Artificial Intelligence and Trend Forecasting in the Fashion Industry: Ethical and Anticipated Ethical Issues

Olivia Bowles and Richard Wilson
Towson University, USA

obowles1@students.towson.edu
wilson@towson.edu

Abstract: Trend forecasting within the fashion industry is aimed at predicting the of future popular styles, materials, colors, and all things related to the development of fashion. Trend forecasting is based on information collected about past, present, and projected future developments in the fashion world. AI, as it has been applied in other areas in society, is now being applied within the fashion industry. This analysis will focus on AI being applied to trend forecasting within the fashion industry. Using AI in trend forecasting brings a number of advantages for those in the fashion industry while at the same time raising a number of ethical concerns. Three significant ethical concerns that are related to the employment of AI in the fashion industry are, the invasion of privacy from the data mining required to gather data to make predictions about fashion trends, the consequences for businesses of incorrect trend predictions, and the anticipated environmentally unsustainable nature of fast fashion due to the overconsumption that consumers practice and that is increasingly promoted by AI. Overconsumption is the product of how AI is involved in rapidly forecasting new trends in fashion that consumers then follow. Addressing all of these ethical issues is needed because fast fashion has continued to be demanded by both consumers and investors. New technologies, particularly AI, have allowed fashion brands to develop methods that allow them to be ahead of rapidly changing fashion trends and put high-demand products in stores faster, increasing the prevalence of fast fashion within the fashion industry. Questions now arise about how to address these ethical concerns. Important questions for the fashion industry include what issues will the use of AI in trend forecasting create in the long run within the fashion industry, and how can proactive action be taken within the fashion industry to prevent future ethical issues in the fashion industry? This paper which employs empirical methods to describe the fashion industry while also employing conceptual analysis related to philosophical ethics. The goal of the analysis is to provide, an informative ethical analysis of AI in trend forecasting, while also attempting to develop ethical guidance for concerns involving the use of AI in trend forecasting. The paper perform an anticipatory ethical analysis that attempts to address future concerns about fashion and will close by drawing conclusions about the direction of future analysis related to the application of AI in the fashion industry.

Keywords: Artificial intelligence, Trend forecasting, Fashion industry, Empirical and Conceptual analysis, Ethics, Anticipatory ethics

1. Introduction

The fashion industry is a broad and complex industry that features many different materials, styles, and methods of craftsmanship related to the development of fashion. Dillon (2018) states that prior to the mid-19th century, clothing was mostly custom-made by either individual tailors who designed, cut, fitted, and finished clothing or individual dressmakers who copied/ adapted the latest clothing ideas from Europe. Dillon (2018) goes on to state that in the 19th century, retail outlets developed, and clothing began to be mass-produced, as well as fixed in price and sizes. Dillion also states (2018) that at first there were three main categories in the fashion industry: haute couture fashion, ready-to-wear fashion, and mass-market fashion. Haute couture originated from dressmaking and the first couture house was established in the 1850's. Haute couture is still designed by fashion houses around the world and is considered the most prestigious kind of fashion because it is custom-made, extremely expensive, and exclusive. Haute Couture is so exclusive that it is in fact, "governed by Paris's Fédération de la Haute Couture et de la Mode" (Bala, 2019). Ready-to-wear fashion, as Dillion (2018) states, is shown in fashion shows, similar to haute couture, but is delivered to the marketplace months after it is designed and developed, and unlike haute couture is sold at a fixed price and in fixed sizes. Mass market fashion involves a larger scale production of fashion products, and due to cheaper methods of manufacturing, can be significantly cheaper than haute couture and produced in a way that makes this clothing, ready-to-wear. In addition to these types of fashion, in recent years a fourth category within the fashion industry has arisen, fast fashion. Fast fashion is similar to mass-market fashion but is arguably different due to its design, production, and market placement at speeds which are much faster than the other types of fashion. Due to the introduction of fast fashion into the fashion world there is a substantial difference between how earlier types of fashion were produced and how fast fashion is produced and how it influences the fashion world. This difference between types of fashions creates a gap between how fashion is made and the result of how fashion is consumed. Fast fashion has an environmental impact that poses a variety of problems for the general public but that are largely unrecognized by the fashion industry and members of the public. This

analysis will employ a conceptual ethical analysis to attempt to close this gap. The analysis will proceed by discussing using empirical analysis fast fashion, trend forecasting and how AI is employed with fashion. This discussion will be followed by a conceptual analysis of ethical and anticipated ethical issues with trend forecasting in the fashion industry.

