

# Semantic Image Retrieval

The Good, The Bad,  
and The Ugly

# Presenter



**Raed Chammam**

Sr. Software Engineer  
*Team Recommend at Algolia*



**Paul-Louis Nech**

Sr. Machine Learning Engineer  
*Team Recommend at Algolia*

# Agenda

1. The Good 🙄

2. The Bad 🙄

3. The Ugly 🙄

**the World is Visual**  
and so is the **Web**

# The World is Visual: hence, the Web too



**Pinterest**

*“97% of top searches are unbranded [...] people come to Pinterest to shop for generic terms and not specific brands”*



**airbnb**

Places with professional photos can get *upto* **20%** more bookings



**NETFLIX**

Thumbnails take **82%** of the **browsing** focus

<https://www.airbnb.com/e/pro-photography>

<https://www.airbnb.com/help/article/3381>

<https://about.netflix.com/en/news/the-power-of-a-picture>

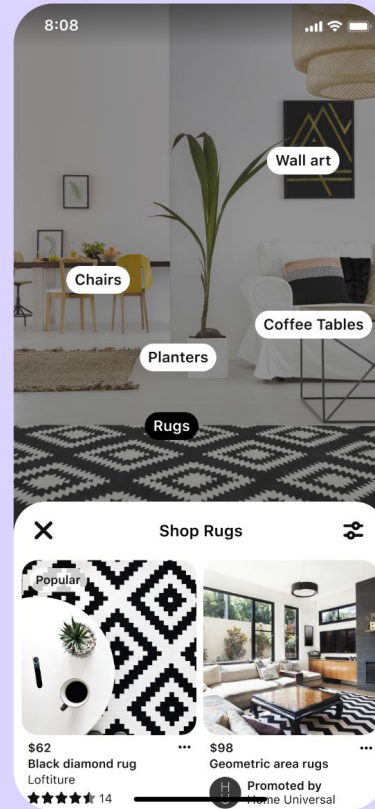
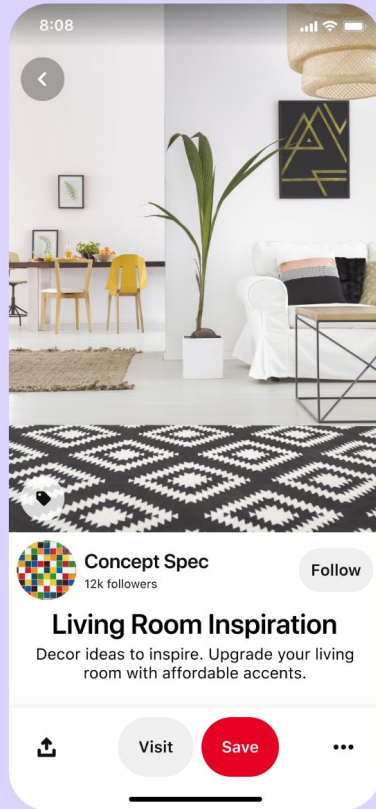
# Etsy: Search by Image



