

IMPORTANCE OF ARTIFICIAL INTELLIGENCE AND AUGMENTED REALITY IN COSMETIC AND BEAUTY INDUSTRY POST COVID 19

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ABSTRACT

Cosmetics and computing is not a preferred combination. However, going against well-liked notion has what led to the conceptualization of a technology driven customized personal care. The key to optimal skincare is to know the distinctive requirements of skin. Since every person's skin tells its own story, it is believed that skincare solutions ought to be tailored to one's personal needs. Digitization has created a large impact on the beauty industry. Artificial Intelligence is reshaping the way brands operate and serving us to look beautiful. In current situation COVID 19, the novel virus has turned the globe upside down. Every industry is affected and the economy is falling apart. The

pandemic is changing the behavior of customers. The use of artificial intelligence for testing, discovery, and customization will accelerate as concerns about safety and hygiene fundamentally disrupt product testing and in-person consultations. The article suggests the importance and use of artificial intelligence and augmented reality for personal care post COVID 19, and different style of instrumentation available out there within the market.

KEYWORDS: Artificial intelligence, Augmented reality, Beauty, COVID-19, Personal care.

INTRODUCTION

The word "Cosmetics" is thought to civilization since ages. At the same time, need to seem smart and beautiful for each individual can also be known because of the psychological needs, having been given the higher place in hierarchy for ages. People are greatly involved concerning their beauty. The cosmetic trade is moving towards sustainability, innovative

packaging, natural ingredients and customization. The purchasers are greatly fascinated by personalized or custom-built beauty product. Customized products are specifically tailored to people's distinctive skin types and desires. Technology permits us to customize such a lot currently, and then the expectation is dynamical for a lot of things and experiences to be altered, together with beauty product. Artificial Intelligence (AI) and Augmented Reality (AR) are remodeling the beauty industry by serving to make personalized product.^[1]

Currently, the COVID-19 pandemic has traumatized everyone's life. The changes in the methodology of application and uses of cosmetic products certainly demands necessary changes. Work in technologies like Artificial Intelligence (AI) and Augmented Reality (AR) allows people to buy, talk, and socialize using these alluring platforms. These technologies are affordable and readily available. Though people cannot overfill their social instincts face to face with them, they will fulfil them virtually. The COVID-19 pandemic has likely given rise to a replacement phenomenon wherein more people are becoming reliant on tools like Artificial Intelligence and Augmented Reality to work and shop. The behavioral change to maintain social distance will last considerably longer if not forever. People will remain socially distant, but using technologies and augmented reality they're going to be virtually close. These platforms and technologies will allow businesses to run and grow regardless of the challenges posed by social distancing.^[2]

Customers will attempt to explore for the products according to their need by the use of AI & AR Technology to avoid contact with others. As many people wear a mask for a long time during the day, the number of consumers affected by skin issues is escalating as well as the demand for hygiene products is increasing. As such, COVID-19 has changed consumer needs. Artificial Intelligence and Augmented Reality is playing a key role in responding to the pandemic.^[2]

ARTIFICIAL INTELLIGENCE (AI)

Artificial intelligence is a branch of computer science that studies how to program computers to exhibit apparently intelligent behavior. According to Riche, "Artificial Intelligence is the study of how to make computers do things which, of a moment, people do better." Artificial Intelligence (AI) is the science and engineering of intelligent machines, computer programs. In order of better understanding of artificial intelligence, the scientists have given several definitions.^[3]

Charniak and MC Dermott, 1985, in their study defined artificial intelligence as “The study of mental faculties through the use of computational models.”^[4] Kurzweil, in 1990, further interpreted AI as, “The art of creating machines that perform functions which require intelligence when performed by people.”^[5] In another research Schalkoff, 1990, described AI as, “A field of study that seeks to explain and emulate intelligent behavior in terms of computational processes.”^[6] In further study Winston, 1992, in his study characterized AI as “The study of the computations that make it possible to perceive, reason and act.”^[7] In other research Luger & Stubblefield, 1993, defined AI as, “The branch of computer science that is concerned with the automation of intelligent behavior.”^[8]

