Ravinder Singh

Price: ~~Rs. 100~~ **Rs. 75**

25%



You Were My Crush! Till You Said You Love Me!

by Durjoy Datta

Price: ~~Rs. 100~~ **Rs. 80**

20%



Few Things Left Unsaid

by Sudeep Nagarkar

Price: ~~Rs. 100~~ **Rs. 75**

25%



If It's Not Forever. It's Not Love.

by Durjoy Datta

Price: ~~Rs. 100~~ **Rs. 80**

20%



Life Is What You Make It

by Preeti Shenoy

Price: ~~Rs. 100~~ **Rs. 80**

20%

Book Summary of Can Love Happen Twice?

Does cupid strike just once, or can people fall in love all over again when they meet someone new?

This is the central theme that's explored in *Can Love Happen Twice*, Ravinder Singh's second novel.

Can Love Happen Twice takes the story forward from where the author's previous novel, *I Too Had a Love Story*, left its protagonists. The book traces Ravin's life after his success as a novelist, and he's invited, along with his


Personalization

<https://www.flipkart.com/recommendations>

Recommendations For You

List View | Grid View

Filter by: Books

- 

2 States: The Story of My Marriage by Chetan Bhagat


Price: ~~Rs. 140~~ **Rs. 98**
Discount: Rs. 42 (30%)

In Stock. Delivered in 2-3 business days. ?

[Buy Now](#) [Add to my wishlist](#)

Binding: Paperback
Publisher: Rupa & Co
Released: 2009

A wedding in India is a complex affair that involves more than just the bride... [More »](#)

Recommended because you added **Revolution 2020** to your wishlist. [Know more](#)
- 

Stay Hungry Stay Foolish by Rashmi Bansal


Price: ~~Rs. 125~~ **Rs. 94**
Discount: Rs. 31 (25%)

In Stock. Delivered in 2-3 business days. ?

[Buy Now](#) [Add to my wishlist](#)

Binding: Paperback
Publisher: Eklavya Foundation
Released: 2010

'Stay Hungry Stay Foolish' were the last words spoken by Steve Jobs during his commencement... [More »](#)

Recommended because you added **Revolution 2020** to your wishlist. [Know more](#)
- 

You Were My Crush! Till You Said You Love Me! by Durjoy Datta, Orvana Ghal


Price: ~~Rs. 100~~ **Rs. 80**
Discount: Rs. 20 (20%)

In Stock. Delivered in 2-3 business days. ?

[Buy Now](#) [Add to my wishlist](#)

Binding: Paperback
Publisher: Grapevine India Publishers
Released: 2011

You Were My Crush! is a story that is sure to make you introspect and... [More »](#)

Recommended because you added **Revolution 2020** to your wishlist. [Know more](#)
- 

Chanakya's Chant by Ashwin Sanghi

Price: ~~Rs. 145~~ **Rs. 137**
Discount: Rs. 58 (30%)

In Stock. Delivered in 2-3 business days. ?

[Buy Now](#) [Add to my wishlist](#)

Binding: Paperback
Publisher: Westland
Released: 2010

Chanakya's Chant is a racy and gripping account on Chanakya, one of the greatest political... [More »](#)

Personalization explained

- Item-Item Recommendations
- Understand the User's behavior.
 - Bought Items
 - WishList Items
 - Cart Additions
 - Rated Products.

User => Products that are defining the behavior/intentions.

Products => Recommendations

Forming Personalized Recommendations,

User => Recommendations.

Personalization

<https://www.flipkart.com/recommendations>

3.



You Were My Crush! Till You Said You Love Me! by Durjoy Datta, Orvana Ghai

Price: ~~Rs. 100~~ **Rs. 80**
Discount: Rs. 20 (20%)

In Stock. Delivered in **2-3 business days.** ?

Buy Now

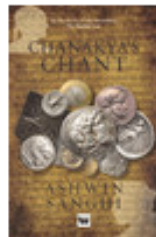
[Add to my wishlist](#)

Binding: Paperback
Publisher: Grapevine India Publishers
Released: 2011

You Were My Crush! is a story that is sure to make you introspect and... [More »](#)

Recommended because you added **Revolution 2020** to your wishlist. [Know more](#)

4.



