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# Semantic Alchemy

Beatrice Gamba | Head of Innovation - WordLift

Distilling Data into Knowledge Graphs for Success in an  
AI-Driven World



**Beatrice Gamba**

# Head of Innovation

**wordlift**



wordlift

**Semantic Alchemy is the *art* of transforming raw data into refined knowledge graphs and ontologies powering scalable, AI-optimized outputs for both humans and machines.**

Raw  
Data

Ontology

LLMs

Knowledge  
Graphs

AI-  
Powered  
Automation

Streamlined  
Workflows

# Preparation and Setup

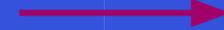
*Structuring for Digital Representation*



# wordlift

## SELECTED RAW PRODUCT DATA FROM THE PIM

price	sku	availability	sale price	material
gender	sport	condition	age	category
description	shipping price	bridge size	primary color	sizing
image	shipping weight	eye size	secondary color	website
title	manufacturer	style code	product type	unit count



## PRODUCT KNOWLEDGE GRAPH



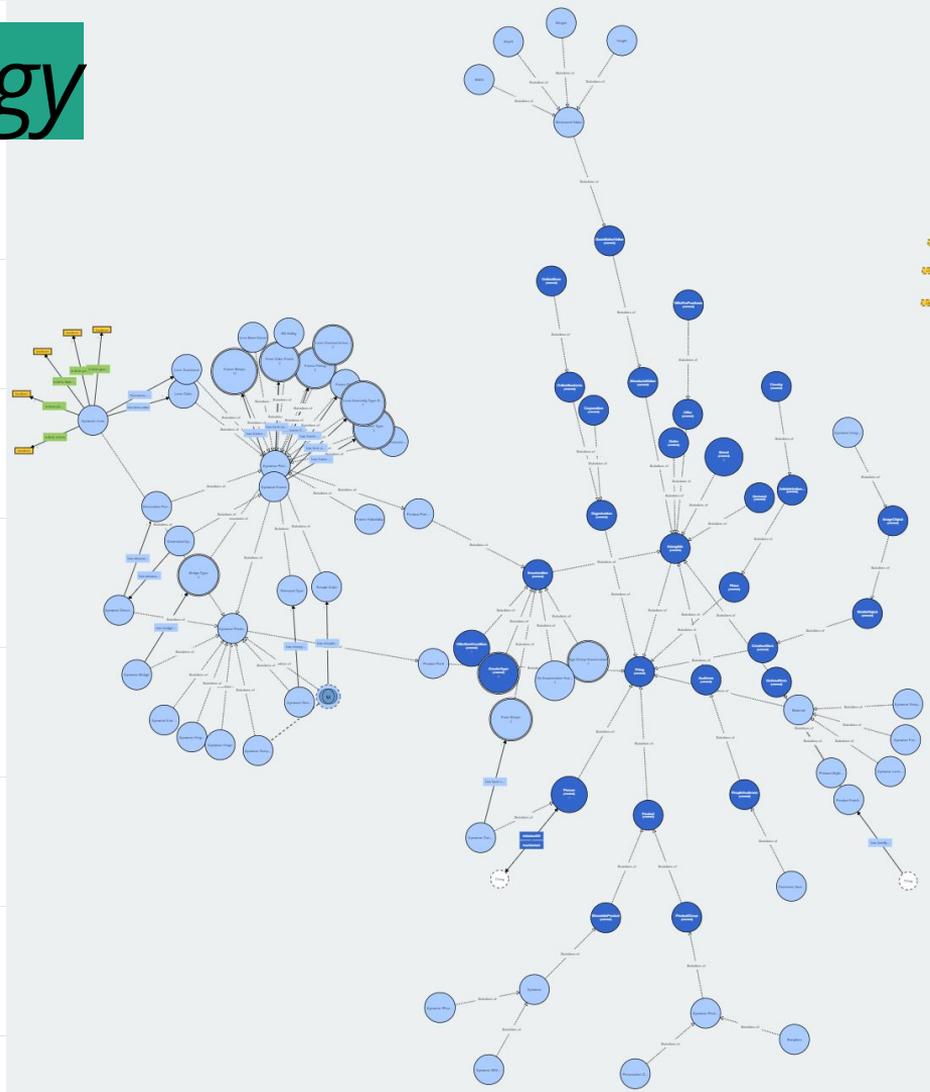
# Heating

*Building Essential Semantics*



# A formalized *ontology* for **eyewear**

- Extended 25+ Schema.org and GS1 classes
- Modeled ~60 domain classes
- Modeled ~25 domain properties
- Modeled 46 eyewear characteristic instances
- Asserted ~900 axioms (300+ logical)
- A few SWRL rules as a case-in-point
- 350+ annotations, notes and comments on every resource to help with continued work



# Automating the creation of structured product data, we leverage a **product knowledge graph** architecture to optimize for search and generative AI applications.



