INT404 – Artificial Intelligence

CA1 – Seminar Pre-Submission Report

Artificial Intelligence on fashion industry

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SUBMITED TO – Akshara Rana Mam

Name (Project Head) - Akshara Rana Mam Registration Number - 20413
Name - Atul Soni Registration Number - 12115448
Name - NA Registration Number - NA
CLASS NAME -K21QT Roll NUMBER - B54

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CHAPTER 1

INTRODUCTION

The fashion industry is quickly adopting artificial intelligence as a game-changer. AI is changing everything, from design to marketing to sales, and it's giving companies new opportunities to become more efficient and succeed. However, just like any other technology, there are difficulties with applying AI to the fashion industry.

The majority of people were raised believing that artificial intelligence only existed in fiction. As it turns out, artificial intelligence is real and more helpful than we could have ever imagined. In everyday tasks, especially in the fashion industry, humans make mistakes. The manufacturing department may become frustrated and disappointed if we miss a stitch or two in the sewing room or cut the fabric incorrectly and have to start over on a dress that has already taken days to complete. AI can help in this situation. A new partnership between fashion and artificial intelligence is one that will undoubtedly be successful for many years to come.

FIG-1.1

With the potential to revolutionise businesses through increased speed, reduced operational costs, and access to a depth of consumer and market data that promises a strong competitive edge, artificial intelligence (AI) has swept into many industries.

A subfield of computer science called artificial intelligence (AI) encourages intelligent behaviour in computer-controlled machines to carry out tasks similar to those performed by humans.

It was not surprising that the fashion industry's initial response to AI was an odd mix of reluctance and an eagerness to be at the forefront of innovation. After all, there are legitimate concerns about automating a sector of the economy that depends on human creativity.

It is crucial to emphasise at this point that while AI models human reasoning, its ultimate goal is not to replace it.

The best use cases for AI in the fashion industry use machine learning, algorithms, and rich data to enhance human and business capabilities.

FIG-1.2

AI supports and validates the creative decision-making process of product development in the fashion industry by monitoring design components like colour, fabric, patterns, and cuts as well as their historical retail performance and predicted future performance indicators.

CHAPTER 2

DIFFERENT APPLICATIONS OF AI IN FASHION INDUSTRY

2.1 AI HELPS MAKE DECISIONS

Do I look good in this colour? With the aid of AI-powered virtual styling tools that guide customers in selecting items for their body type, skin tone, and clothing needs, retailers can assist customers in finding the answer to that question.

One illustration is Styleriser, a B2B German company that creates AI-based image consulting software. A virtual stylist reviews a picture that a customer uploads to the retailer's online store. It gets specific and suggests colours that work best with the person's skin tone (wear cream instead of white, or charcoal grey instead of black). According to CEO and cofounder Mark Hunsmann, the tool increases shopping confidence, which raises purchase readiness by 80%. Additionally, he continued, this results in lower returns, which support the industry's viability.

Artificial intelligence (AI) has grown in importance as a tool for better decision-making in the fashion industry. Here are a few applications for artificial intelligence in the fashion sector:

- **Trend forecasting:**Artificial intelligence (AI) has the ability to forecast trends by analysing massive amounts of data from a variety of sources, including social media, search engines, and e-commerce websites. Fashion brands can choose better styles, colours, and fabrics by using AI algorithms to analyse consumer behaviour and preferences.

- **Personalized recommendations:** AI can assist fashion retailers in giving customers personalised recommendations based on their preferences, previous purchases, and browsing history. Increased customer satisfaction and sales may result from this.

- **Inventory management:** By forecasting which products will sell when, AI can assist retailers in maximising inventory management. This can aid retailers in reducing waste and overstocking and understocking while increasing profits..

- **Virtual try-on:** Customers can virtually try on clothing to see how it will look on them without actually trying it on thanks to artificial intelligence (AI). This can make shopping more enjoyable and lessen the chance of returns..

