Ilkogretim Online - Elementary Education Online, 2021; Vol 20 (Issue 2): pp. 2611-2617
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2021.02.277

Implication Of Artificial Intelligence In Fashion Industry And Its Sustainable Impact

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Abstract: Artificial intelligence is a concept that has gained popularity in recent years and has a broad definition. Artificial Intelligence penetrates all conventions and finds a long-term home in fields such as art, music, textiles, and fashion design. Fashion is one of the most profitable sectors on the planet, with earnings in the global garment market expected to reach $2.25 trillion by 2025. Regardless of the conventional environment of the fashion industry, AI is largely changing the sector, from how fashion enterprises create their things to how they are advertised and sold. The fashion business is being transformed by artificial intelligence (AI) across the board, including design, manufacturing, shipping, marketing, and sales. AI is being utilized to increase productivity in the fashion industry as well as in corporate operations. In addition to web 4.0 and other upcoming technologies,

1. INTRODUCTION TO AI:

There is no single definition of Artificial Intelligence Universally, a specific definition is provided by the European commission's high level expert group on Artificial Intelligence which refers AI as "systems that shows intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. Ai-based systems can be purely software-based, acting in the virtual world (e.g., voice assistants, image analysis software, search engines, speech and face recognition systems) or ai can be embedded in hardware devices (e.g., advanced robots, autonomous cars, drones or internet of things applications)."

1.1 Basic AI Characteristics:

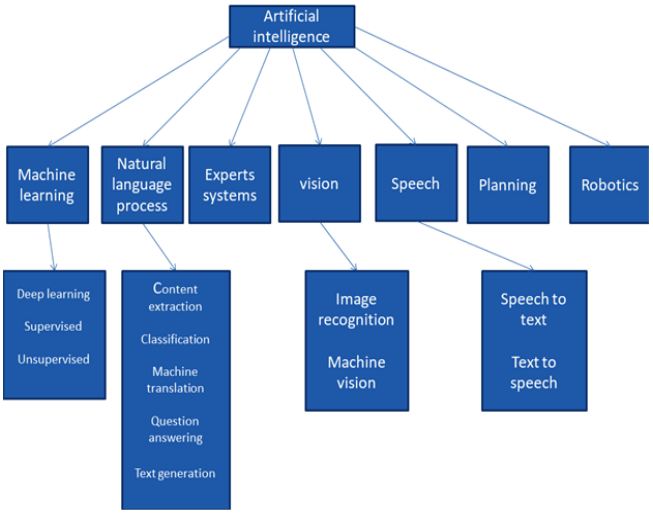


Fig 1. AI block diagram

1.1.1 Tools and techniques:

Machine Learning is an important component of AI Systems these days, ML is classified as set of techniques by which machines achieve the ability to self-learn in an autonomous manner, without human intervention.

There are basically three types of ML Algorithms:

- Supervised Learning
- Un supervised Learning
- Reinforcement Learning

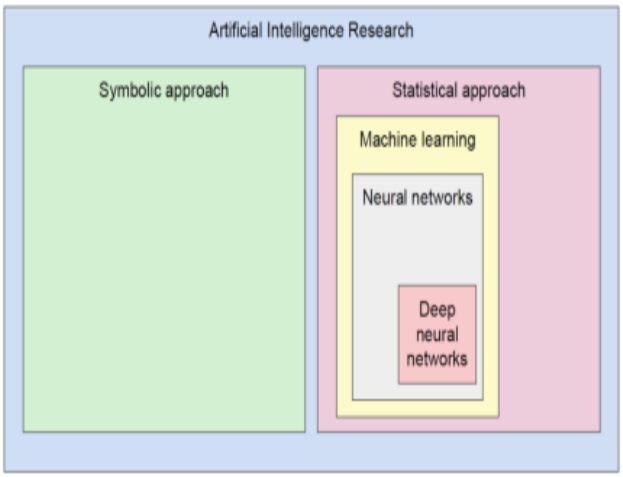
In Supervised Learning the data provided to the AI System Contains the test cases as well as the answers in the data set, based on this data the ai system predicts the outcome when new test cases are introduced.
While in Unsupervised learning the data provided is divided in clusters without any knowledge of how to divide it into group.
This could be used to recognise facial patterns by clustering pixels and then provide them to supervised learning system for facial Recognition.
Reinforcement Learning can be defined as a process of instructing an environment how to perform by the use of software. These Algorithms are mostly used in Robotics, Car Automation as wells as Natural Language Processing.
Machine Learning also have a descendant know as Neural Networks, Neural Network is a network of interconnected neurons (Nodes) which compute information in parallelly by communicating across the linked neurons.
The Knowledge of the system is represented by these patterns of data communication.
Neural networks are made up of three essential components:
• Input layers, which contain input data
• Hidden layers, which contain the synapse architecture
• Output layers, which provide the network's final results

