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## **ADOPTION OF AUGMENTED REALITY IN INDIAN EYEWEAR RETAIL: A STUDY WITH REFERENCE TO LENSKART**

**Mr. Sangam Koli**

Assistant Professor  
Guru Nanak College of Arts, Science & Commerce

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### **ABSTRACT**

This paper looks at the design, deployment, and impact of augmented reality (AR) virtual try-on systems in online eyewear retail, focusing on Lenskart. Lenskart is an Indian omnichannel eyewear retailer that has integrated AR and AI into its shopping experience, particularly through a “3D Try On” feature and facial analysis tools. This approach aims to reduce uncertainty in online purchases while improving conversion rates, customer satisfaction, and personalization. Using secondary data from company pages, product and blog posts, app descriptions, as well as industry and academic literature, this study reviews existing research on AR in e-commerce, details Lenskart’s AR capabilities, evaluates the benefits and limitations, and offers recommendations for further research and practical use. Key findings show that AR increases experiential value, reduces perceived risk, and enhances online adoption for visually evaluative products like eyewear. However, issues with technical accuracy, user experience design, accessibility, and privacy management continue to pose significant challenges.

**KEYWORDS:** Virtual Try-On Technology, Face Mapping ,3D Face Scanning, E-commerce Innovation

### **INTRODUCTION**

The rise of immersive technologies, such as augmented reality (AR) and virtual reality (VR), has opened new doors for retailers to replicate physical product interactions in online spaces. Eyewear is particularly suited for AR since fit, style, and appearance heavily influence purchase intent. Traditionally, consumers depend on in-store try-ons to assess frames. Lenskart, one of India’s largest eyewear retailers, has adopted an AR-first strategy by implementing a real-time 3D try-on system alongside AI-based face analysis and recommendation tools. This case illustrates how AR is integrated into a high-volume retail environment and how it interacts with user experience, backend data systems, and business metrics like conversion rates and returns. Lenskart highlights the availability of a 3D try-on feature on its website and mobile app, as well as face shape detection and AI-driven



recommendations as part of the AR experience.

### STATEMENT OF THE PROBLEM

Business measurement Retailers often lack consistent metrics and long-term data to link any increase in conversion directly to AR features. Privacy and perception: Users might be hesitant about face scanning; clear practices and genuine data minimization are crucial. This case study examines how Lenskart has tackled these challenges and identifies remaining gaps. Accuracy versus performance trade-offs: High-quality facial mapping and lens/frame rendering need significant computational power, which can lead to lag or errors on low-end devices. User experience adoption friction: Users might find it difficult to discover or use AR features effectively such as permissions, lighting, or posing guidance.

### SIGNIFICANCE OF THE STUDY:

Understanding AR's effect helps Lenskart and similar retailers optimize digital merchandising, reduce logistics costs from returns, and refine UX features for higher conversions. For academia, the study adds India-specific empirical evidence about AR impacts on consumer behavior in omni channel retail.

### REVIEW OF THE LITERATURE:

#### 1. Manchanda, M. & Deb, M. (2020)

Title: "On m-Commerce Adoption and Augmented Reality: A Study on Apparel Buying Using m-Commerce in Indian Context."

This study explored how augmented reality (AR) influences the adoption of mobile commerce in India, particularly in apparel buying. The authors pointed out that AR helps customers visualize clothing before they buy, bridging the gap between online and offline shopping. The study found that AR's perceived ease of use, usefulness, and enjoyment significantly shape consumer attitudes. Indian consumers showed a greater intention to buy through mobile apps when AR features were included.

#### 2. Trivedi, T. (2023)

Title: "Generation Z Inclined Toward Immersive Shopping Experiences: AR Virtual Try-On in Online Retail in India."