2.2 AI HELPS WITH DESIGN

Almossawi uses AI to get ideas and is inspired by it; as a result, he has come up with more ideas than he would have otherwise. The early stage of every designer's process "involves a lot of explorations and ideation sessions," including tossing around wild ideas and group brainstorming. He claimed that AI facilitates collaboration by extending human-to-human interaction to human-to-machine interaction. As bizarre and fascinating as AI is, he asserted, "I can only see it getting better and doing much more than just outputting images."

Here are a few applications for artificial intelligence

- Fabric selection: Using criteria like texture, durability, and sustainability, AI can assist designers in selecting the best fabrics for their creations. By making sure they choose the best materials for their designs, this can save designers time and money.

- Artificial intelligence (AI) is capable of producing complex patterns that are difficult or time-consuming for humans to produce. These patterns can be used by designers to produce one-of-a-kind designs or to add to collections.

- Custom clothing can be made using 3D body scanning technology and fit customization. In addition to reducing waste, this can enhance the customer experience by supplying clothing that fits perfectly.

FIG-2.1

- Almossawi, for instance, used AI to design a line of clothing inspired by the Japanese kimono. I thought it would be interesting to consider designing various silhouettes with various textures and details, the man said.

2.3 AI AIDS MERCHANDISING

- Online shoppers can better understand what a garment looks like and how it will look on them by using AI-driven augmented reality (AR) and virtual reality (VR) tools. With some apps, users can project clothes onto their actual bodies and then experiment with colour, texture, and accessories to find the perfect look.

- "A significant component of creating buzz around a product is product placement... With AI, you can quickly create interesting backgrounds in various styles for your product.

- According to Almossawi, AI can also place products in the appropriate setting. According to him, a key component of creating buzz about a product is using product placement to explain what it is and why it was created. "With AI, you can easily create interesting and pertinent backgrounds for your product in a variety of looks.

- AI can analyse how customers interact with visual displays and make suggestions for improvements to product placement, signage, and other components.

- Fraud prevention: Artificial intelligence (AI) can examine transaction data to find fraudulent activity, minimising losses brought on by chargebacks and other forms of fraud.

2.4 AI CAN “GREEN” FASHION

According to the UN Alliance for Sustainable Fashion, the manufacturing of clothing is responsible for up to 8% of global greenhouse gas emissions and 9% of the annual microplastic pollution in the oceans. As restocking returns is frequently not financially feasible for retailers and high-fashion brands don't want to devalue their names by selling to deep discounters, the majority of returned items end up in landfills.

- Starting with trend forecasting, AI can be helpful in many areas. Making a mass-produced product based on what consumers want is a game of chance; if the manufacturer bets poorly, they'll end up with a lot of unsold clothing. A number of companies use AI and machine learning to scan social media for images, noting patterns, shapes, and colours to help their manufacturer clients determine which products will succeed and which ones will fail. In addition, these businesses use AI to guide brands in developing pricing plans and avoiding fads.

FIG-2.2

- Sourcing sustainable materials
- Reducing inventory
- Enhanced purchasing experiences

2.5 AI CAN REDUCE COUNTERFEITING

- Who desires a replica Birkin bag? Nobody, especially someone who spent at least $40,000 on the genuine article. There are two ways AI applications can help avoid awkward situations.

- AI is used by accounting behemoth Deloitte's One tool to identify design infringements. The tool, dubbed Dupe Killer, uses data from millions of photos to identify subtle but distinctive design elements, such as an item's shape, colour, or even distinctive stitching patterns. This article in Vogue Business explains how Dupe Killer aids brands in identifying and pursuing businesses that are unauthorised using their design trademarks.

- Another method helps customs agents and others in the supply chain identify fakes by authenticating "real" goods using computer vision, a branch of artificial intelligence.

✧ **Here are some strategies for utilising AI to lessen counterfeiting:**

- **Image recognition:** AI algorithms can be trained to identify distinctive elements, like logos, watermarks, or serial numbers, on genuine goods or documents. The AI can quickly determine whether an item is genuine or fake by comparing these features to those on a suspect item.