Deep Learning is a kind of architecture that consist of supervised, unsupervised and reinforcement learning. It uses layers of neurons that is similar to brain neurons, each layer performs specific computation and passes the data to layer above it.
The Diagram below represents the relationship between AI and Machine Learning:

1.1.2 General Adversial Networks (GANs): is kind of artificial intelligence presented by amazon in 2017 (for AI fashion designer) which are mainly focused towards improving efficiency of an unsupervised learning-based model. It consists of two different neural networks, one which creates results and other which assess the correctness of those results.

Fig 1.2 | Source MIT IPRI 2018

1.1.3Data Mining: is an AI based technique which is used to extract meaningful data from collections of big data. For example, in fashion sector people like and dislikes in social media would be useful to determine their perspective on goods and trends.



1.2 AI Application areas:

1.2.1 Computer Vison (CV):
With the help of machine learning we can recognise things in images, the layers of deep learning can detect pixels of the essential features of an image.
After detection the features are passed to upper layers in the network and at the final layer the item is recognized. In fashion industry CV and used in visual image search, augmented search, artificial mirrors.

1.2.2 Natural Language Processing (NLP): Natural Language Processing is a branch of AI which specifically deals in processing of natural human language. It gives machine an ability to understand natural human language.

1.2.3 Predictive Analysis: Based in Statistical methods and mathematical modelling with the help of Artificial Intelligence future trends are predicted. For ex: During the pandemic Average Cases and Daily Covid Cases were predicted based on statistical Models.
In fashion industry by understanding customer behaviour products are recommended to customers and even demand / market of a product is predicted.

1.2.3 Robotics: use in field of fashion industry is just in alpha phase, due to certain complexities like fabric handling, stitching. The use of Computer Vison and advanced algorithms is adapting and soon we will see robotic automation in fashion industry.

2.0 APPLICATION OF AI IN FASHION INDUSTRY:

2.1 <u>Customer Service Enhancement:</u>

2.1.1 Ai Chatbots and Assistants:

Ai Chatbots/Assistants are used in many retail websites, these chatbots are used to bring in autonomy in customer support, so that number of users can be reduced which have to contact a customer support agent. These chatbots allow 24 x 7 fast support and resolve most of the simple queries by themselves.
These chatbots are generally of two types:
Scripted: Limited to follow set of established rules.
AI bots: Use **NLP** to understand user and give result according to it.
In fashion industry these chatbots are also act as retail person, which recommends users some products according to selective input given to them.

