



WHITE PAPER

# The Future of Personalization is Visual

## THE FUTURE OF PERSONALIZATION IS VISUAL

It's hard to believe that ecommerce has been around for more than two decades, and juggernaut sites like Amazon and eBay were first launched in the mid-1990s. Shopping has changed dramatically in the past 20 years, and now, people are using their smartphones to look for and purchase a wide array of products. A recent Pew Research Center [survey](#) found that 79% of Americans have made an online purchase of any type, and 51% have used their cellphone to buy something. Back in June 2000, only 22% of Americans had made a purchase online.

Personalization has become a key feature in just about every web and mobile application people use. Most consumers now want and expect shopping websites and applications to provide highly personalized shopping experiences. When it comes to online shopping experiences, personalization comes primarily in the form of recommendations. Many ecommerce applications and websites are still using old-fashioned shopping systems that have been around for decades without a lot of innovation. Most of these legacy shopping systems include some form of recommendation functionality that often rely on [collaborative filtering](#) which requires a great deal of “the wisdom of the crowd.” It's a method of providing recommendations that are based on the similarity of users where the system gives shoppers advice like “customers who bought this, also bought that” or “people who viewed this also viewed that.” Even Amazon is still using an old-fashioned collaborative filtering-based recommendation system.

### PROBLEMS WITH LEGACY RECOMMENDATION SYSTEMS

Historically, recommendation systems are based on user history and product popularity—what users have purchased, viewed, or liked. A user history-based recommendation system requires that the site visitor is logged in and has some purchase history. The system is not capable of addressing a new customer or an anonymous customer which is one of the biggest challenges of personalizing onsite.

There are several key problems when using legacy recommendation systems. One problem is that the recommendation system must sit passively in the background for weeks or months to gather data about what shoppers are doing. Another major issue with legacy recommendation systems is known as “cold start.” [Cold start](#) is where there simply isn't enough data to provide solid recommendations. If a product catalog has zero selling information, zero user viewing, and absolutely no historical information, then it is nearly impossible for the system to provide recommendations that are relevant. In addition, there sometimes isn't enough scale of data or optionality to choose from, from the recommended items on display.

Cold start is especially problematic for industries that rely on newness, like the fashion industry. Online retailers that sell clothing, footwear, handbags, and other fashion products must face the cold start problem every season if they are using a legacy recommendation system. One way of countering the cold start problem is to add padding which is simple business logic. For example, the system will display best sellers within a category. All standard collaborative filtering-based recommendation engines have this cold start problem.

Legacy systems, especially those using collaborative filtering, are highly susceptible to some outliers. If a product has been in the catalog a long time, a lot of disparate products start to show up in recommendations. For example, a site visitor viewing sunglasses could see recommendations that include a pot or a pan because other customers have bought those items along with sunglasses in the past. These types of recommendation outliers can be rather jarring.

### THE EMERGENCE OF VISUAL SEARCH

The use of computer vision with recommendation systems is relatively new. Around 2013, startups offering visually-based recommendation systems started popping up. However, it is only within about the past two and a half years that the use of computer vision with recommendation systems and visual search started to increase. Some early startups began with automatic image classification and tagging, later expanding these capabilities to visual search.

Visual search involves the use of machine learning and computer vision to understand the content of an image and allow for queries that return results based on what is in that image. Visual search is somewhat different than what we do here at Sentient as it is often about trying to match images. Sentient Aware™ is primarily about understanding the features within the image and trying to pull products with similar features together.

Also, many visual search platform providers will look at an image and try to translate it into words. They then put those words into a standard search system that is already on a customer's website or some other application that will start to curate that data. So you are still bound by the problem of vocabulary, the vocabulary of the computer system to classify it correctly and the vocabulary of the person who enters the product into the product catalog. Vocabulary can also differ between retailers and end users. For example, one person's beige is another person's tan, or one person's stiletto is another person's high heel. This vocabulary differentiation can limit the ability of shoppers to find what they want. With Sentient Aware, vocabulary is never an obstacle.

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## WHAT IS SENTIENT AWARE?

**Sentient Aware** is an AI-powered personalization and shopping experience platform optimized for mobile, but works seamlessly on any device. The platform builds a large, AI-driven model of the products in a retailer's catalog. All of the products in the catalog are plotted in hundreds or thousands of dimensions. The platform then applies proprietary algorithms that traverse through that model space based on things that a user is doing live in session—signals the shopper is giving regarding what they like or don't like, and the items they click. Sentient Aware is ideal for catalogs with products that people buy primarily based on appearance, such as clothing, shoes, and home décor.

Sentient Aware includes several UI components that can be used right out of the box, and integrated with your existing shopping system using a [single API or copy and paste JavaScript UI widget](#). UI components currently available include Personal Shopper, Intelligent Recommendations, and Living Page.