- **Data analysis**: AI can look for patterns or anomalies that might point to counterfeit activity by analysing vast amounts of data, including financial transactions, supply chain data, and online reviews.

- **Machine learning:** By learning from new data and modifying its models accordingly, machine learning algorithms allow AI to continuously improve its capacity to identify fake goods.
- **Blockchain technology**: By ensuring that all transactions are genuine and transparent, secure, tamper-proof digital records of transactions can be created using AI. This can help prevent counterfeiting.

2.6 AI CAN ADVANCE WEARABLES

- The incorporation of AI into clothing could lead to smarter fabrics, clothing that is better for sports and performance, and clothing that is more responsive to the body. For instance, certain materials can sense when a person is sweating or hot, and when they do, tiny pores in the material open up to let more air flow through.

- Additional materials have varying degrees of stiffness and flexibility. A wearer's body movements and sporting patterns could be used by AI to design areas of the garment that are stiffer or more flexible, enhancing performance. "The opportunities are limitless."

❖ Here are a few examples of how AI can advance wearables:

- Real-time monitoring: Wearables with sensors can gather information on a range of health indicators, including heart rate, blood pressure, and sleeping habits. AI algorithms can analyse this data in real-time to provide users with valuable insights and alerts for potential health risks.

- Improved User Interface: By utilising natural language processing, voice recognition, and gesture controls, AI can aid in the creation of a more intuitive and user-friendly interface for wearables.

- Smart Assistance: Wearables equipped with AI-powered virtual assistants can provide users with hands-free access to information, reminders, and notifications.

- Predictive Maintenance: Based on usage patterns, battery life, and other factors, AI can help predict when wearables may need maintenance or repair, enhancing their dependability and decreasing downtime.

2.7 AI CAN FIX FIT

- AI can contribute to enhancing the fit of clothing. AI can analyse enormous amounts of data on body measurements, fabric properties, and design specifications to produce precise virtual models of clothing. This is done with the aid of machine learning algorithms and computer vision techniques.

- The fit of a particular garment can then be predicted using these virtual models on a variety of body types and sizes, allowing designers and manufacturers to make necessary changes to the design. In order to assist customers in finding clothing that fits well and complements their individual tastes, AI can also be used to generate personalised recommendations for them based on their body measurements and style preferences.

- Overall, artificial intelligence (AI) has the potential to completely transform the fashion industry by increasing the precision and effectiveness of garment design and production, which will result in better-fitting clothing and happier customers.