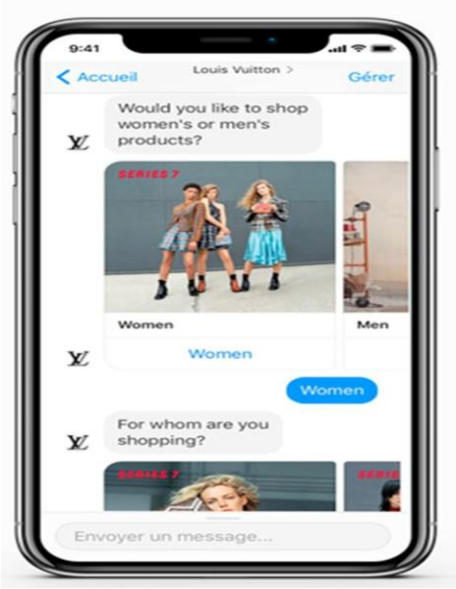
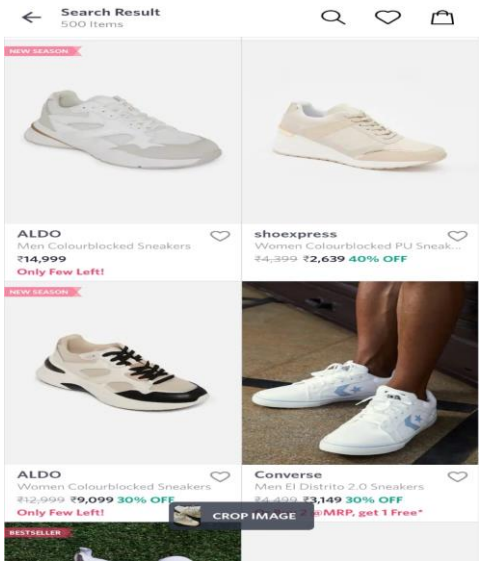
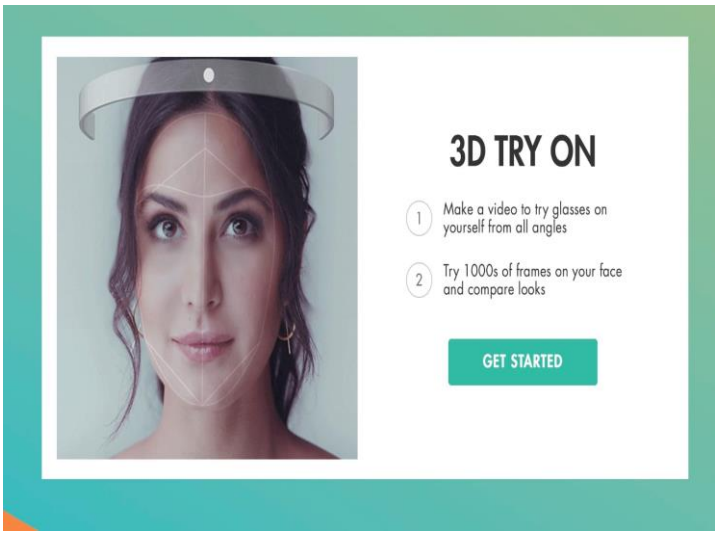


Fig 2.1 | Louis Vuitton Bot (Facebook Messenger)

2.1.2 Reverse Image Search: we have all seen image search everywhere in internet, google introduced the image search in 2001, in which we input some text and get images as output,
reverse image search is opposite to image search in which we use an image to search to get similar looking images/products, it is achieved with the help of computer vision and certain algorithms.





Fig

2.2 Myntra Image Search |Source Myntra

The above image shows how a fashion retail brand (Myntra) uses image search to provide easy hassle-free way to search products.

2.1.3 Augmented Reality (3D Try On): In Fashion Industry, businesses can improve their customer experience by engaging their customers with alluring experience of virtual environment /mixed reality by creating special environment to engage with.
Augmented Reality (AR) helps us to merge reality and virtual experience.
With the help of AR customers can try products and accessories before buying them.

Fig 2.3 | Source Lens kart

The above image shows how lens kart have used augmented reality for providing 3D try on to their customers.

2.1.4 Recommendation Systems: With the help of AI merchandise provide personalized recommendation to their users according to their likes /dislikes and their behaviour.
These AI recommendation systems are of two types:
Collaborative: this type of recommendation system if fed enormous data of customer purchases by which it recommends similar products to other users.
Content: this type if system uses customer action and preferences.

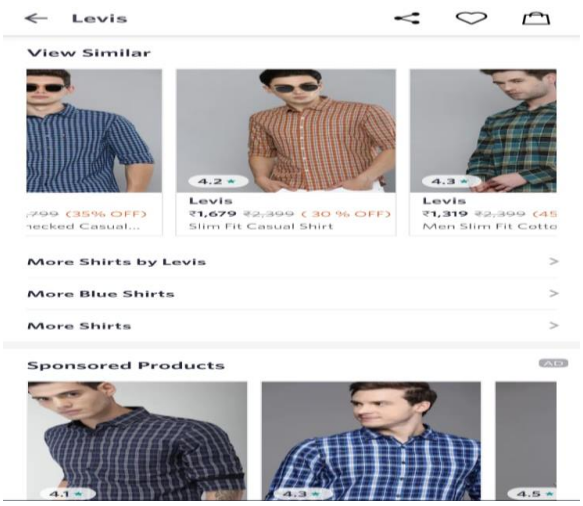


Fig 2.4 | Source Myntra

This image represents similar product recommendation in Myntra. This can be the example of content filtering recommendation system.