*from Building Etsy's Search by Image Feature*

*By Eden Dolev, Alaa Awad*

# Pinterest: Shop from Pins



# ...and you can have it too

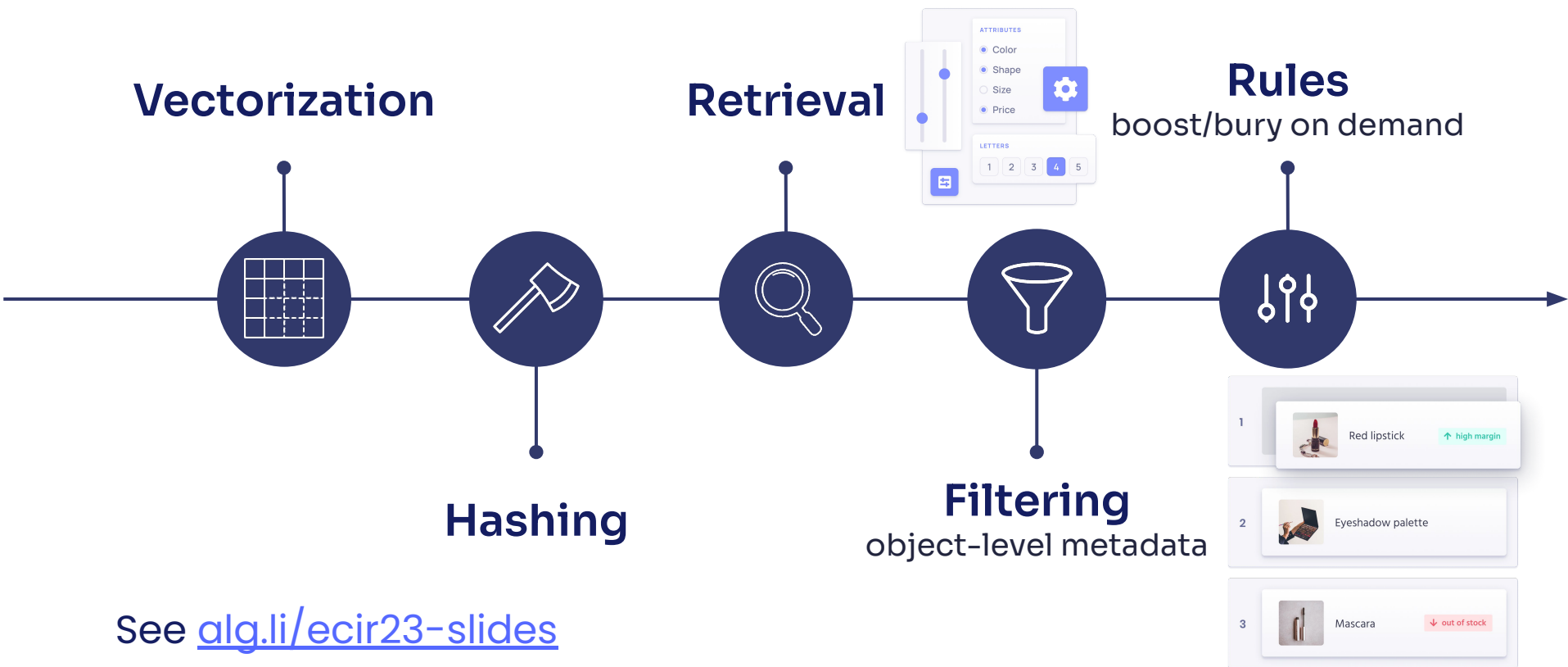


Scandi gray  
Sofa



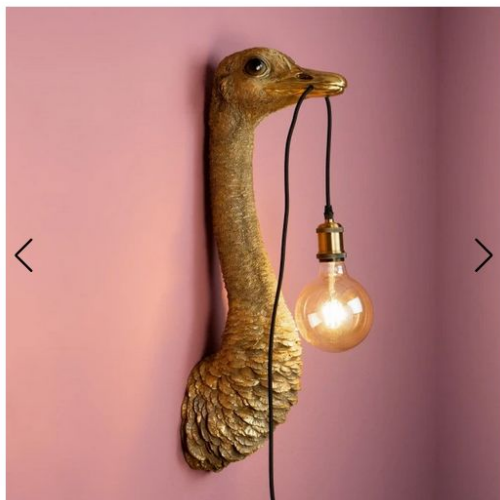


# Under the hood: using vectors & metadata together



**the Good**

# XTDeco.ro: is it a bird? Is it a plane?



## LAMPĂ FRANZ

★★★★★ [Serie o](#)

**1.318,40 lei**

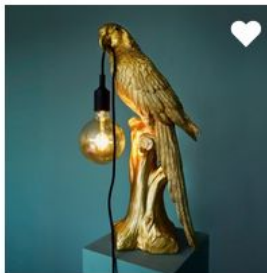
DISPONIBILITATE:

1

Producător:  
[WernerVoss](#)



## Foarte asemănătoare



Lampă de masă, Papagal  
auriu, Timmy, 27.5 x 18 x 61 cm

★★★★★

**1.318,40 lei**



Lampă de masă, Focă aurie,  
Robbie, 32.5 x 28.5 x 51.5 cm

★★★★★

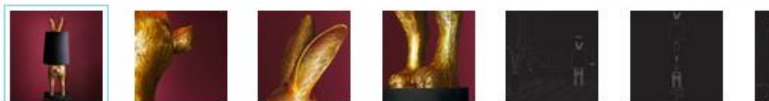
**1.489,60 lei**



Lampă de masă, Maimuță  
aurie, Abu, 25.5 x 23.5 x 39.5 cm

★★★★★

**940,80 lei**



Acasă > Iluminat > Lampadare > Lampadare iepuraș aurii, Hiding Rabbit, 39 x 39 x 115 cm



## LAMPADAR IEPURAȘ AURIU, HIDING RABBIT, 39 X 39 X 115 CM

★★★★★ [Scrie o recenzie](#)

Cod: **WRV-43022**



**2.356,80 lei**

DISPONIBILITATE: 7 - 14 Zile

1

ADAUGĂ ÎN COȘ

Producător:  
[WernerKiss](#)

LA FAVORITE

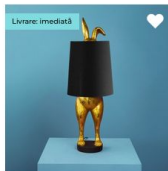


Descriere

Specificații

Referitor livrare

### Foarte asemănătoare



Lampă de masă, iepuraș, Hiding Bunny, Negru, 24 x 24 x 74 cm

★★★★★



Lampă de masă, iepuraș, Hiding Bunny, Portocaliu, 24 x 24 x 74 cm

★★★★★



Lampă de masă, Girafă aurie, Lucie, 35 x 28 x 70 cm

★★★★★



Lampă de masă, iepuraș, Hiding Bunny, Magenta, 24 x 24 x 74 cm

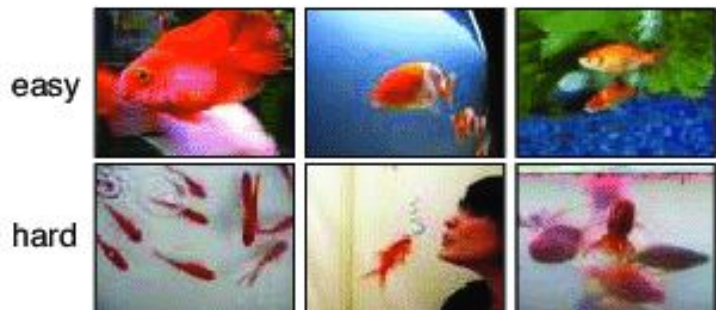
★★★★★



Lampă de masă, iepuraș, Hiding Bunny, Tu

★★★★★

# XTDeco.ro: what does the model see?



Goldfish - easy (23 blocks) vs. hard (29 blocks)



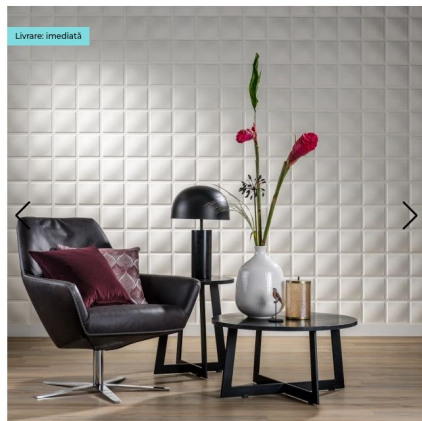
Artichoke - easy (18 blocks) vs. hard (28 blocks)



Spacecraft - easy (23 blocks) vs. hard (29 blocks)



Bridge - easy (24 blocks) vs. hard (29 blocks)



## CUBES

★★★★★ [Scrie o recenzie](#)

Cod: [WRT\\_GA-WA07\\_CUBES](#)



**269,00 lei / cutie** (89,67 lei / mp)

DISPONIBILITATE: [În stoc \(9\)](#)