This research focused on Generation Z, a tech-savvy demographic in India, analyzing their use of AR-based virtual try-on (VTO) in online retail. With a sample of 300 respondents, the study demonstrated that perceived utility, enjoyment, and ease of use are key factors influencing positive attitudes toward AR adoption. The research highlighted that Gen Z consumers prefer immersive, interactive, and gamified shopping experiences. This work aligns with global findings but also.

#### 3. Jain, T. & Gupta, A. (2023)

Title: "Thematic Analysis for Identifying the Factors Affecting the Adoption of Augmented Reality



by the Customers in the E-Commerce Industry in India.”

Using a qualitative approach and thematic analysis, this study looked at the factors that drive or prevent AR adoption among Indian online shoppers. The authors identified five main themes: usability and simplicity of AR apps, accuracy and technical quality of AR features, trust and data privacy, perceived costs and resource constraints (such as high-speed internet and smartphones), and the influence of social factors on adoption. The study found that while Indian consumers are open to trying AR, significant barriers remain.

#### **4. Walia, S. & Tomar, J. (2024)**

Title: “Consumer Attitude Towards Virtual Try-On Experiences: Examining the Impact of AR on Consumer Purchasing Behavior.”

This study aimed to assess how Indian consumers view AR-based virtual try-on features for fashion and accessories. The findings showed that perceptions of realism, interactivity, and usability heavily influence overall attitudes toward AR technology. Positive attitudes towards AR were linked to stronger purchase and intentions, emphasizing that accurate virtual try-on systems not only build trust but also elevate the likelihood of purchase.

#### **5. Bhatia, N. (2024)**

Title: “The Impact of Augmented Reality (AR) on Consumer Behavior and Ecommerce Performance.”

This research examined the broader effects of AR on Indian e-commerce by studying how AR affects consumer engagement, satisfaction, and repeat purchase behavior. The results indicated that AR boosts trust in online platforms by offering a more realistic product experience. It also found that retailers using AR typically see better performance related to conversion rates and brand loyalty. The study noted that while AR adoption in India is still progressing, it has significant potential.

### **2.1 AR/VR in E-commerce: Theoretical background**

AR adds computer-generated content to the real world, allowing consumers to see products in context. This technology changes two main parts of online shopping: perceptual vividness (providing a richer, more realistic view) and interactivity (allowing users to manipulate the view, like rotating or moving items). Research shows that these changes enhance both hedonic (pleasure, novelty) and utilitarian (task efficiency, accuracy) value for consumers. Systematic reviews indicate that AR research in e-commerce focuses on tests of perceived realism, user presence, trust, purchase intention, and reduced return rates.

### **2.2 Virtual try-on for apparel and eyewear**

Virtual try-on (VTO) emerged early in the fashion and accessories markets. Studies show that realistic VTO can enhance product confidence and lower return rates, but success relies heavily on tracking



accuracy (correct alignment of the product to the body or face), rendering quality, and the user experience flow for activation. In studies specific to eyewear, researchers stress the importance of accurate facial landmarks, 3D head pose estimation, and per-frame alignment to support head movement. Researchers also point out demographic and cultural differences in adoption, noting that younger, tech-savvy consumers respond more favorably.

### 2.3 Business outcomes and challenges

Meta-analyses show that effective AR use in retail leads to increased engagement, longer shopping sessions, higher conversion rates, and lower return rates. However, challenges include technical complexity, increased app demands, varying device capabilities (like camera quality and processing power), privacy and data sensitivity issues, and the need for a consistent user experience across different platforms. Literature calls for long-term field studies to assess the real impact of AR on business, beyond lab-based or short-term tests.

#### RESEARCH GAP:

Existing industry pieces explain implementation and UX, but empirical, India specific quantitative evidence linking AR features (usefulness, ease-of-use, trust, aesthetic realism) directly to purchase intention and post-purchase outcomes (returns, conversion uplift) remains limited. Additionally, cross-category comparisons (eyewear vs. cosmetics vs. footwear) lack controlled analyses, and few studies integrate app analytics with consumer survey data for triangulated evidence. This study aims to fill these gaps by mixing survey responses with behavioral metrics.