The Key Drivers of Artificial Intelligence

The key factors that drive recent advances in artificial intelligence are-

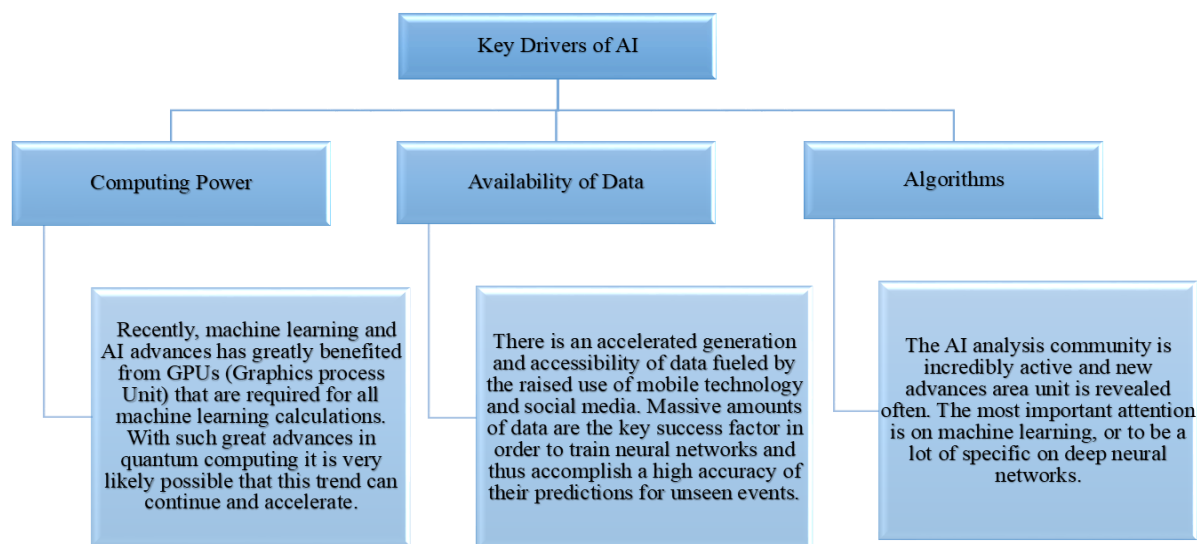


Fig. 1: Key Drivers of Artificial Intelligence.^[9]

The key characteristics of general artificial intelligence:

1. **Learning:** The power to change one’s behavior based on past experiences, e.g. when encountering new and unseen situations.
2. **Memory:** The encoding, storage and retrieval of past experiences.
3. **Reasoning and abstraction:** Draw logical conclusions and have the power to generalize rules based on sample data.
4. **Problem solving:** The power to systematically come up with potential solutions and derive the simplest answer to a haul.
5. **Divergent thinking:** The power to get multiple solutions to a given drawback.

6. **Convergent thinking:** Slim down an inventory of multiple choices so as to derive the simplest potential answer.
7. **Emotional intelligence:** Recognize and interpret human emotions.
8. **Speed:** All characteristics mentioned above must happen in an exceedingly affordable timeframe close to real time. Additionally they cannot rely on massive amounts of data, e.g. to retrain a neural network. In some cases, learning are often supported one single example solely.^[9]

AUGMENTED REALITY (AR)

Augmented Reality (AR) is a novel technology that involves the overlay of computer graphics on the real world. Augmented reality may also be defined as a real-time direct or indirect view of a physical real-world that has been reinforced or augmented by adding virtual computer generated data to it. AR is both interactive and registered in 3D also it combines real and virtual objects. Augmented reality aims at simplifying the user's life by transferring virtual data not only to his immediate surroundings, but in addition to any indirect view of the real-world surroundings, like live video stream.^[10, 11]