1

ADĂUGĂ ÎN COȘ

WallArt  
Producător:  
WallArt

♡ LA FAVORITE

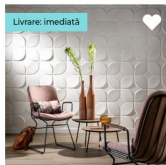
### Foarte asemănătoare



Panouri decorative 3D Vaults,  
WallArt, 12 placi 50x50cm

★★★★★

**89,67 lei / mp** (269,00 lei /  
cutie)



Panouri decorative 3D Sweeps,  
WallArt, 12 placi 50x50cm

★★★★★

**89,67 lei / mp** (269,00 lei /  
cutie)



Panouri decorative 3D Beau,  
WallArt, 12 placi 50x50cm

★★★★★

**89,67 lei / mp** (269,00 lei /  
cutie)



Panouri decorative 3D Gaps,  
WallArt, 12 placi 50x50cm

★★★★★

**89,67 lei / mp** (269,00 lei /  
cutie)



Panouri decorative 3D Lia  
WallArt, 12 placi 50x50cm

★★★★★

**89,67 lei / mp** (269,00 lei,  
cutie)

# CabinetParts.com: my handle broke...





# CabinetParts.com: ...and I'm out of words



Shop & Save Today  
End of Year Sale - \$5 off Orders \$95+  
Coupon EOY2023 exp. 12/31/23

- My Account
- Help
- Cart

Departments Undermount Drawer Slides Semi-Concealed Cabinet HI... Standard European Cabinet ... #1 Cabinet Makers' Shop Free Shipping Specials New! Cabinet Doors Trusted Since 1997

Decorative Knobs and Pulls French Farm Designs Collec...



## French Farm Designs 8 Inch Center to Center Ancient Bronze Cabinet Pull

★★★★★ Rating 4.8 | 97 Reviews | Our Item Number SHC-263-ABZ

Intricate French country design is the inspiration behind this elegant collection. Contours, curves and fluid design hug each piece.

\$56.80 Was \$71.00  
SAVE 20% thru 12/09/2023

**PRO Packs™**  
\$54.53/ea for 5  
\$52.82/ea for 10  
\$51.12/ea for 20  
60 or more [See Pricing](#)

- Free Shipping on Schaub and Company Knobs - Orders \$49+  
Use Code **BFSSCHAUB2312** Expires 12/31/2023
- End of Year Sale - \$5 off Orders \$95+  
Use Code **EOY2023** Expires 12/31/2023

Finish: Ancient Bronze



**Product Info** Overall Length: 11-3/4", Projection: 1-3/8", Product Finish: Bronze, [See more product details](#)

Qty:  Each

or

**PRO Packs™**  
Save more! Buy a Pro Pack.

- 
- 
- 

575 In Stock  
Ships by Monday, Dec 11th  
if ordered by 2pm Today (EST)

[Compare this item](#)

# CabinetParts.com: allow exploration beyond words

**CabinetParts.com**  
Year #1 Source for Cabinet Hardware Since 1997


Shop & Save Today  
End of Year Sale - \$5 off Orders \$95+  
Coupon EOY2023 exp. 12/31/23

Search for Product

My Account Help Cart

Departments Undermount Drawer Slides Semi-Concealed Cabinet H... Standard European Cabinet... #1 Cabinet Makers' Shop Free Shipping Specials New Cabinet Doors Trusted Since 1997

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\$54.53/ea for 5  
\$52.82/ea for 10  
\$51.12/ea for 20  
60 or more [See Pricing](#)

Free Shipping on Schaub and Company Knobs - Orders \$49+  
Use Code BFFSSCHAUB2312 Expires 12/31/2023

End of Year Sale - \$5 off Orders \$95+  
Use Code EOY2023 Expires 12/31/2023

Finish: Ancient Bronze

**Product Info** Overall Length: 11-3/4", Projection: 1-3/8", Product Finish: Bronze, See more product details

Qty:  Each

[Add to Cart](#)

or

**PRO Packs™**  
Save more! Buy a Pro Pack.

[Buy Pack of 5](#)

[Buy Pack of 10](#)


[Buy Pack of 20](#)

575 In Stock  
Ships by Monday, Dec 11th  
if ordered by 2pm Today (EST)


[Compare this item](#)

[Add to Project List](#)


Shop Similar Style Products




French Farm Designs 8 Inch Center to Center Antique Nickel Cabinet Pull  
\$56.80  
★★★★★ (97)




French Farm Designs 3-3/4 Inch Center to Center Antique Nickel Cabinet Pull  
\$15.20  
★★★★★ (97)




French Farm Designs 3-3/4 Inch Center to Center Ancient Bronze Cabinet Pull  
\$15.20  
★★★★★ (97)




French Farm Designs 12 Inch Center to Center Ancient Bronze Cabinet Pull  
\$130.40  
★★★★★ (97)



Traditional 3 Inch Center to Center Bar Pulls with Nickel Finish  
\$6.82  
★★★★★ (42)



Lisbon 3-3/4 Inch Center to Center Antique Bronze/Copper Cabinet Pull  
\$5.56  
★★★★★ (73)



Lille 12 Inch Center to Center Bright Nickel Brushed with Dull Lacquer Cabinet Pull  
\$131.44  
★★★★★ (44)

Popular products inspired by this item

# CabinetParts.com: great variant-awareness

**CabinetParts.com**  
Your #1 Source for Cabinet Hardware. Since 1997

Shop & Save Today  
Free Shipping on Knobs & Pulls  
See Code in Cart

Search for Product



My Account



Help



Cart

Departments

Undermount Drawer Slides

Semi Concealed Cabinet Hi...

Standard European Cabinet ...

Excellent Reviews

Money-Saving Coupons

Expert Customer Service

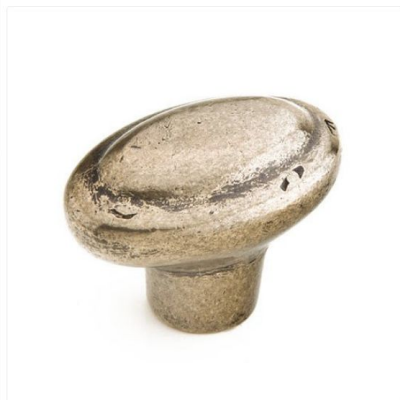
New Cabinet Doors



Decorative

Knobs and Pulls

Mountain Collection by Sch...



## Cast Bronze Mountain 1-7/8 Inch Diameter Italian Nickel Cabinet Knob

★★★★★ Rating 4.8 | 97 Reviews | Our Item Number SHC-782-IN

The rustic touches of this collection bring the outdoors in to any room.