#### OBJECTIVES OF THE STUDY:

Primary objective:

To analyze how Lenskart implements AR-based virtual try-on and assess the implications of this technology for consumer behavior and business results using secondary data.

Secondary Objectives

The study aims to:

Summarize the technical features and user experience (UX) aspects of Lenskart's AR offerings.

Identify challenges and provide recommendations to improve AR deployment in large-scale eyewear retail.

#### HYPOTHESIS:

H0<sub>1</sub> (Null): Use of Lenskart's AR virtual try-on has no significant effect on customers' purchase intention.

H1<sub>1</sub> (Alternative): Use of Lenskart's AR virtual try-on increases customers' purchase intention.

H0<sub>2</sub> (Null): Perceived usefulness of AR is not significantly related to purchase intention.

H1<sub>2</sub> (Alternative): Perceived usefulness of AR is positively and significantly related to purchase



intention.

### **RESEARCH METHODOLOGY:**

This research relies on secondary qualitative and quantitative data from:

The present study is a case-based descriptive research conducted to understand the role of Augmented Reality (AR). Since this is a case study, the research has been carried out primarily through secondary data sources. The period of the study was from August 2025 to October 2025, during which all relevant information was collected, verified, and analyzed. The research design used is descriptive, as the objective is to describe and interpret existing information rather than test hypotheses through new data collection. No primary data was collected through questionnaires or interviews due to the nature of the topic and the availability of reliable secondary data.

### **LIMITATION:**

Since this study relies on secondary data, it cannot establish direct causal links to business outcomes (like sales lift). Conclusions are therefore inferential.

### **OBSERVATION:**

Lenskart offers a comprehensive AR experience:

**3D Try-On:** Users can see frames on their face using selfies or live camera, rotate their head, and view frames from multiple angles.

**Face Analysis & AI Recommendations:** The system detects facial shape, suggests appropriate sizes, and recommends frames tailored to individual features.

**Social Integration:** AR filters are deployed on Instagram, and videos/tutorials promote AR try-on features.

These features show a holistic AR strategy across native apps and social platforms.

**UX Considerations:** -

**Strengths:** Quick onboarding, large catalog support, and smooth AR interactions.

**Friction Points:** Users may struggle to find try-on options; AR performance can decline in poor lighting or when wearing glasses.

**Technical & Operational Insights:** -

Core tasks include facial landmark detection, 3D head pose estimation, and real-time 3D rendering.

AR works across devices, with optimizations for lower-end hardware.

Industry practices suggest Lenskart likely uses AR toolkits (ARKit, ARCore) and custom ML pipelines for face analysis.

**Impact Indicators:** -

While exact business metrics are unavailable, secondary sources suggest AR boosts engagement and customer satisfaction.

Academic literature supports that AR improves perceived fit and reduces returns for fit-sensitive



products.

#### **FINDINGS:**

- 1.AR reduces purchase risk:3D Try-On and face analysis help users feel confident in their choices.
- 2.Personalization matters: Combining AR with AI recommendations narrows options and enhances perceived relevance.
- 3.Operational complexity: Supporting AR at scale requires significant investment in 3D assets, rendering, and device testing.
- 4.UX & accessibility: Clear discovery, guidance, and smooth performance are essential for AR adoption.
- 5.Privacy is crucial: Transparent policies and data management maintain user.

#### **SUGGESTIONS:**

Lenskart demonstrates how AR can solve a key online retail problem: helping users confidently buy appearance-sensitive products. Its 3D Try-On and face-analysis system improves user experience and aligns with literature showing AR can increase engagement, purchase intention, and reduce returns. However, true business impact can only be measured with internal A/B tests and conversion data. Future research should integrate user behavior analytics and controlled experiments to quantify AR's effect on purchases and returns.

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