Recommended Because



You added this product to your wishlist.



Revolution 2020
by Chetan Bhagat
Price: ~~Rs. 140~~ Rs.98



back
and

is a racy and gripping account on
the greatest political... [More »](#)

In

Recommended because you added

You added this product to your wishlist.



I Too Had A Love Story
by Ravinder Singh
Price: ~~Rs. 100~~ Rs.75



5.



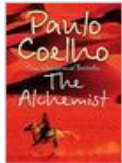
34

Binding: Paperback

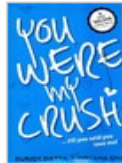
Personalized Recommendation

Recommended Products For You

[View More Recommendations For You »](#)



The Alchemist: A Fable...
by Paulo Coelho
~~Rs. 735~~ **Rs. 603**



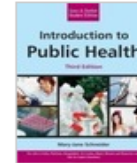
You Were My Crush! Till You...
by Durjoy Datta
~~Rs. 100~~ **Rs. 80**



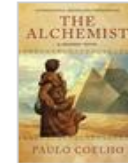
Omron MC-246 Thermometer...
~~Rs. 155~~ **Rs. 130**



Control Systems Engineering
by I. J. Nagrath
~~Rs. 425~~ **Rs. 319**



Introduction to Public Health
by Mary Jane Schneider
Rs. 795



The Alchemist: A Graphic Novel
by Paulo Coelho
~~Rs. 1356~~ **Rs. 1071**



Recommendations Based On Your Browsing History

You Recently Viewed



Now That You're Rich! Let's Fall In
by Durjoy Datta
Price: ~~Rs. 100~~ **Rs. 80**



You Were My Crush! Till You Said You
by Durjoy Datta
Price: ~~Rs. 100~~ **Rs. 80**



If It's Not Forever. It's Not Love.
by Durjoy Datta
Price: ~~Rs. 100~~ **Rs. 80**