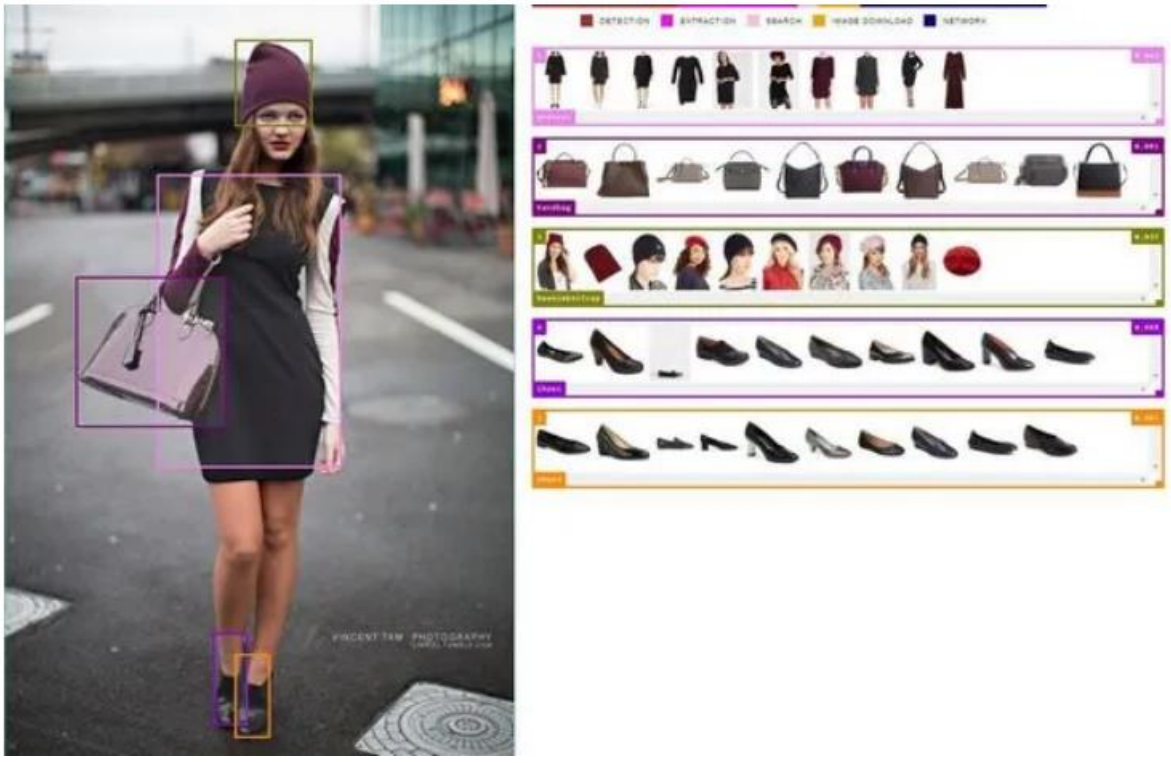

FIG-2.3 (STYLING THE FASHION ACCESSORIES)

2.8 GENERAL APPLICATION OF AI IN FASHION INDUSTRY

The fashion industry is changing as a result of artificial intelligence (AI), which is streamlining and improving a number of processes including marketing, production, design, and inventory management. Fashion businesses can improve customer understanding, cut waste, and boost productivity with the aid of AI.

The following are some applications of AI in the fashion sector:

1. Personalized product recommendations are made possible by AI algorithms that examine customer information like past purchases and browsing patterns. This aids fashion businesses in boosting sales and customer engagement.

2. Virtual try-on: Using their smart phones or computers, customers can virtually try on clothing and accessories thanks to AI-powered virtual try-on technology. This lessens the need for returns and aids customers in making wise purchases.

3. Supply chain optimization : By forecasting demand, identifying the most effective production techniques, and minimizing waste, AI algorithms are being used to optimize the supply chain.

4. Fashion that is sustainable: Artificial intelligence (AI) is being used to create sustainable fabrics and materials as well as to cut waste in the supply and production chains.

5. Fashion design: By examining data from social media and online fashion trends, AI algorithms are being used to help designers create new designs.

6. Customer service: By responding to customer questions and resolving issues in real-time, AI-powered chat bots and virtual assistants are used to provide customer service and support.

- Product Design: AI can analyse information from social media, fashion blogs, and e-commerce websites to spot new fashion trends and assist designers in coming up with new lines that suit consumer tastes.

- Fraud Detection: Systems that use AI to detect fraud can assist merchants in spotting and stopping illegal activities like credit card fraud and fake returns.

- Sustainability: By streamlining production procedures, cutting waste, and enhancing supply chain transparency, AI can assist fashion brands in lessening their environmental impact.

- AI-powered image and video recognition can be used to recognise logos and patterns on clothing, assisting brands and retailers in keeping an eye on the use of their intellectual property and spotting counterfeit goods.

- **1. Artificially intelligent chatbots** are able to understand human language and can think of solutions to questions that aren't already known. Specialized chatbots are now readily available for retail applications. This chatbot uses natural language processing (NLP), which enables it to customise marketing activities like email, social media posts, customer service contacts, and product reviews based on the linguistic context. A chatbot has helped ASOS, an online retailer of clothing, increase sales by 300%, and Levi's, a pioneer in the use of chatbots, partners with AI firms like mode.ai to use them to assist customers in finding the ideal pair of jeans.