**\$36** Was \$45.00

SAVE 20% thru 12/09/2023

**PRO Packs™**

\$34.56/ea for 5

\$33.48/ea for 10

\$32.40/ea for 20

80 or more [See Pricing](#)

Free Shipping on Schaub and Company Knobs - Orders \$49+  
Use Code **BFSCHAUB2312** Expires 12/31/2023

End of Year Sale - \$5 off Orders \$95+  
Use Code **EOY2023** Expires 12/31/2023

Finish: Italian Nickel



**Product Info** Projection: 1-1/4", Product Finish: Nickel, Collection Style: Eclectic, Material: Cast Bronze, [See more product details](#)

Qty:  Each

[Add to Cart](#)

or

**PRO Packs™**

Save more! Buy a Pro Pack.

[Buy Pack of 5](#)

[Buy Pack of 10](#)

[Buy Pack of 20](#)

80 In Stock  
Ships by Monday, Dec 11th  
if ordered by 2pm Today (EST)

[Compare this Item](#)

[Add to Project List](#)

### Shop Similar Style Products



Mountain Oval Knob  
1-7/8 inch Diameter  
Natural Bronze

**\$36.00**

★★★★★ (97)



Cast Bronze Mountain  
1-3/8 Inch Diameter  
Italian Nickel Cabinet  
Knob

**\$35.20**

★★★★★ (97)



Cast Bronze Mountain  
1-5/8 Inch Diameter  
Italian Nickel Cabinet  
Knob

**\$38.40**

★★★★★ (97)



Distressed 1-11/16 Inch  
Diameter Champagne  
Cabinet Knob

**\$12.83**

★★★★★ (51)



Cast Bronze Mountain  
1-1/4 Inch Diameter  
Italian Nickel Cabinet  
Knob

**\$28.00**

★★★★★ (97)



Mountain Round Knob  
1-3/8 inch Diameter  
Natural Bronze

**\$35.20**

★★★★★ (97)



Distressed 1-3/8 Inch  
Diameter Champagne  
Cabinet Knob

**\$11.75**

★★★★★ (51)

# Nooteboom Textiles

Home > Tissus à motifs floraux > Jersey de Viscose imprimé fleurs Cobalt



# Nootboom Textiles: power users recognize patterns



...




**JERSEY DE VISCOSE IMPRIMÉ  
FLEURS POURPRE**  
N° ART. 21116/044



**VISCOSE BUBBLE IMPRIMÉ  
FEUILLES VERT**  
N° ART. 21072/025

# Nooteboom Textiles: allow newcomers to deep dive





Home > Tissus à motifs floraux > Jersey de Viscose imprimé fleurs Cobalt



**JERSEY DE VISCOSE TISSU IMPRIMÉ FLEURS COBALT**  
N° ART. 21116/005 | [Voir les spécifications](#) |

Disponible en: 50m Rôles, 12m Double Folded

Couleurs & Motifs (4)

-  **005** - Cobalt
-  **069** - Noir
-  **016** - Rouge
-  **044** - Pourpre

[CONNEXION](#) [S'INSCRIRE](#)