Can Love Happen Twice?
by Ravinder Singh
Price: ~~Rs. 125~~ **Rs. 88**



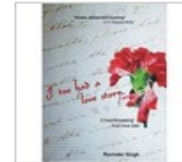
Recommended Products



Ohh Yes, I Am Single! And...
by Durjoy Datta
~~Rs. 100~~ **Rs. 80**



She Broke Up, I Didn't!.....
by Durjoy Datta
~~Rs. 100~~ **Rs. 85**



I Too Had A Love Story
by Ravinder Singh
~~Rs. 100~~ **Rs. 75**



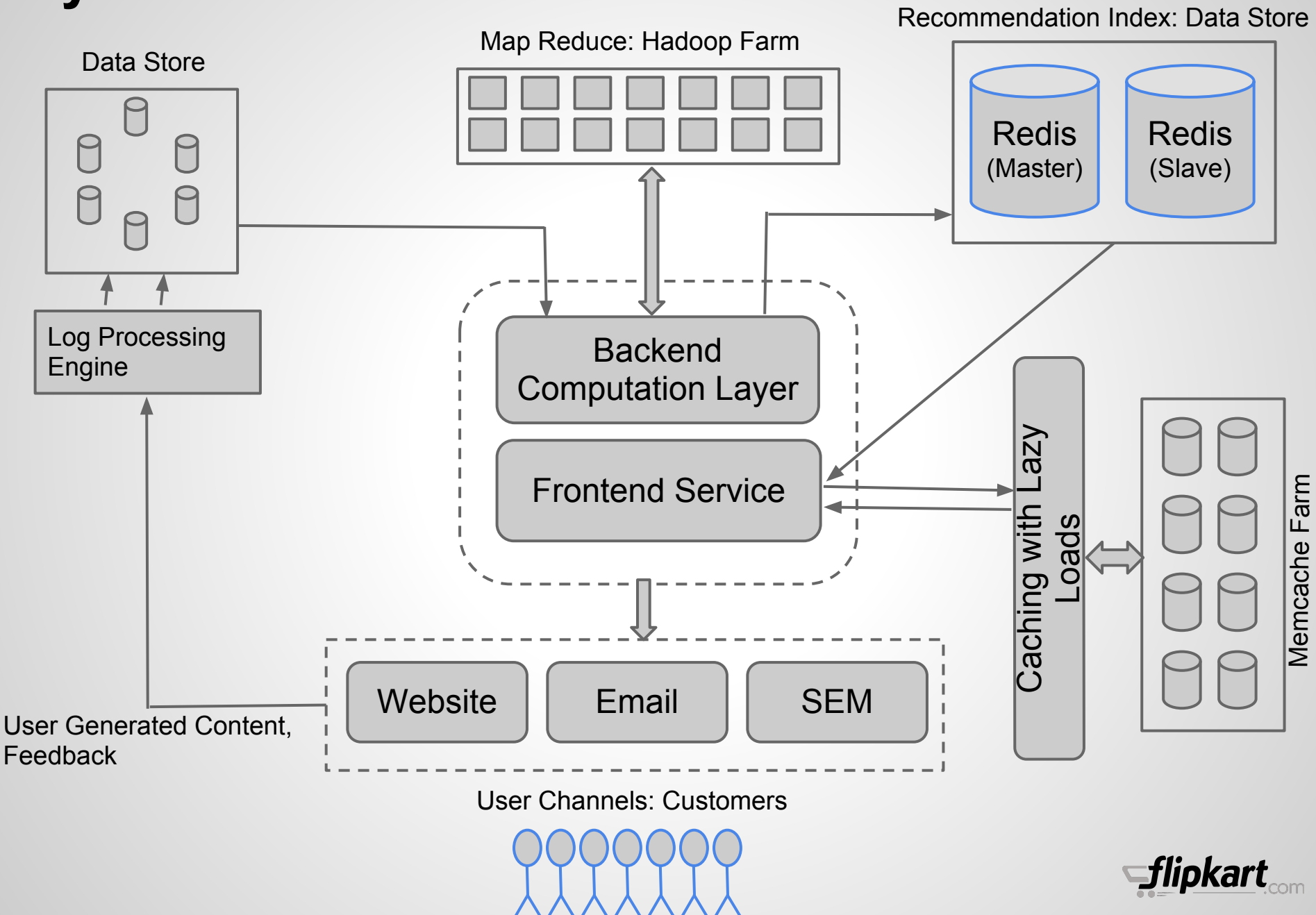
Few Things Left Unsaid
by Sudeep Nagarkar
~~Rs. 100~~ **Rs. 75**