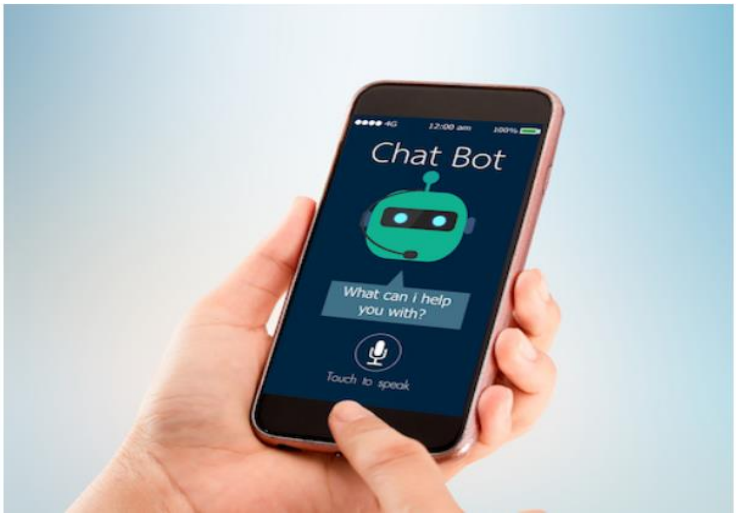

FIG-2.4

2. **Visual Search**: A subset of reverse image search, it enables users to locate specific objects within an image and conduct searches for them. For instance, this would enable you to look for a similar outfit, pair of shoes, or accessory in an image. While neural networks and computer vision make it possible to see objects, machine learning makes it possible to recognise them. The online fashion retailer ASOS has created a visual search application that transforms the customer's smartphone camera into a sort of discovery tool. The customer can take a picture of a product, and the ASOS application can match it with its own inventory by identifying the shape, colour, and pattern of the object, and find comparable products.

2.9 GENERAL IMAGES

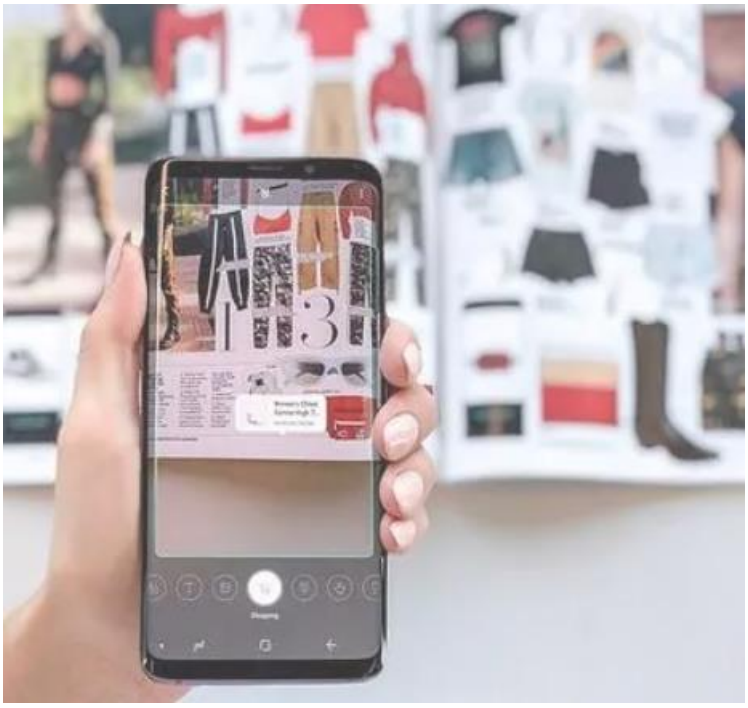

FIG-2.5 (VIRTUAL SERACH)

FIG-2.6 (FASHION DESIGN USING AI)

FIG-2.7(AI IN FASHION INDUSTRY)

FIG-2.8 (SMART MIRRIOR)

CHAPTER 3

IMPACT OF AI IN Fashion industry

The fashion industry has a variety of applications for artificial intelligence. In the first use case, digital assistants are used in an advisory capacity to make clothing recommendations to clients based on their height, weight, shape, and current size.