## Tissus associés



**JERSEY DE VISCOSE IMPRIMÉ FLEURS POURPRE**  
N° ART. 21116/044



**VISCOSE BUBBLE IMPRIMÉ FEUILLES VERT**  
N° ART. 21072/025



**VISCOSE SATIN IMPRIMÉ ABSTRAIT BLEU MARINE**  
N° ART. 21077/008



**VISCOSE VORTEX JERSEY IMPRIMÉ FLEURS BLEU MARINE**  
N° ART. 20187/008



**SATIN DE COTON IMPRIMÉ ABSTRAIT VERT**  
N° ART. 21083/025



the Bad

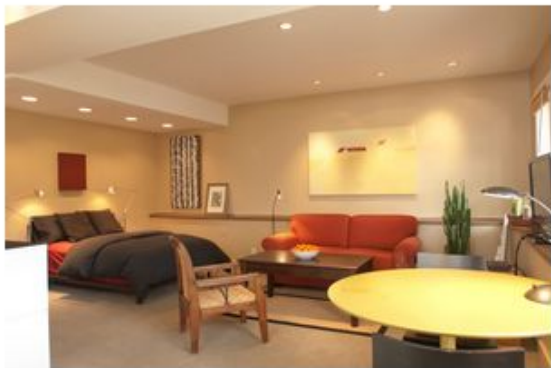


often  
the Badly  
DONE

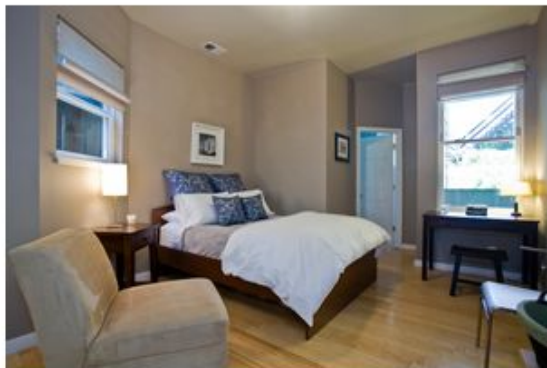


# The “What you see is what you get” problem

Showing 3 of 3 results



1

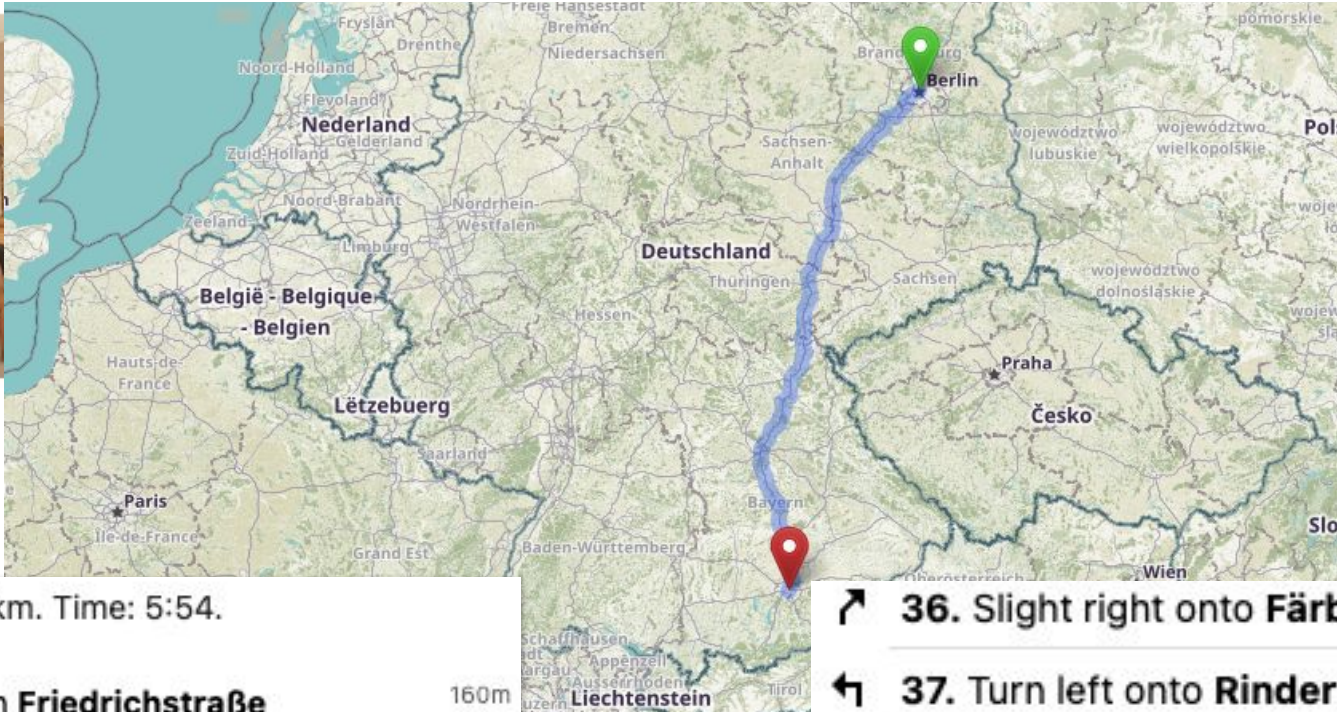


0.732421875



0.7064453125

# The “What you see is what you get” problem



Distance: 585km. Time: 5:54.

- ↑ 1. Start on **Friedrichstraße** 160m
- ↘ 2. Turn right onto **Behrenstraße** 800m
- ↙ 3. Turn left onto **Ebertstraße** 200m

- ↗ 36. Slight right onto **Färbergraben** 200m
- ↖ 37. Turn left onto **Rindermarkt** 140m
- ↘ 38. Turn right onto unnamed road 40m
- 📍 39. Reach destination



often  
the Badly  
**DONE**



# Your next Guitar: Andre købte også?

DanGuitar.dk  
Alt i musikinstrumenter, lyd & lys

Søg på alt i musikinstrumenter, lyd og lys



 FAVORIT

Forside Musikinstrumenter v Lydstyr v Lys & effekter v Tilbehør v **Udsalg** B-Stock Lykkeposer

Hjem / Musikinstrumenter / Guitar / Spansk guitar / Børne spansk guitar / Sant Guitars CJ-30-BK 1/2 spansk børne-guitar sort

## Sant Guitars CJ-30-BK 1/2 spansk børne-guitar sort



### Andre købte også



Sant CL-50-WH spansk guitar  
hvid, pakkeløsning

**1.018,16 DKK** 1.276,00-DKK

 Varen er på lager - Levering 1-2 hverdage



DR Strings DSM-11 mandolin-  
streng, light

**129,00 DKK**

 Varen er på lager - Levering 1-2 hverdage



Thornton HY504  
megafon, 5 W

**59,00 DKK** 99,00-DKK

 Varen er på lager - Levering 1-2 hverdage



Santana O1 DK ukulele danish  
flag

**299,00 DKK**

 Varen er på lager - Levering 1-2 hverdage



HiEnd 2 x XLR(han)-til-  
minijack(stereo)-kabel 3 meter

**69,00 DKK**

 Varen er på lager - Levering 1-2 hverdage



# Your next Guitar

**DanGuitar.dk**  
Alt i musikinstrumenter, lyd & lys

Søg på alt i musikinstrumenter, lyd og lys



FAVORITTER (0)

INDKØBSKURV (0)

Forside

Musikinstrumenter ▾

Lydstyr ▾

Lys & effekter ▾

Tilbehør ▾

Udsalg

B-Stock

Lykkeposer

Mærker ▾

Hjem / Musikinstrumenter / Andre strengeinstrumenter / Mandolin / Akustisk mandolin / Tanglewood TWMF VSE mandolin

## Tanglewood TWMF VSE mandolin



★★★★★ Anmeld

**Tanglewood**

- ✓ Mandolin med f-formet krop i en flot sunburst farve
- ✓ Med indbygget mikrofon
- ✓ Dæk, sider og bagside er udført i lindetræ

Læs hele beskrivelsen

Se specifikationer

**~360€** **2.699,00 DKK**

• Varen er på lager - Levering 1 - 2 hverdage

1

Læg i kurv



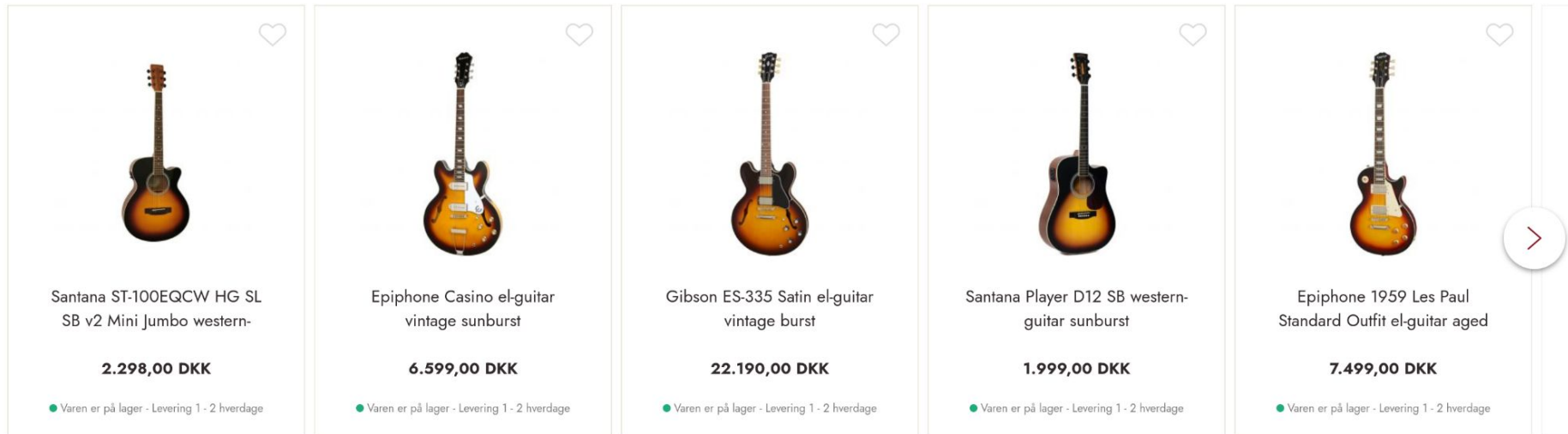
↻ Tilfredshedsgaranti: 30 dages returret






Varenr.:TW-TWMPVSE

# Your next Guitar

Andre <sup>nope</sup> bedre også  
Gode alternativer

what do you do when you have **no user events** ?