Of Course I Love You! Till...
by Durjoy Datta
~~Rs. 100~~ **Rs. 80**



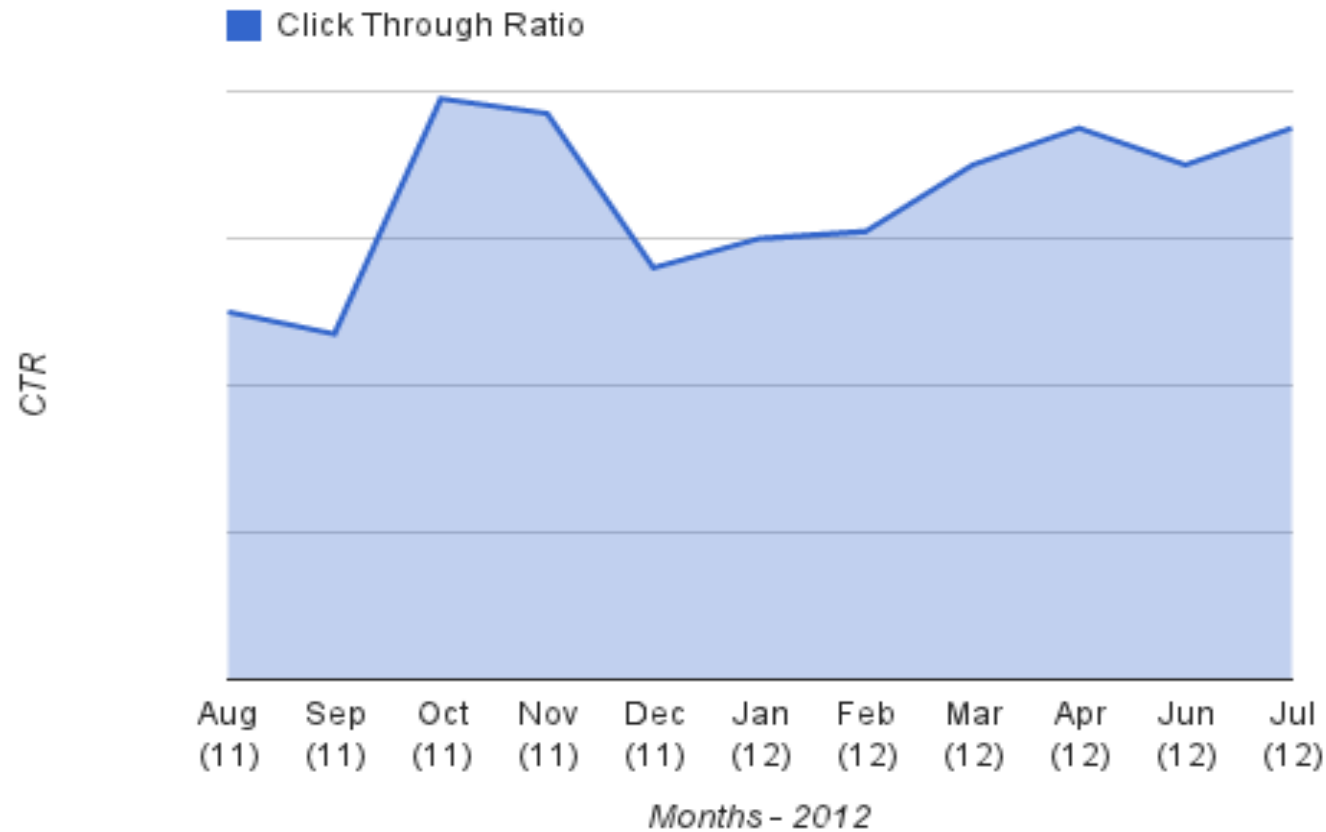
System Architecture



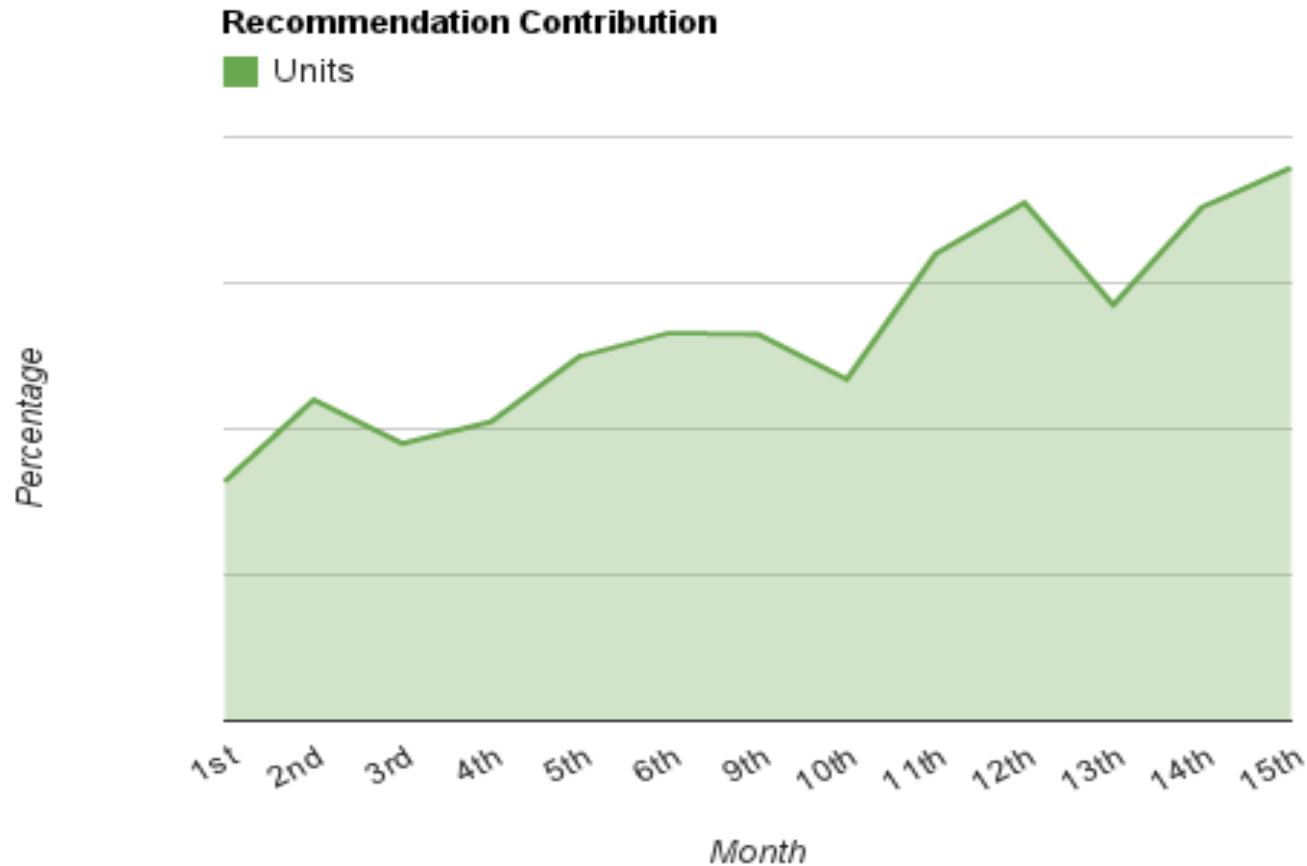
Are we on right track?