The practicality and productivity of AI in fashion will also be used for in-store and online retail. Retailers can easily keep track of their inventory, sales, returns, online purchases, and other activities with the aid of AI. According to McKinsey data, 144% of the profits in the fashion industry are produced by the 20% of global fashion brands that use AI. It is abundantly clear that in order to benefit financially from AI, a fashion brand must rank in the top 20%.

Another scenario where fashion brands can gather data about their customers' needs and intended purchases involves the use of chatbots. In the end, AI is changing the way that apparel manufacturers and designers create their goods. AI is also changing how clothing is sold and delivered to consumers in the fashion industry.

Supply chain management is one of the areas where AI in fashion is having the biggest effects. Businesses can make better decisions about what to stock and when by using AI models that can be trained by historical inventory levels and sales performance.

Artificial intelligence ("AI") is a field of computer science that is advancing technology by developing machines that mimic human intelligence processes. AI will open up new opportunities for innovation and emerging technologies that are based on AI and AI-driven processes. The prevalence of AI is changing how businesses create products, engage with suppliers and customers, and forecast trends. It is also being seen as a more valuable tool across a variety of industries.

3.1 MAJOR IMPACT OF AI IN FASHION INDUSTRY

The fashion industry is one that has benefited from the use of AI. The fashion industry has been able to use AI in a variety of creative ways by compiling data from social media and the Internet to gain insight into rapidly changing fashion trends, identify what consumers want, help with the design process, and gather information on key characteristics of rival fashion lines and price points.

It is advantageous for businesses in the fashion industry to have access to such vast amounts of data and the ability to synthesise that data objectively and effectively, but despite their apparent advantages, these developments may also give rise to new legal issues, threaten established intellectual property rights, and raise privacy issues in ways that were previously unproblematic.

The distinction between human-created and machine-created technologies may become blurred as a result of the potential practical issues that the use of AI may present for businesses regarding the ownership of intellectual property rights. It is crucial to comprehend the potential legal repercussions of using artificial intelligence and should not be disregarded. As a result of these developments, lawyers and professionals across a range of industries are increasingly interested in analysis and commentary on the potential effects of using AI-generated works because this novel field of technology raises interesting legal questions, particularly in relation to concerns about privacy and intellectual property

The benefits of AI allow brand owners to remain competitive and will probably play a larger role in product development, so the fashion industry will probably continue to use it despite these potential legal issues and uncertainties.

3.2 Many ways AI changes fashion Industry

In many ways, artificial intelligence (AI) has changed the fashion industry. The following are some of the major effects of AI on the fashion industry**:**

Personalization: AI has made it possible for fashion businesses to offer their customers a personalised shopping experience. AI algorithms can make personalised product recommendations to each customer by examining their data, including their search history, purchase history, and social media activity. Along with improving the shopping experience, this has also improved client retention.

Supply Chain Management: The fashion industry's supply chain management has been greatly enhanced by AI. Fashion businesses can forecast demand, manage inventory, and improve production schedules by implementing AI-powered algorithms. As a result, waste has been decreased, efficiency has been increased, and profitability has increased.

Product Design and Development: The process of product design and development has been completely transformed by AI-powered tools like generative design software and virtual reality tools. With the help of these tools, designs and prototypes can be quickly created, tested virtually, and modified as needed before being put into production. In addition to saving money and time, this has raised the quality of the finished product.

AI has made it possible for fashion companies to quickly and accurately analyse fashion trends. AI algorithms can forecast upcoming fashion trends by examining social media data, fashion blogs, and runway shows, which can assist fashion companies in designing and developing products that are in demand.

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The Fashion Industry's Integration of Artificial Intelligence and Human Capabilities: Artificial Intelligence Applications by Fashion Companies

The ability to collect and analyse massive amounts of data to better understand consumer demand has proven particularly helpful in the fashion industry, as one example. In the era of the Internet and social media, it is more difficult for designers, retailers, and suppliers to anticipate consumer demand and figure out how to quickly satisfy that demand. With consumer access to the Internet and social media, trends in the fashion industry are changing more quickly. Being unable to keep up with these changes can be problematic for businesses in this sector, as humans are unable to process all of the data from individual customers and entire markets, social media feeds, and customer product reviews.Additionally, it is difficult for humans to not be influenced by their own bias and thought processes.