 Santana ST-100EQCW HG SL SB v2 Mini Jumbo western-  <b>2.298,00 DKK</b>  ● Varen er på lager - Levering 1 - 2 hverdage	 Epiphone Casino el-guitar vintage sunburst  <b>6.599,00 DKK</b>  ● Varen er på lager - Levering 1 - 2 hverdage	 Gibson ES-335 Satin el-guitar vintage burst  <b>22.190,00 DKK</b>  ● Varen er på lager - Levering 1 - 2 hverdage	 Santana Player D12 SB western- guitar sunburst  <b>1.999,00 DKK</b>  ● Varen er på lager - Levering 1 - 2 hverdage	 Epiphone 1959 Les Paul Standard Outfit el-guitar aged  <b>7.499,00 DKK</b>  ● Varen er på lager - Levering 1 - 2 hverdage
--	--	---	--	---

**Always have something to show**

# Shoes? Visual scores tell you about specificity

Item viewed



Nike Air Max 97 -  
Boys' Grade School



Looking similar



↗ 83.594

Nike Air Max 97 SE -  
Boys' Grade School



↗ 83.496

Nike Air Max '97 -  
Men's



↗ 83.32

Nike Air Max 97 SE -  
Boys' Grade School



↗ 83.242

Nike Air Max 97 -  
Girls' Grade School



↗ 82.773

Nike Air Max 97 -  
Men's



↗ 82.715

Nike Air Max 97 -  
Girls' Grade School



↗ 82.559

Nike Air Max 97 -  
Boys' Grade School



↗ 82.246

Nike Air Max 95 SE -  
Men's



↗ 82.148

Nike Air Max 97 SE -  
Boys' Grade School



↗ 82.09

Nike Air Max 97 -  
Boys' Grade School

# Shoes? Knowing Specificity tells you what to show them

 Reebok Step N Flash - Girls' Presch... ×

 Show random

Show Rules?

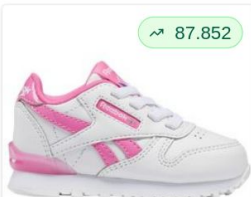
 Display F

Item viewed

Looking similar

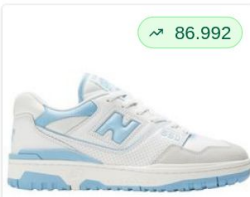


Reebok Step N Flash  
- Girls' Preschool



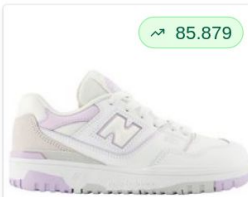
↗ 87.852

Reebok Classic  
Leather - Girls' ...



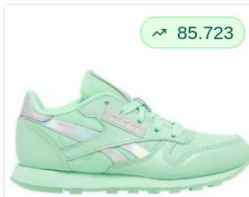
↗ 86.992

New Balance BB550 -  
Men's



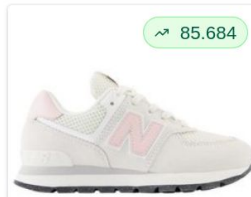
↗ 85.879

New Balance 550 -  
Boys' Grade School



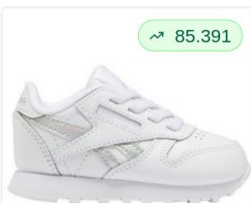
↗ 85.723

Reebok Classic  
Leather - Girls' ...



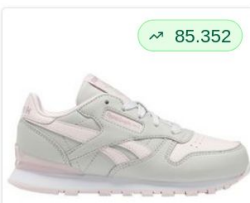
↗ 85.684

New Balance 574  
Classic - Girls' ...



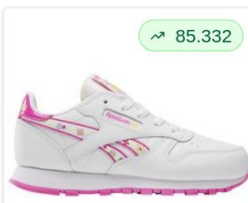
↗ 85.391

Reebok Classic  
Leather - Girls' ...



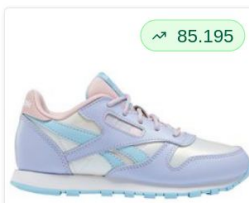
↗ 85.352

Reebok Step N Flash  
- Girls' Preschool



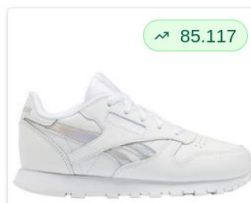
↗ 85.332

Reebok Classic  
Leather - Girls' ...



↗ 85.195

Reebok CL Dazzle -  
Girls' Preschool



↗ 85.117

Reebok Classic  
Leather - Girls' ...