- Metrics
 - Click through rates (CTR) :
 - Relevance/Quality
 - Visibility
 - Click to Orders (Conversion):
 - Quality
 - Confidence
 - Bounce Rate
 - Number of items in an order
 - Contribution to overall sale
- A/B Testing

Click Through Ratio(CTR)



Recommendation contribution: # of Units Purchased



Learnings

- Push changes with AB Testing
- Think about Scalability
- Every user events tells something

Long path ahead

- Incorporate contextual information in CF.
 - Differentiating Transient effect Vs Long term pattern
 - Dealing with cold starts
- Personalization everywhere
 - Understand the Customer, bootstrap their profile
 - User-Attribute relations that are true across verticals
- Platformization
 - Plug in new data sources, pipe in input signals effortlessly
 - Plug in multiple algorithms
 - Streamlined tracking and feedback collection

Thank You

Visit Us

<http://flipkart.com/recommendations>

Contact Us

 [@flipkart_tech](https://twitter.com/flipkart_tech)

Data is the Power!!



Map Reduce Paradigm(Step 1)

B1 -> P1, P2, P3, P4,

B2 -> P2, P3, P4, P5,

Generating pairs:

Mapper: Key(Pair of items) =>
Value(weight)

Reducer: Accumulates the
weights for each Pair.

Key	Value
P1 P2	1
P1 P3	1
P1 P4	1
P2 P3	1
P2 P4	1
P3 P4	1

Key	Value
P2 P3	1
P2 P4	1
P2 P5	1
P3 P4	1
P3 P5	1
P4 P5	1

=>

Reducer O/P
P1 P2 1
P1 P3 1
P1 P4 1
P2 P3 2
P2 P4 2
P2 P5 1

Reducer O/P
P3 P4 2
P3 P5 1
P4 P5 1

Map Reduce Paradigm(Step 2)

Calculating the value 'n1':

Input:

P1 P4 1

P2 P3 1

P4 P5 1

P2 P4 1

Mapper: Key (**i1**) => Value(Pairs with weights)

Reducer: Accumulates the **i1**'s to form the
Pairs with weights, **n1**

Key	Value
P1	P1 P4 1 1
P2	P2 P3 1 1
P4	P4 P5 1 1
P2	P2 P4 1 1

=>

Reducer Output
P1 P4 1 1
P2 P3 1 2
P4 P5 1 1
P2 P4 1 2

Map Reduce Paradigm(Step 3)

Calculating the value 'n2':

Input:

P1 P4 1

P2 P3 1

P4 P5 1

P2 P4 1

Mapper: Key (**i2**) => Value(Pairs with weights)

Reducer: Accumulates the **i2**'s to form the
Pairs with weights, **n2**

Key	Value
P4	P1 P4 1 1 1
P3	P2 P3 1 1 1
P5	P4 P5 1 1 1
P4	P2 P4 1 1 1

=>

Reducer Output
P1 P4 1 1 2
P2 P3 1 2 1
P4 P5 1 1 1
P2 P4 1 2 2