In order to address the fashion industry's need to forecast individual consumer purchases and quickly track trends that the general public will adopt, artificial intelligence (AI) has come into play. AI has made it possible for the fashion industry to collect and analyse massive amounts of data, which is revolutionary and enables businesses to be more responsive to the market and consumer preferences. For instance, Burberry, a well-known and well-respected luxury fashion brand, has used big data and AI to improve its sales and customer relationships as well as a tool to thwart fake goods.Burberry uses big data to make customised recommendations for both online and in-store shoppers and as a way to boost sales. The company encourages customers through loyalty and reward programmes. Burberry also employs big data and AI to track down counterfeiters and identify fake goods using Entrupy's AI-powered image recognition technology. This technology claims to be 99% accurate in identifying counterfeit goods and can determine whether a product is real or fake. Such technology is extremely valuable to a company like Burberry because it enables Burberry to swiftly shut down and put enforcement measures against counterfeiters despite being one of the most copied brands in the world.

3.3 AI AND COPYRIGHT LAW

As it raises a potential ownership issue, copyright is one area in particular that is implicated in the interaction of AI and intellectual property rights. The use of AI to generate fabric patterns, colours, and silhouettes is a key aspect of the technology being used by the fashion industry that raises concerns about copyright. The question is whether the design is jointly owned or solely owned by the human who contributed to it when AI-generated designs combine human and machine contributions.

There is currently no clear copyright protection for fashion designs made using AI in the United States, nor is there a specific law addressing the ownership of works made by machines. Although section 306 of the Compendium of U.S. Copyright Office Practices specifically states that "[t]he U.S. Copyright Office will register an original work of authorship, provided that the work was created by a human being.... [T]he Office will refuse to register a claim if it determines that a human being did not create the work," this requirement for human authorship is still present. The amount of AI involvement in a design that would disqualify it from copyright protection is unclear, and there is no U.S. case law that specifically addresses this issue with respect to AI.The "monkey selfie" case, Naruto v. Slater, is notable because it involves an assertion of animal authorship. The Ninth Circuit ultimately decided that the monkey lacked standing to sue under the Copyright Act because animals are not permitted to file copyright infringement lawsuits under the Copyright Act.

With regard to the use of AI technologies in the fashion industry, this area of intellectual property will probably be a major concern because it may affect the level of originality needed for copyright protection and raise questions about the need for human authorship. If such AI-generated designs are not protected, they may be more susceptible to copying in the future, harming fashion companies and brands, and raise complex questions about what can be considered an infringement for designs created entirely or in part by AI.

3.4 AI AND TRADEMARK AND COUNTER-FITTING

AI has provided positive developments for brand owners in the areas of trademarks and counterfeiting, despite potential legal difficulties and uncertainties. To detect potential infringement and confirm the authenticity of a potentially counterfeit good, some AI technologies can provide image processing capabilities. One example is a service provided by Entrupy, which was established in 2012 and offers a machine learning app to detect fake fashion items based on a database of genuine luxury items. This service is used by Burberry. This service claims to be 99.1% accurate and has used data samples spanning the past 80 years to the present to distinguish between fake and genuine goods.

Using AI-powered image and text analytics, another service provider, DataWeave, introduced a Counterfeit Products Detection solution in 2018 to help brands identify and lessen the presence of counterfeit goods on e-commerce websites. Additionally, DataWeave provides a range of goods, such as brand analytics and retail intelligence services. The use of AI can be advantageous for brand owners, especially in identifying and reducing infringement and counterfeiting activities across the Internet and around the world, as these two examples of AI-powered services and technologies show

AI will be a valuable tool in being able to address and identify infringement for global brands and reduce losses from counterfeiting while minimising costs of investigation efforts and enforcement of potential infringers and counterfeiters as these technologies are used by companies in the fashion industry more frequently and are further developed..