 Articles similaires

## MUSTANG SHOES

### Bottines chelsea cuir montantes

Détails

★ 5 / 5 [2 avis](#)

 Noir

Taille >

1 >

99,99 € -20%

**79,99 €**

French Days

Ajouter au panier



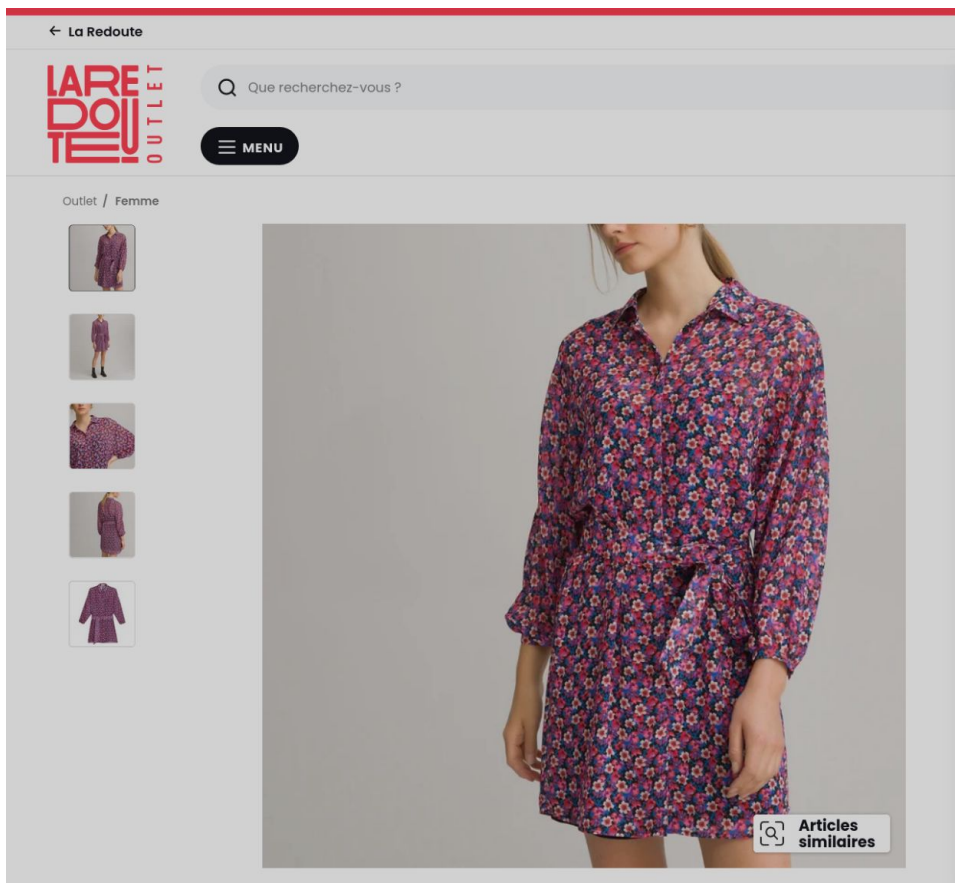
★★★★ (179)

Vendu et expédié par : Rue des Hommes

Livraison gratuite

Explore alternatives  
in context

# Sizes – La Redoute



## Choisissez votre taille

34	Articles similaires
36	Articles similaires
38	49,99 € 15,00 €
40	49,99 € 15,00 €
42	49,99 € 15,00 €
44	Articles similaires
46	Articles similaires

Recover from 'not available' with visual recommendations

Guide des tailles

# Sizes – La Redoute

Sort by similarity – and more

Trier les résultats

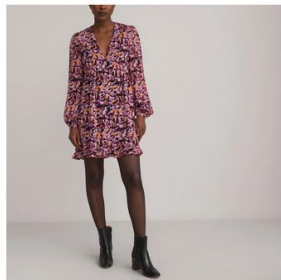
Plus similaires



LA REDOUTE COLLECTIONS

Robe courte évasée, manches l...

30.00 €



LA REDOUTE COLLECTIONS

Robe encolure v, manches long...