Seadrift

```
@context: http://schema.org
@type: "Product"
@id: https://data.luxottica.com/costadelmar/97963967471
name: "Seadrift"
url: https://www.costadelmar.com/en-us/sunglasses/659114-97963967471
material: "Nylon&Propionate , Polycarbonate"
sku: "6s911491140660-15"
category: "EYEWEAR"
gender: "Unisex"
sport: "Water Sports"
itemCondition: https://schema.org/NewCondition
age: "Adult"
sizing: "Multiple sizing options"
description: "For every waterwoman looking to bring style on their next outing without leavi...
shippingPrice: "0"
bridgeSize: "15"
primaryColor: "Copper"
website: https://www.costadelmar.com/en-us
image: https://assets2.costadelmar.com/cdn-record-files-pi/cee91446-416c-4ecc-8c10-b0400bd2...
shippingWeight: "Light"
eyeSize: "43.8"
secondaryColor: "Shiny Tortoise Fade"
unitCount: "1"
title: "Seadrift Polarized Sunglasses in Copper"
manufacturer: "Costa Del Mar"
styleCode: "06S9114"
productType: "Sunglasses"
```



offers {2}

```
@type: "Offer"
price: "166.00"
priceCurrency: "USD"
availability: http://schema.org/InStock
salePrice: "136.00"
```

shippingDetails {2}

# Vaporization

*Data Convergence in Content  
Generation*



## Standard

ALL PRODUCT VARIANT SHARE  
THE SAME DESCRIPTION



For every waterwoman looking to bring style on their next outing without leaving functionality behind, this frame is ready for the journey. Designed to move with you, it features a sleek profile and performance-driven details that stand up to the elements. Comfort, clarity, and versatility come together for a look that's as capable as it is confident. Whether you're chasing horizons or casting lines, these sunglasses are built to keep up, and help you see it all.

## AI-Generated

EACH PRODUCT VARIANT GETS ITS  
OWN PERSONALIZED DESCRIPTION



For every waterwoman looking to bring style on their next outing without leaving functionality at the dock, meet Seadrift. This sleek, 8-base, Bio-Resin frame in a striking **Urchin color** lets you roll with the waves, while purpose-built features like **Hydrolite™ rubber and micro-sculpted side shields** are there when you're ready to take the helm. Crafted with **Polarized Glass (580G) lenses**, Seadrift offers exceptional clarity and protection for long days on the water. Seadrift comes with multiple sizing options, so no matter who's looking, there's no end to what you'll see. Whether the wind takes your drift past reefs or a good weed line, you'll be ready to pick your shots with frames built to perform.

Global revenue from conversational AI services is expected to grow from \$14.6 billion in 2025 to **over \$23 billion** by 2027, driven by a surge in enterprise investment fueled by the rise of **agentic AI**.

# Condensation

*Optimizing for Humans and Agents  
Alike*



To meet user intent, data modeling must capture not just facts, but **context**.

By assigning clear roles to data points and attributes within structured frameworks, we align the agents with the way users express themselves in natural language.

W

The screenshot shows a Google Shopping search results page for "sport performance blue polarized lens boating sunglasses for women". The search bar at the top contains the query and filters for "Sport Performance", "Plastic", "Full Rim", "On sale", "Amber", "Oversized", "Get it fast", "Metal", "Square & Rectangle", "Narrow", and "Under \$100".

**Refine results**

- On sale
- Get it fast
- Used
- Small business

**Features**

- Sport Performance
- Oversized
- With interchangeable...