CHAPTER 4

FUTURE SCOPE

FIG-4.1

We know that nothing can replace human creativity in the design process, but artificial intelligen ce(AI) can be used to assemble, manufacture, sell.

A. **I technology for small retailers**

For small retailers on tight budget, an important consideration is AI for content analysis and mar kup, which can reduce the burden on your data teams by freeing them up to focus on other impor tant tasks. In general, small retailers need to think about how technology can improve the custom er experience and engage their customer base.

With the rise of artificial intelligence (AI), the future of fashion tech is looking brighter than ever. AI is enabling fashion tech to move beyond the traditional shopping experience. AI is revolutionizing how we shop and interact with fashion. AI is transforming markets, helping fashion entrepreneurs get closer to their customers by providing greater personalization and convenience.

Supply Chain Inventory Management Real-
time inventory tracking (e.g., using RFID), warehouse management, or operational purchasing he lps get your orders moving on time, creating a best customer service in customer orders.

AI-enabled chatbots offer customers the opportunity to shop in the convenience of their own homes by providing personalized recommendations, interactive product displays and styling advice. AI also offers insights into customer behavior, empowering fashion entrepreneurs to create more relevant and better-targeted marketing campaigns.

The role of virtual try-on apps in increasing online shopping and helping shoppers to try on clothes virtually without leaving their homes, how amazing to be just at home and try a new cloth at any time!. Virtual try-on apps can use AI and computer vision technology to give customers an accurate 3D representation of their bodies. This can give shoppers a better sense of how clothes fit them, reducing the risk of buying items that don't fit or are unsatisfactory.

It could also let them see how an article of clothing looks with their own accessories or shoes. This sort of technology has the potential to drive a large amount of traffic to the site as shoppers try on dresses, and may lead to faster and more confident purchase decisions. It may also be accessible for shoppers to match the dress with shoes or accessories they already own or plan to purchase. The API can be enhanced to show which color the dress is available in, reducing the return and exchange policy. Overall, an app like this can increase sales by providing consumers with a more convenient and personalized shopping experience. I believe partnering with a virtual try-on app can be an exciting and innovative step for fashion businesses. It can give shoppers a better sense of how clothing fits their bodies without having to try on clothes in stores or risk ordering items online that don't work correctly.

CHAPTER 5

CONCLUSION

There are many ways artificial intelligence (AI) and machine learning technologies are influencing the global fashion industry today to improve its performance, including through the personalization of products or better designing. These technologies have enormous business potential, as evidenced by the significant increase in investments made in them by numerous top fashion brands. Artificial intelligence (AI) can be used in a variety of ways, including machine learning, deep learning, natural language processing, visual recognition, and data analytics, to forecast trends more accurately and help reduce forecasting errors, which would lead to a decrease in the amount of clothing produced but never worn. Modern fashion manufacturers are experimenting with the use of AI to enhance human textile workers and improve the quality and efficiency of manufacturing processes.

Future forecasts predict that the market for AI technology will reach $7.3 billion. Artificial Intelligence (AI) is becoming an essential component of technology in the apparel and fashion industry, which is not surprising given that machine learning in retail is already in high demand.

Fashion companies are now better able to respond to consumer demands, strengthen customer relationships, and use social media and other platforms to boost sales and offer a more engaging experience thanks to the use of AI and big data. The fashion industry will continue to find new uses for AI given the technology's rapid development and use of big data. The law will need to address the intersection of AI with intellectual property and privacy issues to prevent threats to innovation and better define the parameters of ownership and protection of intellectual property and data. However, the implications and challenges of AI, which is still largely unregulated in the United States, may continue to raise new legal issues.

This project has shown that technology has always played an important role in fashion. Yet, it is with the diffusion of digital technologies and the wealth of data created by these technologies – the digital transformation – that the fashion industry started a more profound and faster transformation that is changing the way in which customers shop and interact with products and brands. At the same time, companies are adopting these technologies to manage their own supply chain better or are using real-time data and analytics to forecast demand better and optimize pricing.

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