In the marketplace of the fashion industry there are changes in fashion that are called 'trends' that appear. Fashion trends involve the spread of ideas and concepts about current fashions that appear in local, national and global arenas. These trends can be defined by attributes such as their color, shape, pattern, material, and the style of fashions. From haute couture designers, to streetwear, to fashions related to significant historical events, fashion trends can be set from and spread from a large range of places, people, and events. There are multiple theories that have developed about how trends work but a few that can be identified are the tickle-up theory, trickle-down theory, and the trend cycle. The Trickle-up theory of fashion occurs when trends originate from popularized fashions of everyday people and spread upwards to the domains of haute couture and high fashion. An example of trickle up fashion would be the popularization of streetwear. In the 1980's-1990's, streetwear, characterized by baggy clothes, ripped jeans, and sneakers were popularly worn by skaters and punk groups. These examples of a trend developing from streetwear caught the attention of many haute couture designers and examples of streetwear began appearing in haute couture and designer brands. Collaborations began to develop one of which appeared as the Louis Vuitton X Supreme 2017 fall collection. This collection combined the work of haute couture designer, Louis Vuitton, with popular streetwear designer brand, Supreme. In contrast with the trickle up theory in fashion is the trickle-down theory of fashion. Trickle-down theory occurs when trends originate from haute couture and high fashion and spread down to mainstream fashion in the mass market and fast fashion levels of the fashion world. Müller (2008) states that prominent haute couture designer, Christian Dior, had his first fashion show in 1947 which changed many women's desires in fashion from a wartime silhouette style to a retro-romantic style. The trend cycle in fashion refers to the representation of the life of a trend. What occurs in the trend cycle of fashion can be described as follows. First the trend is introduced, then it rises in popularity, then the trend reaches its peak at maturity until it declines in popularity, and then the trend is eventually rejected. The trend cycle can range in length depending on the nature of the trend, including the fact that some trends even reappear after they have been rejected.

2. State of the Art: Fast Fashion, Trend Forecasting, AI in Fashion and Stakeholders

2.1 Fast Fashion

Fast fashion is a more recent type of fashion that has prevalently emerged in recent decades where trends arise and then fall out of fashion just as quickly as they arose. Fast fashion brands and retailers are constantly producing and supplying the latest trendy apparel to the public at a rapid pace and lack the quality of items produced in other parts of the fashion industry. Even though much of the time fast fashion lacks in quality, consumers are still drawn to it because of its incredibly low prices, its ease of access and because it keeps up with the latest trends that people don't want to miss out on. This is captured in the phrase the fear of missing out (FOMO). "FOMO has a major influence on customer decision-making in both fast and slow fashion" (Bläse et al. 2023). FOMO when it occurs within fast fashion is problematic for a number of reasons. In both social and physical environments there are three major reasons for why fast fashion is problematic, the large consumption of resources needed to supply the growing demand, the cheap prices that come from the exploitation of people, and the massive amount of fashion waste and pollution that comes from production and overconsumption of fast fashion. Fashion waste is the accumulation of large quantities of apparel and clothing scraps discarded in landfills, dumping sites, or otherwise disposed of in unsustainable ways. Of the 12,970,000 tons of clothing and footwear generated in the USA in 2018, nearly 70% was placed in landfills (EPA, 2018). The European Union, United States, and China are the main exporters of tons of fast fashion apparel and materials; and due to the low quality of the materials used in fast fashion, are disposed of in large amounts every week to countries, far away from the EU, USA, and China, in places like Chile and Ghana (Ziegler and Elpídio da Silva, 2022). Fashion brands and retailers may not have the intention of contributing to fast fashion and to fast fashion waste, but the desires for economic success has an influence upon them and guides them to participate in unsustainable and unethical manufacturing and production practices. Consumers aren't blameless either, their desire to participate in the purchase of new trends in fashion drives them to buy unnecessary amounts of clothing and their particular lack of desire to deal with unwanted clothing properly, contributes to fashion waste and overconsumption as well.

