A Retail Apparel Transformation with Generative AI and NLP

Challenges facing retailers for the adoption of Generative AI

Generative AI, which includes technologies like Generative Adversarial Networks (GANs) and models like OpenAI's GPT and DALL-E, holds great promise for the retail industry in areas such as product design, marketing, and personalized customer experiences.

However, using generative AI in retail presents its own unique set of challenges:

**Skill Gap and Training**
There's a significant skill gap in the market when it comes to AI expertise in general and Generative AI in particular. Retail companies often find it challenging to hire or train staff with the necessary AI skills. The rapid evolution of AI technologies makes continuous learning essential, further exacerbating the skill gap.

**Intellectual Property Concerns**
Generative AI can produce new designs, patterns, and even marketing content. Determining the ownership of these AI-generated creations can be tricky. For instance, if a generative AI creates a unique product design, who owns the rights to it? The company, the AI developer, or the AI itself? This raises novel legal and ethical questions about IP rights.

**Data Privacy and Security**
As AI systems often rely on large amounts of customer data to make predictions and recommendations, ensuring the privacy and security of this data is paramount. Retailers must navigate complex regulations like the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA) while ensuring that their AI systems don't inadvertently expose or misuse customer data.

**Over-reliance on Generated Content**
While generative AI can produce vast amounts of content quickly, over-relying on it can lead to a lack of authenticity or originality in marketing campaigns or product designs. It's essential to strike a balance between AI-generated content and human creativity to maintain brand identity and authenticity.

For retailers, the key is to use generative AI as a tool that complements human creativity and decision-making, rather than replacing it. Proper guidelines, ethical considerations, and continuous monitoring are essential to harness the potential of generative AI while mitigating its challenges.
Why current tools in the market fall short

Generative AI tools, as promising as they are, face certain limitations due to the nature of their underlying technology and the complexities associated with AI. Here are some reasons why current generative AI tools fall short:

**Understanding of computational cost**

Even using pre-trained large language models (LLMs) is computationally expensive for enterprises due to costs involved in invoking requests to these models (ex: Azure OpenAI). Majority of the tools lack needed checks and optimization techniques required to reduce computational costs. In addition, environmental impact due to the high energy consumption of large-scale AI models makes optimizing a key area to be addressed.

**Operationalization**

Many of the tools currently available are standalone tools that do not integrate with enterprise workflow systems. Also, seamless integration for real-time data processing and decision-making is critical in the dynamic retail environment.

**Tools built for experts**

Many of the tools are built for technically savvy experts, this creates a lost opportunity when business stakeholders who understand market nuances cannot directly engage with the tools.
How Predactica solves the problem differently?

Predactica with expertise in building enterprise grade AI products and solutions with cloud operational expertise looks at the problem holistically and provides solution that is scalable and cost effective to meet customer needs.

**Measure and Improve**
Create a baseline measure of performance metrics and compare against newer datasets. Improve performance by optimizing prompts to retrain the models.

**Strategy and Planning**
Work with business and technical stake holders to understand business objectives and priorities.

**Optimize**
Provide capabilities in the tool to measure and optimize costs involved in invoking Generative AI models. The measures include providing feedback to users on the cost of executing queries against the large language models (LLMs) and internal optimizations to reduce redundancy in data inputs.

**Data mapping and cleaning**
Automate data sourcing from multiple channels, clean the data and use data unification techniques to feed into Generative AI models.

**Built for citizen data scientist**
The intuitive no-code tool is built to be used for both business users and expert data scientists alike.

How Retailers benefit from using Predactica's solution

Predactica helps retailers by

- **Identify product portfolio gaps by analyzing current market trends, customer preferences, and historical sales data.**

- **Improved automation and efficiency for product marketing & design leading to reduced operational costs and increased profit margins.**

- **Rapid turnover in design times helping retailers stay ahead of fast-changing fashion trends.**
Case Study: A Retail Company

Client is a Texas, Dallas based retail apparel company with over 50 years in the industry. The company designs and manufactures high end fashion apparel with licensing attached to the products. Company’s apparel designers monitor fashion industry trends in designing trendy apparel and their manufacturing team out of India creates the products based on the design. The company’s products are sold direct to consumers via the company web site and also to large retail customers like Walmart, Target etc.

Tech environment

- **Azure**: OpenAI (client secured environment)
- **BERT**: Google BERT based NLP/OPEN AI
- **Snowflake**: Snowflake deployment on top of Azure cloud
- **Python**: Python
- **Streamlit**: UI based on StreamLit and React.JS

Challenge

The client has been using spreadsheets and manual mechanisms to track product demand and maps them to existing inventory. This created huge inefficiencies due to lack of a centralized digital platform. In addition, the client was not able to capitalize on consumer trends in real-time due to a lack of required automation and technological skills within the team.

The client’s reliance on spreadsheets and manual processes to track product demand and inventory led to significant inefficiencies. These inefficiencies not only hampered their ability to meet customer demand promptly but also resulted in the production of unsold products, leading to high inventory costs and reduced profitability.

Solution

The proposed solution addressed these challenges through a multi-faceted approach:

1. **Creating a Unified Data Model**
   - We established a common data model that mapped product attributes across sales and inventory data, providing a centralized view of product information.

2. **Solution**
   - Utilizing Natural Language Processing (NLP) powered by azure open AI, we analyzed customer reviews and comments on Amazon’s online store, extracting valuable insights.

3. **Automated Product Attributes**
   - We automated the extraction of product names and attributes based on Amazon searches, seamlessly mapping them to the client’s products and inventory.

4. **Identifying Trends and Competitive Insights**
   - Our solution identified key consumer fashion trends and highlighted gaps in the client’s offerings compared to competitors.

5. **Next Best Action Recommendations**
   - Based on consumer demand analysis, we provided actionable recommendations to optimize product offerings.
Results

The implementation of our solution yielded impressive results:

80% Reduction in Manual Efforts
Automation significantly reduced the need for manual data tracking and analysis, allowing the client’s team to focus on more strategic tasks.

Approx. $2.5 Million in Cost Savings
The streamlining of processes and improved demand-sensing capabilities translated into substantial cost savings, enhancing profitability.

Reduced Demand Sensing Analysis Time
What used to take months for demand analysis now takes just days, enabling the client to respond swiftly to market trends and consumer preferences.

Testimonial

"Predactica’s Generative AI platform helped us automate and extract insights into consumer apparel preferences in the ever-changing fashion industry. What used to take us weeks in the past through manual efforts has been reduced to hours with Predactica’s Solution."

- Director of Analytics, Fashion retail client

Technical certification

- Snowflake Ready
- Snowflake Select
- Snowflake Accelerated