Components of AR

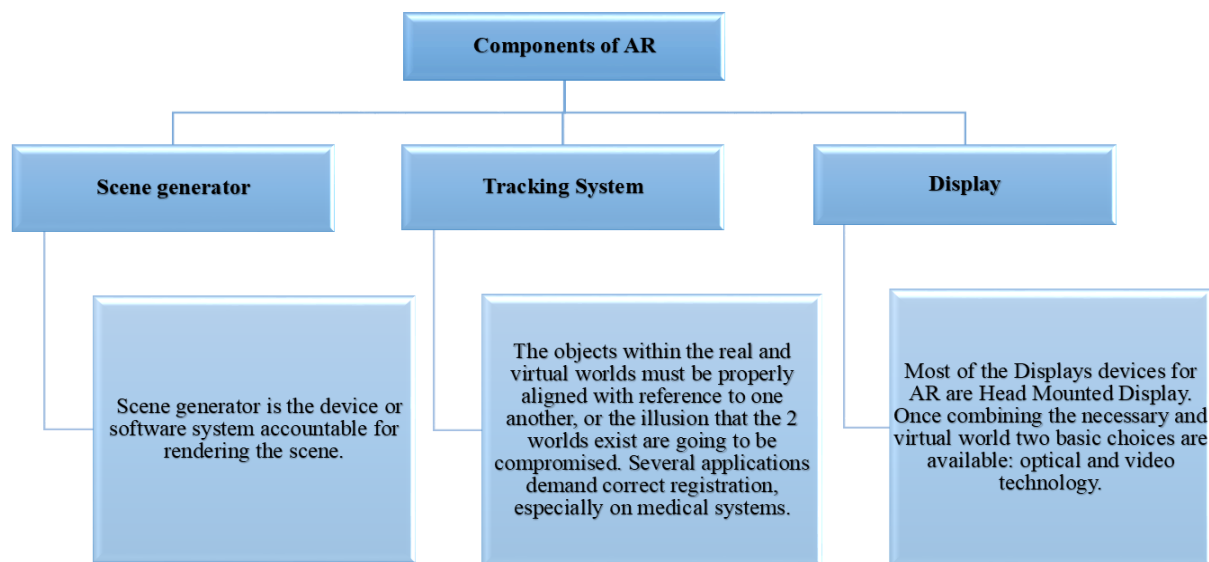


Fig. 2: Components of Augmented Reality.^[10]

APPLICATIONS OF AI & AR IN COSMETIC INDUSTRY

Advancements in Artificial Intelligence (AI) and Machine Learning are infiltrating the beauty industry over the past few years. Artificial intelligence (AI) is one amongst the key drivers of the fourth industrial revolution, and it is changing the way we think, work,

and interact with data and technology. For the consumer goods industry, AI provides the flexibility of personalization, process automation, augmented decision making, and digital supply chain networks, which have traditionally required human intelligence. With the arrival of artificial intelligence, smart technology, and machine learning, increasing numbers of companies are embracing product personalization and offering knowledge based beauty routines to their consumers.^[12,13]

These technologies can completely reshape the approach that brands operate, by simplifying processes as well as providing 10x additional efficient services to satisfy customers needs and demands. The AI Technology enables the customer to talk with the aestheticians and dermatologists and buy products online which allows to maintain social distance as well as prevent spread of diseases.^[10]

Beauty brands are also using augmented Reality to let customers virtually “try on” things before buying them.^[12]

Augmented reality involves mixing the users’ real-time video with digital overlays to generate new experiences and that fits in perfectly with the beauty industry’s need to prove a client expertise where individuals can attempt as many product as they need, before making their final choice. AR-enabled virtual makeup app lets shopper’s expertise the product look on them with just screens in front of them. Products like apparel, eyeglasses, lipstick, eye shadow, nail color, jewellery can be selected with augmented reality systems. Shoppers can try different clothing without the effort of repeatedly entering changing rooms. This may reduce the probabilities of spreading of communicable infection.^[14]

ADVANTAGES OF AI & AR IN COSMETIC INDUSTRY

The proliferation of social media and technology has resulted in the beauty and cosmetic industry moving from a product-based model towards an experience-based model where consumers no longer just buy a product, instead they buy into ‘the brand’. As a result, the industry is heavily reliant on social media channels, celebrity endorsements, fully-integrated marketing campaigns to attract and retain customers, and technology is increasingly becoming part of this marketing mix.