2.2 Trend Forecasting

Trend forecasting in the fashion industry is the effort to predict future popular styles, materials, colors, etc. in the fashion industry marketplace based on information collected about past and present fashion and based upon previous fashion trends. This data is used in conjunction with AI to project future fashion trends based upon what has previously occurred in the fashion industry. Forecasting provides brands and retailers with useful information related to understanding their audience, what products need to be restocked or marked down in price due to customer preferences, and guidance as to what types of features should be included in designing new products. Traditionally, fashion forecasters travel and observe global and local fashion developments, attend fashion shows and read fashion magazines, while studying social and economic standings of consumers, cultures, weather, political climates, and sales data since all of these factors are critical for predicting future fashion trends. With this information, they use theories like trickle-up theory, trickle-down theory, and the trend cycle analysis to attempt to understand how a trend will behave and to predict new trends. The processes related to fashion forecasting can be time-consuming, which is why it is not surprising that AI is being adopted into the fashion trend forecasting industry. The use of AI in the fashion industry reduces the time needed to engage in trend forecasting.

2.3 AI in Fashion

Artificial Intelligence (AI) since its inception has sought to enable machines that exhibit human-like intelligence and to perform tasks that resemble human reasoning processes. AI has become an integral part of many items that are used in day to day activities within society, and one of the areas where AI is now having an influence is in the fashion world. AI is used in fashion for shopping with style assistants, chatbots, and smart mirrors, designing products, improving manufacturing, developing demand and trend forecasting. In fashion trend forecasting AI can be used in the following ways: for trend forecasting in fashion, as a tool to collect large amounts of data, identify and label fashion attributes of images, and to identify and predict fashion trends based upon what has been identified in extremely large sets of customer data. Data can be collected through tools such as application programming interfaces (API's), which as Luce (2019) states, act as a communication layer between two programs enabling access and data collection on websites such as social media and shopping sites. With access to API's, natural language processing (NLP's) can be employed for a wide variety of purposes. For example, Luce (2019) states that API's can be used to gather and analyse text sentiment data from shopping websites and social media platforms, where customers discuss fashion products. NLP's can also be used to understand and analyse data collected through surveys. Luce (2019) also states that computer vision can extract features using edge detection and object detection. Additionally, Zhao et al. (2024) identity's how AI employing deep learning and deep neural networks such as region convolutional neural networks (RCNN), AI can identify and categorize objects within images. Zhao et al. (2024) identify that to develop this type of detailed analysis machine learning needs to be fed data from a large dataset to train the model to recognize attributes. Luce (2019) states that this can be done with supervised learning, where the model is trained on labelled data. Zhao et al. (2024) use unsupervised learning, where the model or neural network is trained on unlabelled data and receives validation data to learn. Additionally, Shi et al. (2021) state that image attributes can be labelled by using a deep learning method called transfer learning. Additionally, Shi et al. (2021) state that transfer learning, when applied to fashion images, can recognize clothing attributes based on the examination and interpretation of other fashion images. Leeway Hertz, an AI Development Company states, that a program can identify and predict fashion trends in a set of data by using machine learning methods and deep neural networks, which can learn unknown patterns, which in turn allows machine learning algorithms to draw conclusions and make predictions about the unrecognized patterns that occurred within the data. Zhao et al. (2024) state that in their trend analysis model, it is necessary to have an accurate identification and classification of images, which serves as the foundation for forecasting fashion trends based on the images that have been analysed. Zhao et al. (2024) claim that they calculate what a trend will be by looking at the frequency in which attributes and combinations of attributes appear in the images classified through the use of machine learning applied to images.