49.99 €



LA REDOUTE COLLECTIONS

Robe courte effet portefeuille

59.99 € -70%  
18.00 €



JDY

Robe-chemise Avec ornements

32.99 €



LA REDOUTE COLLECTIONS

Robe décolleté V, manches lon



MANGO

Robe à fleurs volantée



LA REDOUTE COLLECTIONS

Robe courte évasée col v, man



LA FEE MARABOUTEE

Robe courte en viscose Escava

Filtered for inStock in this size

Display the original item

**the Ugly**

# Matching random user review pictures

Item viewed



**Caveman Kitchen**



Looking similar



**King Donut**



**Taste of Mexico**



**Elements**

# Matching random user review pictures

Item viewed



**Chez Alice Cafe & Bakery**



Looking similar



**Sweet Acorn**



**Edible Arrangements**



**Thomas Sweet Ice Cream**

# Matching random user review pictures

Item viewed



Firestone Grill



Looking similar



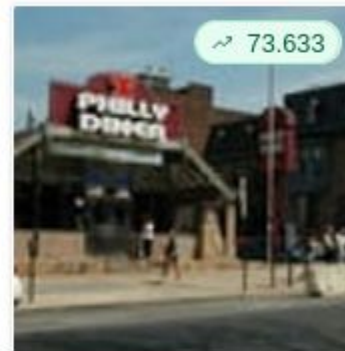
↗ 75.488

Five Guys Burgers  
and Fries



↗ 75.488

David's Books



↗ 73.633

Philly Diner

# Matching random user review pictures

Item viewed



**Broadway Brew  
Biergarten**



Looking similar



**SideBar & Grill**



**Fred's Italian Corner  
Restaurant**



**The Point Tavern**



# Matching random user review pictures

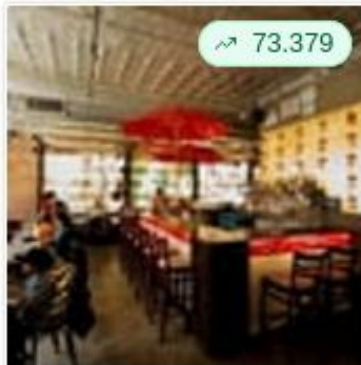
Item viewed



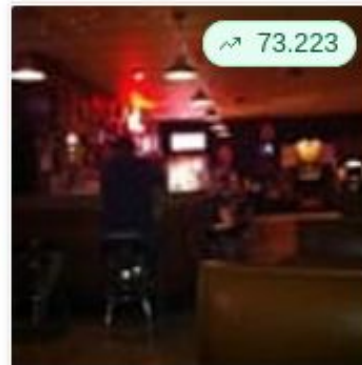
Whiskey Blue



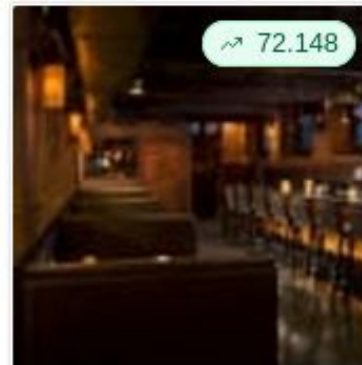
Looking similar



Thai Market



Brass Rail



The ROI Food &  
Music

# Matching random user review pictures

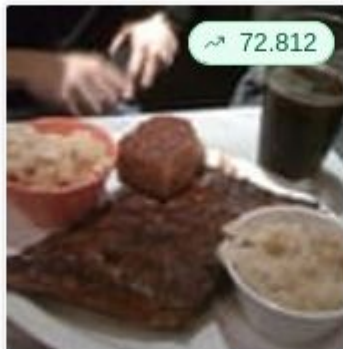
Item viewed



**Oliver & Bonacini  
Cafe Grill**



Looking similar



72.812

**Baby Blues BBQ**



72.637

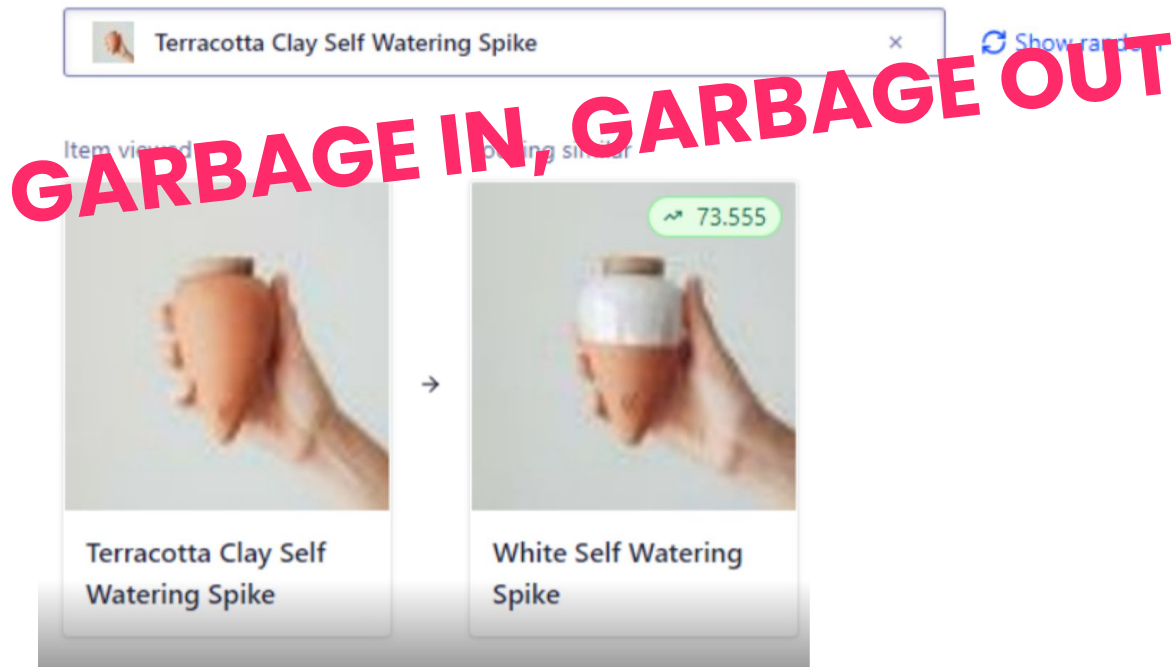
**Mango Mango**



71.289

**Venable Rotisserie  
Bistro**

# Matching hands



Try **better data**

Focused  
**imagery**

Object  
**segmentation**


Or use the **threshold!** "threshold: 0.7"

# Matching MUSCLES

## Product

23kg to 54kg Resistance  
Band

6693084102702

Price: 12.8 

Stock: 100



*Pure muscles in...*

**PURE MUSCLES OUT**



# What to do when an use-case is ugly?

There's always an alternative to better serve your content!



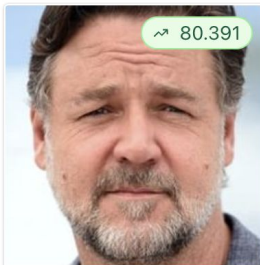
- **Metadata-based carousels**  
- **User-behavior based suggestions** 
  - Out-of-stock -> suggest **alternative** items
  - On the cart page -> offer **complementary** items

Image-based suggestions is **only one way** to surface **relevant items** to your users!

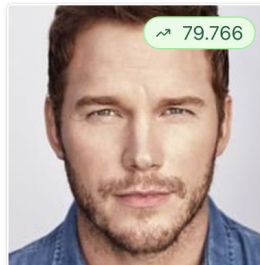
# Faces



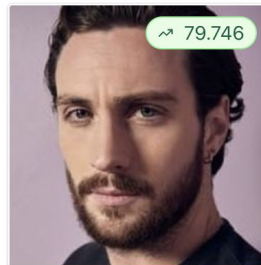
Nicolas Cage



Russell Crowe



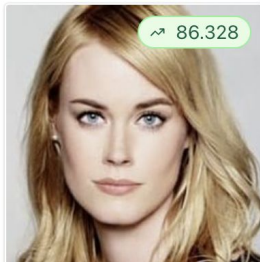
Chris Pratt



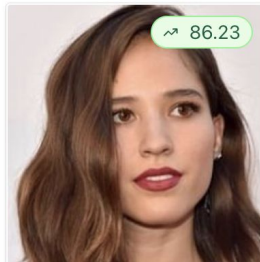
Aaron Taylor-Johnson



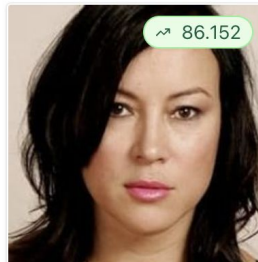
Scarlett Johansson



Abigail Hawk



Kelsey Asbille



Jennifer Tilly

# Wine



# Conclusion



# Conclusion

- **The Good:** great use-cases get **immediate uplift**
- **The “Bad”:** some should use visual recommendations **alongside other signals** to benefit
- **The Ugly:** don't judge a **book** by its **cover!**

Think about *your* use-case

# Think about *your* use-case

Would **image matching**:

- 😊 **immediately delight ?**
- 🙄 **work with other features**  
**user's purchasing criteria?**
- 😬 **or ultimately be a distraction?**

# Thank you!

Get the slides



Try the model