**Sort by**

- Price low to high
- Price: high to low

**Material**

- Plastic
- Metal
- Wood

**Frame Type**

- Full Rim
- Semi Rim
- Rimless

**Color**

- Silver
- Beige
- Yellow
- Clear

**Costa Product Line**

- Tuna Alley
- Pro Series
- Whitetip
- Brine
- See more

**Lens Color**

- Gray
- Yellow

**Bridge Fit**

- Adjustable Bridge
- High Bridge
- Standard Bridge
- Low Bridge

**Frame Type**

- Rimless
- Semi Rim

**Silhouette**

**Sponsored**

- Safety Glasses - Ice Wraparound... \$30.00 ULINE
- Mau Jim Ho'olika Rimless... \$219.00 Mau Jim - O... 4.5 (2k+)
- Tifosi Vero Performance... \$79.95 Tifosi Optics 4.5 (329)
- Zeal Optics Women's Salida... \$159.00 Zeal Optics 4.5 (3)
- Rader Prescription... \$181.00 \$231 Oakley 4.5 (3k+)
- KastKing Dugan Polarized Sport... \$27.99 KastKing
- Ray-Ban Sunglasses... \$176.00 Ray-Ban 4.5 (6k+)
- Mau Jim Nau Landing Wrap... \$279.00 Mau Jim - O... 4.5 (29)

**Researched with AI**

Women's sport performance sunglasses designed for boating prioritize blue polarized lenses to reduce glare and enhance contrast on the water, offering clearer vision while ensuring comfort and security during active wear. These specialized lenses protect against the sun's harmful rays, crucial for prolonged exposure. Look for features like a wrap-around design to block out wind and splashing water, ensuring optimal protection and uninterrupted focus on the activity.

**Related products:**

- fostergrant.com: Sunglasses Lens Color Guide | Foster Grant
- julbo.us: How To Choose Your Next Performance...
- 1800getlens.com: The Ultimate Guide to Sunglasses for...
- costadelmar.com: Costa Sport Performance Polarize...
- bolle.com: Water Sports Sunglasses | Bolle

**Costa Del Mar Women's Seadrift Sunglasses** (20% OFF) \$196.00 \$246.25 Nordstrom & more Get it by Apr 22 (Free) 5.0 (12)

**Costa Del Mar Men's Seadrift Polarized Sunglasses** \$171.00 SmartBuyGlasses.com Free delivery 5.0 (12)

**Costa Seadrift Polarized Sunglasses** \$160.00 shopdalesclothing Get it by Apr 22 (Free) 5.0 (12)

**Costa Seadrift Small Urchin Blue Sunglasses** (31% OFF) \$160.00 \$230.43 RIDRn, The Runner's Super... Get it by Sat (Free) 5.0 (12)

**Costa Seadrift Unisex Shiny Tortoise Fade Eyesize Sunglasses** \$186.00 en SportPro Get it by Apr 24 (Free) 5.0 (12)

**Costa Del Mar Seadrift Sunglasses** \$166.00 Alabama Outdoors Get it by Fri (Free) 5.0 (12)

**Costa Del Mar Seadrift Polarized Square Sunglasses** \$166.00 Nordstrom Get it by Apr 22 (Free) 5.0 (12)

**Costa Seadrift Urchin Gray** \$160.00 Shades Sunglasses and Cas... Free delivery 5.0 (12)

**Costa Seadrift Sunglasses** \$180.00 Shop Expeditions 5.0 (12)

**Costa Seadrift Sunglasses** \$186.00 Safety Gear Pro Free delivery

**About this product**

Searchfit Polarized Sunglasses in Blue Mirror | costadelmar.com Manufacturer

For every waterwoman looking to bring style to their rest outing without leaving functionality at... More v