2.4 Stakeholders in Fashion Trend Forecasting

The primary stakeholders involved in the use of AI in fashion trend forecasting examined in this analysis include consumers, the fashion forecasting companies using AI, fashion brands and retailers using the AI fashion trend forecast results. Each one of these stakeholders is a primary stakeholder because they arguably hold the most influence or are most influenced by the use of modelling in AI infused fashion trend forecasting. The fashion forecasting companies using AI are important because they are the ones who are actively creating

the AI infused fashion trend forecast. Fashion brands and retailers are important because they are the ones using the AI infused fashion trend forecast to develop and manufacture fashions for the marketplace. Consumers are important because they are the target audience of the AI infused fashion trend forecast. It is also important to remember the three primary ethical concerns with trend forecasting in the fashion world, invasive data collection, consequences of incorrect trend prediction, and fast fashion contribution. To analyse these issues and attempt to provide guidance about these issues for anyone analysing trend forecasting in the fashion world standard ethical principles from Philosophy and the Association for Computing Machinery (ACM) Code of Ethics will be applied.

3. Ethical Analysis of Fashion Trend Forecasting

Fashion trend forecasting with AI involves invasive data collection, which brings up the ethical issue of the invasion of privacy. To produce more accurate forecasts requires the collection of more images and sentiment data by those employing the AI from consumers. This data can be gathered from social media, catwalk images, search history, and purchase history. Trend forecasting companies using AI like Worth Global Style Network (WGSN) and Heuritech use social media images for analysis. WSGN states that they use “image recognition technology to classify images” (WSGN) of their “proprietary global map of Instagram influencers” (WSGN). Heuritech states that due to “millions of images analysed from social media, computer vision and artificial intelligence” (Heuritech) they can accurately predict fashion trends. Zhao et al. (2024) states that a study by Gabale and Subramanian (2018) used an AI model that is trained on images from Facebook and Instagram to identify fashion trends. Depending on who is collecting this data and how this data is being collected, the data collection may be unknown to individuals whose data is being collected. If this data tracking was known to be occurring, it might be unwelcomed. The tracking occurs through processes such as social media tracking and through the collection of search and purchase history. From the perspective of consumers one ethical principle that applies to this situation, is Kant’s Categorical Imperative II. This ethical principles states that we should “Act so that you use humanity, as much in your own person as in the person of every other, always at the same time as an end and never merely as a means” (Ciulla, Martin, and Solomon 2013). This means that a person should never be used as a means to benefit yourself or others. Instead, the well-being of others, and their autonomy should be the end goal of adhering to the principle. This applies to trend forecasting agencies engaged in using AI are using consumers information and privacy as a means to get to an end of a more accurate trend forecast and ultimately as a source for their economic profit. In addition, section 1.1 of the ACM code states that we should strive to “contribute to society and to human well-being, acknowledging that all people are stakeholders in computing” (ACM, 2018). Collecting this information about consumers should not be strictly reliant on these more invasive methods. There are other methods like surveying that are an option for gathering data. WGSN has successfully implemented surveying into its trend forecasting process. There are also other routes to continue using social media which some forecasting companies may already perform, such as collecting data on a more transparent level by making social media users, customers, and browsers more aware of the data that is being collected from them, which would allow users the option of opting out of data collection.

From the perspective of trend forecasting agencies when trend forecasting is employed within the fashion world there is the possibility of failed forecasts. The implementation of AI into trend forecasting does not make this possibility disappear, but it does change the way failed forecasts can occur and introduces potential new risks that the use AI brings to the table. Failed forecasts can happen due to flaws in the AI as well as limitations of the AI compared to the abilities of humans. AI can have issues related to errors in coding or in the software program, there can be incorrectly labelled images, and there can be a lack of data on influential unaccounted-for events. The consequences of failed forecasts can include loss of profits, fashion waste, and waste of resources. These ethical issue conflict with another ethical issue, the invasive collection of data. They are related because more accurate trend forecasts come from an increase in the amount of data collected, which compels trend forecasting agencies to desire to use more invasive AI data collection for trend forecasts even though their intention may not be to invade consumers privacy. The principle of care ethics in particular applies as it is concerned with prioritizing of interpersonal relationships and individuals’ dependence on one another, highlighting compassionate and context-sensitive responses to other individuals and situations over rigid adherence to universal principles (Maio, 2017). A key component of care ethics is human connection and dependence on each other, this is something trend forecasting companies using AI should be able to implement. It is important that humans are involved in correcting and preventing mistakes related to the use of AI in trend forecasting. Balancing interests related to employing AI as a tool and not completely replacing human input with AI, is necessary. Care ethic’s flexibility and nonuniversal principles allows AI to be a tool and