- **Personal Shopper** is an interactive shopping experience that allows users to select specific features of a product based on their personal preferences. The widget lets users drill down through product features until the shopper hones in on the exact product they are seeking.
- **Intelligent Recommendations** is the standard, visually-based products recommendation feature that comes with Sentient Aware. The Recommendations feature helps customers quickly and easily find the products they are looking for in real time.
- **Living Page** is a personalized landing page that a retailer can use to set up and showcase a collection of products on their website. Using a CMS, the retailer can insert a block of code provided by the Sentient Aware platform. Once the code is in place, the landing page is enabled and automatically merchandised. Living Page can be used to enhance email marketing and ad campaigns by providing a relevant landing page for shoppers.

## WHAT MAKES SENTIENT AWARE DIFFERENT

What primarily differentiates Sentient Aware from legacy recommendation systems is the fact that it is visually based. Typical legacy recommendation systems focus on historical data instead of real-time data or the current intent of the user. Relying on historical data and potentially out-of-date user patterns means that the recommendations are often inaccurate and the system is not actually providing true personalization. Legacy systems also typically do not use specialized models for recommendations. At Sentient, we have tuned our models to work for specific categories, for fashion and beyond. Sentient Aware also uses proprietary data and specialized knowledge we have gathered from existing customers about certain retail category spaces.

Sentient Aware drills down to the components of the product, things the consumer may not be consciously be aware of. Algorithms sort product features based on the individual user's engagement and patterns. For example, the system can figure out if the user prefers a specific heel shape, heel height, or some other minute feature that might not be extracted and sorted using other typical methods.

### **PERSONALIZED RECOMMENDATIONS POWERED BY ONLINE LEARNING**

Sentient Aware uses [online learning](#) to automatically and continuously learn from user interactions and apply that knowledge to its models. Most visually based personalization and recommendation platform providers are using visual components to provide a recommendation or an ordered search. They are looking at personalization from a strict catalog basis and are not taking into account in-the-moment inputs from the user. Shoppers click or tap through products in many different ways. With Sentient Aware, each one of those clicks makes a difference in determining what the shopper is going to see. Conversely, there is much the system could learn about individual users from what they don't click on, or what they scroll past. Sentient Aware can ingest these gestures as signals as well. Few, if any, legacy systems use online learning, so they are not capable of automatically learning and re-merchandising based on signals.

### **NO MORE COLD START PROBLEM**

With Sentient Aware, the most prominent signal in identifying stylistic similarity of preferences is the image of the product. The system can take a product feed from a retailer then turn around and deploy that model in a couple of days. The retailer can then choose to go live with recommendations and other personalization features on their website. We have seen the initial model, with no type of augmentation, will provide lifts of 5 – 6% over traditional recommendation systems. Because images are the most important source of information, recommendations can be ready to go, and at the near highest capacity right out of the box.

### **TAILOR-MADE FOR MOBILE**

Our engineers have architected the back end of the Sentient platform and designed the way the models interface with the algorithms so that it dovetails perfectly with the way mobile devices are set up. Most mobile app users are just scrolling and tapping through photos and links. They are not necessarily typing in information or clicking checkboxes, which are the way most retail websites are set up for people to shop. There is also the "image translated to words" problem. Many recommendation systems, especially legacy systems, do not necessarily lend themselves well to mobile devices.

# 79%

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At Sentient, we are building products like Sentient Aware that provide AI-powered UI components. Our platform allows retailers to enhance existing shopping cart systems with highly relevant personalization and recommendations. The UI lets users scroll and tap through recommendations in the same way they would on Facebook, Pinterest, or Instagram on their phone. The UI also compensates for small screens that limit the number of products that can be viewed by users. Personalization is critical to showing shoppers the most relevant products right away.

We believe the AI is the perfect partner to the UI elements, and the future of how people use their devices.

### **PERSONALIZATION FOR MODERN CONSUMERS**

Many retailers are still using old-fashioned online shopping systems with legacy recommendation capabilities that are not designed for modern consumers who are increasingly mobile-first. Many consumers today are using smartphones and applications that leverage advanced technologies such as AI and machine learning. Many consumers expect shopping applications to be as advanced and personalized as the other applications they use every day.

Retailers do not have to keep providing customers the same dated shopping experiences or spend millions of dollars reconciling decades-old systems with modern devices and applications. Sentient Aware is an efficient and cost-effective solution that automatically merges an optimal customer user experience with key product data.

With [Sentient Aware](#), retailers can provide shopping experiences and personalization for the consumers of today, and tomorrow.





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## ABOUT SENTIENT TECHNOLOGIES

Sentient's mission is to transform how businesses tackle their most complex, mission-critical problems by empowering them to make the right decisions faster. Sentient's technology has patented evolutionary and perceptual capabilities that will provide customers with highly sophisticated solutions, powered by the largest compute infrastructure dedicated to distributed artificial intelligence.