**User reviews**

5 12 reviews  
4 0 reviews  
3 0 reviews  
2 0 reviews  
1 0 reviews

**5.0** 12 reviews

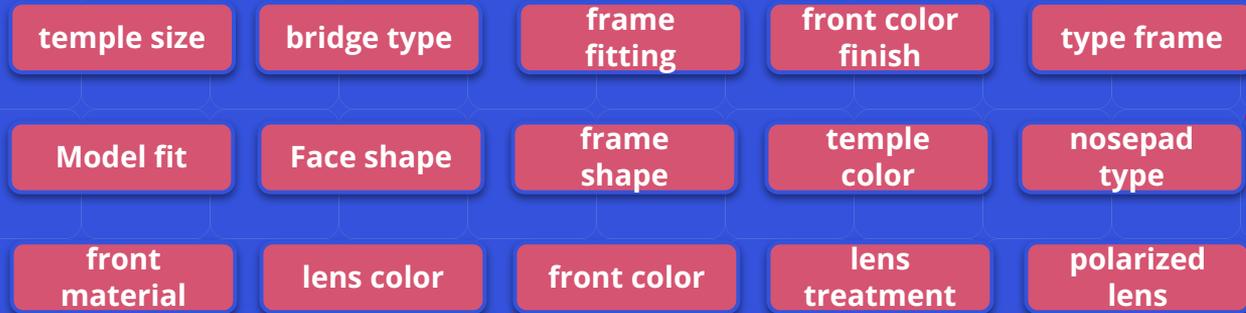
✓ All reviews - ✓ Most relevant -

**Hayley P.** 5 5 months ago  
I absolutely love my new Costa sunglasses! They are the most comfortable pair of shades that I have ever worn or owned! Everything about them is just amazing! Reviewed on costadelmar.com

**Edward M.** 5 8 months ago  
exceptional! This sun glasses are so nice you forget you are wearing any. Your eyes are like in a relax mood, love them happy wife, happy life. Reviewed on sportpro.com

More reviews v

## UNUSED ATTRIBUTES IN THE PIM



## PRODUCT KNOWLEDGE GRAPH & GOOGLE MERCHANT CENTER

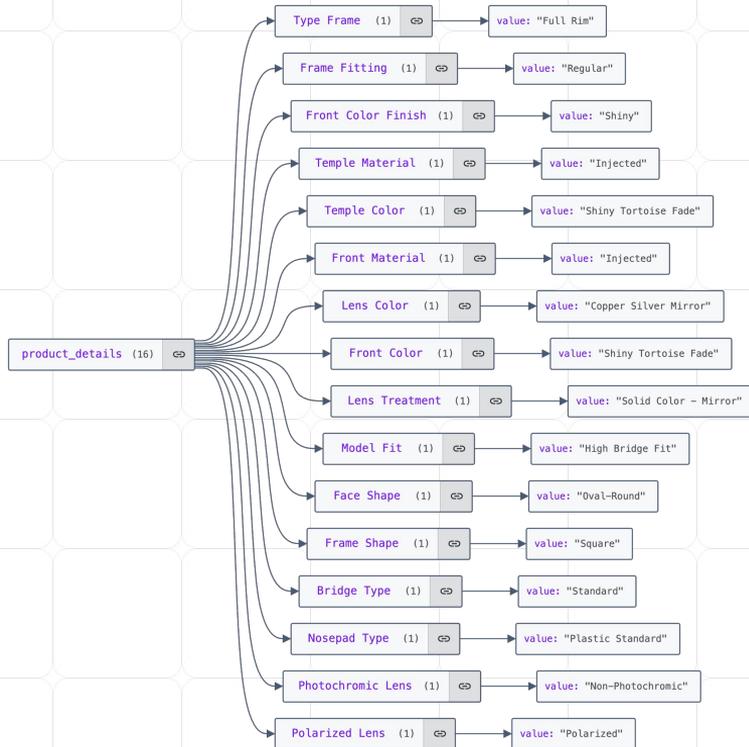


Product Details allow for the inclusion of comprehensive and **structured information**, enhancing the visibility of individual products in direct response to customer queries.



## Seadrift

Product ID  
97963967402



Google Costa Seadrift

Refine results

Stores

- eBay
- Nordstrom
- Macy's
- Half Hitch

See more

Price

Under \$150

Over \$150

\$ Min \$ Max Go

Features

Frame Type

Lens Color

Bridge Fit

Frame Fit

Silhouette

Costa Product Line

Lens Width

Material

Free shipping

Sponsored

Costa Del Mar  
https://www.costadelmar.com/costa\_del\_mar/sunglasses

**Costa Sunglasses Black Week - Up to 50% Off Sitewide**

Black Friday Week is on! Discover Costa® deals up to 50% off on eyewear and apparel. Discover **Costa Sunglasses** built for Day Fishing and shop now with free shipping & returns. 100% Polarized.