it can include human input, while turn reducing AI's errors. Section 3.7 of the ACM Code of Ethics states that it is important to "recognize and take special care of systems that become integrated into the infrastructure of society" (ACM, 2018). As AI is integrated into trend forecasting in the fashion industry it is important to recognize that while AI is a sophisticated technology, it does have flaws and has the potential to be at times, wrong. AI when it used for trend forecasting has the potential to predict trends that will end up being incorrect. Due to unpredictable circumstances, trends could be predicted that lead to the production of products that won't be sold and that will end up becoming waste. For example, the AI forecasting company Heuritech, recognized Covid as a significant factor that would change their original predictions for summer and fall fashions in 2020 and decided to develop trend predictions with Covid in mind. An AI program cannot, at least, as of yet, fully take into account all influences that may affect future fashion trends. This responsibility is left to humans which is why it is crucial to not rely completely on AI and recognize that human input is still a necessary ingredient within the field of fashion trend forecasting.

The fashion industry is growing increasingly dependent on unethical, unsustainable practices which is largely a product of fast fashion. An important contributor to fast fashion is the increasing speed at which trends in fashion are changing. When fast fashion is conjoined with AI, following and creating new fashion trends has become quicker and easier to accomplish. AI makes it easier to gather, analyse, and utilize information and data for trend predictions and can make fashion predictions on its own. Some believe that AI trend forecasting can help with sustainability, by cutting down on the production of wasted "untrendy" products that people will not buy. Brad Lacey, the global design director of lifestyle footwear at New Balance, in an interview with AI trend forecasting company, Heuritech, stated, "people don't really think of efficiency as a way to be more sustainable but it's a big part of it, you know you look at how much waste is in fashion in general largely because we don't understand consumers desires and needs to the degree that we need to… understanding people's needs is a big part of sustainability" (Brad Lacey). While brands and retailers can use AI trend forecasting to aid in reducing the amount of unsold clothing by providing the products their customers want, it can also be abused as well. The overuse of AI trend forecasting in the fashion industry looks like it can lead to creating overflow in the market by miss predicting trendy products. Examples of overflowing the market with trendy apparel are companies like Shein, a dominant fast fashion brand. A better understanding of what the consumer wants will likely decrease the amount of unsold clothing waste, but that doesn't really help when other AI trend forecasting companies, brands, and retailers will abuse AI trend forecasting information to mass produce trendy items, likely in poor condition, and because of this, many of the products being produced will end up in landfills. This isn't just true with poor quality apparel items it is also true of decent or sometimes high-quality apparel. Consumers have the pattern of buying an item to wear once or twice and then end up discarding it. Or even if they donate it, Press (2016) states not all donations go to loving homes, most donated clothing is sold in bales that are sent to Eastern Europe or Africa for resale or end up as waste. Press (2016) states recycling apparel isn't of much help either as it is hard to recycle blended fabrics. Act consequentialism or act utilitarianism states that "An act X, is morally permissible if the consequences produced by doing X result in the greatest good for the greatest number of persons affected by act X" (Tavani, 2013). Examining the consequences of using AI in excess in trend forecasting leads to a number of consequences. For the stakeholders of trend forecasting, companies using AI consequences would likely benefit and profit from selling trend information. For fashion brands and retailer's, consequences would be increased sales and revenue. Consumers would receive the benefit of owning trendy apparel items. These are the more positive consequences, more notable and more concerning are the potential negative consequences which can be seen when observing the situation more carefully. Looking at the long-term consequences of the excessive use of AI in trend forecasting raises the question of what will happen to all of the trendy new clothing consumers buy? Trends have been changing more frequently with the development of technology and AI and brands are more able to predict these changes in trends and provide more trendy products, influencing consumers to purchase more frequently which is a major contribution to the ethical issues related to fast fashion. Fast fashion is a more pressing concern as it affects everyone on the planet as well as the ecosystem of the planet itself. This main point here is that since using AI in trend forecasting has such a large negative effect compared to the smaller more positive ones, under act consequentialism this excessive use of AI in trend forecasting would not be moral. This highlights why it is important to reduce consumption by consumers and to also reduce production on the part of the producers which includes AI trend forecasting companies, fashion brands, and retailers. Section 2.7 of the ACM code states to "foster public awareness and understanding of computing, related technologies, and their consequences" (ACM, 2018). Trend forecasting companies should make it apparent not only to their clients, fashion brands and retailers, but also to themselves that using AI in fashion trend forecasting is something to be used in moderation, and when used in excess contributes to fast fashion