2.2: Inventory and Supply Chain Management

The use of AI in inventory management have increased due to short term market and pile of unsold product, hence it has become necessary to correctly predict amount of inventory to manufacture to prevent loss.

These AI applications are used for learning trends, inventory management and predicting the demand inside the market.

Otto one of the German brand is using deep learning to predict 90% customer orders beforehand, this allows them to have a stock management system which automatically orders good from third party sellers beforehand (The Economist 2017).

Farfetch an online marketplace is promoting AI among is partners for increasing inventory and supply chain visibility by linking store and online inventory for store pickup and return services.

3.0: Sustainable Impact of AI in Fashion Industry:

- The fast fashion industry wastes a lot of money due to the endless changes in the fashion industry. Artificial Intelligence can help minimize this waste by analyzing data and predicting sales trends. This technology can also help retailers reduce their inventory levels and improve their customer satisfaction.
- Availing rental fashion is a solution that saves consumers money by allowing them to buy clothes that are already used. In 2021, a startup called Rent the Runway became the first e-commerce platform to go public.
- In order to scale up the system using AI, robotic arms need to be able to automatically identify the various cleaning methods used on the clothes when they're retrieved. This process can then be performed in a minimal amount of time, which can help maximize the reuse potential of the clothes.

- Due to the advancements in 3D virtual models, virtual fitting rooms are expected to become a reality soon. With this technology, customers can easily measure their own body size and purchase the correct sizes online reducing returns.

- Environmental Impact and Waste at Landfills are being reduced as the fashion production is slowed, with the help of Increasing Customer Satisfaction with the help of AI.

- Automated Warehouse Management helps to deliver product fast and helps reducing errors, which helps in saving resources and making a sustainable environment.

Advantages of AI in fashion industry:

- **Customer Experience Enhancement:** With the help of AI Fashion Brands and Retail have provided a smooth and hassle-free experience from Personalized Recommendation and Advertisements It is easy for customers to get what they want , which directly impact the sales and profit of the brands.
- **Inventory Management:** using predictive analysis fashion brands and retailers can plan out there inventory and prevent dead stock/unsold inventory and losses.
- **Automation:** Using AI automation Fashion Retailors can automate repetitive task and can bring down man power , task like customer support , data entry can be automated.
- **Decreases amount of Returns:** with the help of personalized recommendation engines , customers get what they need and are satisfied which reduces return.
- **Market Forecasting:** as we know the fashion industry have regular changing trends, a new trends arrives every month or two, leading to unsold inventory , AI Forecasting tools helps to predict customer demand early.

Conclusion: AI in fashion is transforming the way the industry works. It will allow brands to create and deliver better products and services by analyzing and understanding the sentiments of their customers.it can help fashion companies cut down on errors and improve the quality of their products by analyzing and predicting what will be in style. It will also keep the industry at the top of its game.

References:

1. https://www..co.in/LMS/2020/08/20/an-overview-to-artificial-intelligence/
2. The Libera Università Internazionale degli Studi Sociali "Guido Carli"(http://tesi.luiss.it/25378/1/212661_PUPILLO_MARIANNA.pdf)
3. https://www.itu.int/en/ITU-D/Regional-Presence/ArabStates/Documents/events/2019/ET/S2-Emerging%20Technologies%20Tunis%20%20Final%20PS%2021.04.2019.pdf
4. Myntra (myntra.com)
5. Lenskart(lenskart.com)
6. Medium(https://medium.com/vsinghbisen/how-ai-is-changing-fashion-impact-on-the-industry-with-use-cases-76f20fc5d93f)
7. https://www.sustainably-chic.com/blog/how-ai-is-making-the-fashion-industry-more-sustainable#:~:text=AI%20Increases%20Customer%20Satisfaction&text=Increasing%20customer%20satisfaction%20with%20the,products%20that%20they%20really%20like.