★★★★★ Rating for costadelmar.com: 4.9 - 687 reviews

Clearance · Up to 50% Off Sunglasses · Women's Sunglasses · Shop Costa® Prescription

Costa Del Mar  
https://www.costadelmar.com/en-us/sunglasses

**Seadrift Polarized Sunglasses in Copper Silver Mirror**

100% UV Protection. Your Costas absorb 100% of UV light, providing you the best in light management and protection. Scratch Resistant and Durable.

**\$172.20** \$244 · Free 8-day delivery · Free 30-day returns · In stock

Costa Del Mar  
https://www.costadelmar.com/en-us/sunglasses

**Seadrift Polarized Sunglasses in Copper Silver Mirror**

Shop the Costa Del Mar Seadrift Polarized Sunglasses in Copper Silver Mirror with 100% UV Protection at Costa Del Mar online store. Free Shipping & Returns.

**\$172.20** \$244 · Free 8-day delivery · Free 30-day returns · In stock

Costa Del Mar  
https://www.costadelmar.com/en-us/sunglasses

**Caleta Polarized Sunglasses in Copper Silver Mirror**

100% UV Protection. Your Costas absorb 100% of UV light, providing you the best in light management and protection. Scratch Resistant and Durable.

**\$163.80** \$234 · Free 8-day delivery · Free 30-day returns · In stock

People also ask

Google and AI platforms have access to rich data sets that can **power native filtering** capabilities, enabling highly **tailored experiences** that align with individual user needs.

Being **data-driven** isn't just a best practice.

It's the foundation for staying **discoverable** and **competitive**.

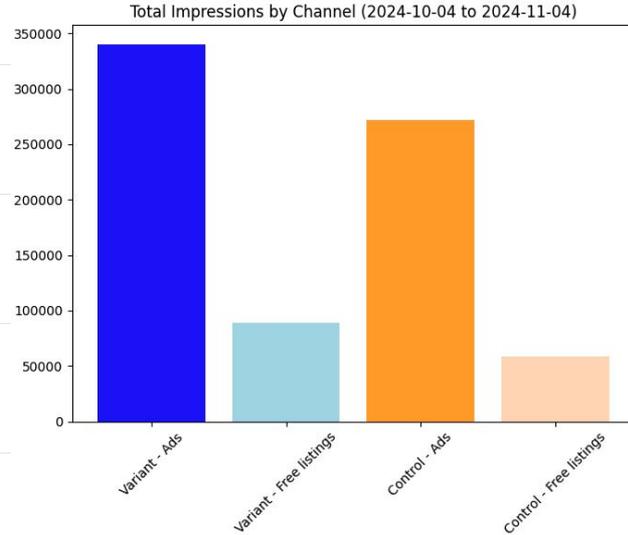
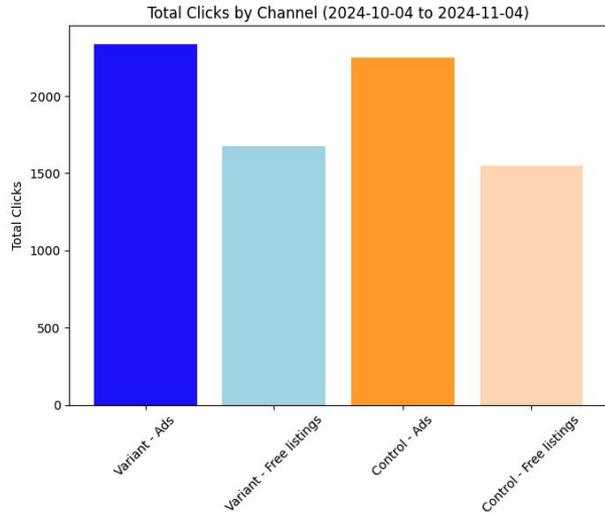
# Collection

*Performance Measurement & Iteration*



# Results on Paid and Organic Traffic

Product pages enriched with detailed information outperformed the control group, showing a measurable lift in clicks across both Ads and organic free listings in Google Merchant Center.



**+4.04%**  
**Ads Clicks**

**+8.04%**  
**Organic Clicks**

**+25.1%**  
**Ads Impressions**

**+53.3%**  
**Organic Impressions**



**wordlift**

**Thank you.**

[www.wordlift.ai](http://www.wordlift.ai)

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# Let's keep the conversation going



Link to my  
presentation



geatricebi



/beatrice-gamba/