and its negative effects because of trendy apparels attractiveness to consumers. Making fashion brands and retailers aware of these developments is important as they are the direct channels for consumers to consume apparel produced in the fast fashion industry.

4. Anticipatory Ethics and the Fashion Industry

With the rapid expansion of technology and particularly AI technology, it is important to recognize that the full effects of technologies has yet to be explored. Anticipatory ethics is a method for attempting to address the development of these new technologies and the consequences of this development. Anticipatory ethics is "focusing on the problems that can be anticipated as potentially arising because of emerging technologies" (Nestor and Wilson, 2022). To use anticipatory ethics, one can employ what are known as The Rules. The Rules are 5 guidelines that act as a way of attempting to develop a means for governance related to the moral responsibility of engaging with computing artifacts. The application of AI to the fashion industry involves the use of computing artifacts. The goal of The Rules is to "reaffirm the importance of moral responsibility for these artifacts, and to encourage individuals and institutions to carefully examine their own responsibilities with respect to computing artifacts" (Miller, 2011). Miller (2011) states that computer artifacts can be characterized as any artifact that includes executing a computer program. For the computing artifact, AI trend forecasting, rule number three will be used which is "People who knowingly use a particular computing artifact are morally responsible for that use" (Miller, 2011). Since fashion brands and retailers are the users of AI trend forecasting, which involves the use of computing artifacts, they are responsible for the anticipated outcomes of the use of those computing artifacts. Fashion brands and retailers are the providers of the apparel that consumer's desire. Fast fashion is on the rise, and product lifecycles are having shortened lifespan due to fashion trends emerging from fast fashion. Adding trendy apparel to the market with increasing rapidity due to the use of AI for trend forecasting will not slow fast fashion down, it will only make it faster. This will in turn worsen the effects of fast fashion. The relationship of the lifespan of trends and fast fashion becomes a key point of influence for the AI computing artifact. This exhibits why it is important that fashion brands and retailers use the computing artifact (AI) with caution in the fashion industry.

5. Conclusions

The application of AI in trend forecasting in the fashion industry is part of a significant shift occurring within the fashion industry which is also is moving forward with the introduction of AI in general to the fashion industry. AI fashion trend forecasting provides new opportunities for the fashion industry but also introduces new ethical concerns. As the fashion industry continues to adopt AI, stakeholders must recognize their responsibility of addressing ethical concerns that are arising associated with trend forecasting in the fashion world. These issues include privacy concerns, the consequences of inaccurate predictions, and the consequences of the introduction of fast fashion within the fashion industry. Trend forecasting companies can become more proactive by making their data collection more transparent and by empowering consumers with choices about data collection. They can attempt to make their clients, fashion brands and retailers more aware of the consequences of incorrect trend prediction and the contribution of fast fashion to environmental concerns. Fashion brands and retailers can moderate or limit the amount of AI trend forecasting they use and mitigate the contribution of AI to fast fashion by making less trendy clothing that is part of the fast fashion industry. Consumer habits develop in the current fashion marketplace, and they drive the trend cycle to move rapidly. Consumers buy into fast fashion and the mass production of trendy apparel that retailers and brands provide for consumers through the use AI for trend forecasting. The balance of using AI in trend forecasting within the fashion industry is not a one-dimensional problem that can be easily fixed, consumers need to know how AI will affect the fashion trend forecasting industry, what role they play in it, and how they can aid in the endeavour to address and treat the ethical concerns related to trend forecasting. Consumers can pay more attention to and place more mindful consideration on what they buy, thinking about the things they need versus the things they want or buy just to keep up with trends. By using anticipatory ethics, the fashion industry can proactively identify and mitigate potential negative consequences, creating a future where technological advancements enhance not only business success but also the well-being of all stakeholders involved. These goals can be accomplished when future research is directed towards fashion analysis and trend forecasting where additional subjects are included in our anticipatory ethical analysis. These subjects can include research on the role of virtual style assistants, smart mirrors and generative AI models employed by the fashion industry in the effort to develop more precise trend forecasting methods.

References

Association for Computing Machinery (2018). *ACM Code of Ethics and Professional Conduct*. [online] Association for Computing Machinery. Available at: https://www.acm.org/code-of-ethics [Accessed Aug. 2024]

Bläse, R., Filser, M., Kraus, S., Puumalainen, K. and Moog, P. (2023). 'Non-Sustainable Buying Behavior: How the Fear of Missing Out Drives Purchase Intentions in the Fast Fashion Industry'. Wiley Online Library, [online] 33(2). doi:https://doi.org/10.1002/bse.3509 [Accessed Jun. 2024].

Ciulla, J.B., Martin, C.W. and Solomon, R.C. (2013). 3rd edn. *Honest Work: A Business Ethics Reader*. New York; Oxford: Oxford University Press.

Dillon, S. (2018). *The Fundamentals of Fashion Management*. 2nd edn. New York: Bloomsbury Visual Arts.

Vijay Gabale and Subramanian, A. (2018). 'How To Extract Fashion Trends From Social Media? A Robust Object Detector With Support For Unsupervised Learning'.

Heuritech. (2024). *Trend Forecasting with AI: Fashion's Way Forward*. [online] Available at: https://heuritech.com/trend-forecasting-fashion-ai/ [Accessed Aug. 2024].

Heuritech. (2024). *Our success stories* - Heuritech. [online] Available at: https://heuritech.com/our-success-stories/ [Accessed Aug. 2024].

Luce, L. (2018). *Artificial Intelligence for Fashion: How AI is Revolutionizing the Fashion Industry*. New York: Apress Media.

Maio, G. (2017). Fundamentals of an Ethics of Care. *Care in Healthcare*, pp.51–63. doi:https://doi.org/10.1007/978-3-319-61291-1_4.

Miller, K.W. (2011). Moral Responsibility for Computing Artifacts: 'The Rules'. IT Professional, 13(3), pp.57–59. doi:https://doi.org/10.1109/mitp.2011.46.

Müller, F. (2008). *Fashion Game Book: A World History of 20th Century Fashion*. New York: Assouline.

Press, C. (2018). Wardrobe Crisis: *How We Went from Sunday Best to Fast Fashion*. New York: Skyhorse Publishing.

Nestor, Michael and Richard L. Wilson (2022). *Anticipatory Ethics and the use of CRISPR in Humans.* Springer Publishing.

Shi, M., Chussid, C., Yang, P., Jia, M., Dyk Lewis, V. and Cao, W. (2021). 'The Exploration of Artificial Intelligence Application in Fashion Trend Forecasting'. Textile Research Journal, 91(19-20), p.004051752110062. doi:https://doi.org/10.1177/00405175211006212.

Tavani, H.T. (2009). *Ethics And Technology: Ethical Issues in an Age of Information and Communication Technology*. Hoboken, N.J.: Wiley

US EPA. (2017). *Nondurable Goods: Product-Specific Data*. [online] US EPA. Available at: https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/nondurable-goods-product-specific-data#ClothingandFootwear [Accessed Aug. 2024].

WGSN. (n.d.). *Trend Forecasting with Data Analysis and* AI. [online] Available at: https://www.wgsn.com/en/wgsn/data [Accessed Aug. 2024].

Zhao, L., Li, M. and Sun, P. (2021). 'Neo-Fashion: A Data-Driven Fashion Trend Forecasting System Using Catwalk Analysis'. Clothing and Textiles Research Journal, 42(1), p.0887302X2110042. doi:https://doi.org/10.1177/0887302x211004299.

Ziegler, A. and da Silva, A. (2022). 'The Dumping Grounds for Fast Fashion Clothes'. Latin American Journal of European Studies, 2(2). doi:https://doi.org/10.51799/2763-8685v2n2001.