The personalization trend has also been extremely popular across the fast-moving consumer goods (FMCG) industry, and it is set to continue. Using new technologies and AI-driven algorithms, start-ups are personalizing the beauty industry by allowing customers to create products that suit their individual needs, such as customizable hair care products or a vegan body wash, etc.

Some of the advantages of AI & AR are as follows-

- Provide all men and women with insights associated with their hair and skin
- Show women makeup ideas by analyzing color, style, and alternative people's similar facial attributes
- Help women virtually try makeup using their own face and analyze makeup styles to predict social media popularity
- Learn what humans notice attractive using facial analysis, analyzing facial symmetry, and complexion and skin evenness
- Create better cosmetics and makeup products
- Understand human faces to predict how a completely unique eye shadow or Makeup cream will really look on the skin and dyes or colors on hair.
- Improve cosmetic surgery. The ability to predict with near-perfect accuracy what an individual can appear as if post-surgery is important not just for client satisfaction, however growing the entire field.
- Improve facial reconstruction. Rather dangerous procedures just like the double-jaw surgery are increasingly common, and also the possibility to use data to keep patients safer and predict complications could prove invaluable for people who prefer to endure surgery.
- Gain insight into in-store customers using visual acceptance. Retailers can gain insight in real-time on what customers checked out, picked up, and didn't buy to enrich the traditional metrics of what was bought and returned. This AI plan will facilitate with "inventory, visual merchandising, even shrinkage."
- Understand the mood, patterns, and options of a consumer using facial recognition. Use AI and machine learning to suggest the right product and facilitate women to use makeup step-by-step based on the shape of their face.
- Predict client orders supported age and gender using visual recognition technology
- Predicting return customer orders based on order history.

- Find images and videos of men and women with similar facial structures using geometric transformations, triplet loss function and transfer learning so as to answer the question: “is are there any other who have an identical face to mine?”
- Detect, analyze and digitally remove makeup from an “image of a human face wearing makeup” in order to predict facial elegance.
- Virtually apply makeup, face or body changes or alterations, dyeing or coloring of hair etc., to visualize in an artificial way to reduce the chances of infection. ^[15]

AI & AR ASSISTED MARKETED PRODUCTS

Beauty industry and companies are using AI and AR assisted devices for skincare. Some of them are.

1) FOREO Luna Fofa

“The Luna Fofa” by Swedish beauty tech brand, FOREO, founded by Bosnian-born Swede Filip Sedic in 2013, unveiled the worlds smartest and smallest beauty coach in the form of the AI enabled smart facial cleansing device. ^[16]

The cleansing device, measures skin moisture levels and condition to make a customized cleansing routine. Not like alternative cleansing devices, “the Luna Fofa” is created of polymer bristles that are quick-drying and stop microorganism build-up. The two-zone cleansing surface is suitable for each skin type, with finer touch-points being ideal for larger areas just like the cheeks and forehead and thicker touch points to focus on oil-prone areas, just like the T-zone and chin for a deep and precise clean. ^[17]

The device uses progressive skin sensors on the back of the device, engineered to measure hydration levels and real skin age. A sophisticated algorithm then processes this feedback to reveal skin’s very important statistics via the “FOREO for You app” on mobile phone as well as deliver personalized tips and tricks for optimum skin health. Based on this data, “the FOREO Luna Fofa” automatically creates a customized program of T-Sonic pulsations that syncs direct to device. The device is totally waterproof and battery-powered by 2 replaceable triple-A standard batteries. With it lasting up to 400 uses on one set of batteries and made from ultra-hygienic silicone, the luna FoFo is the excellent travel buddy. ^[17]

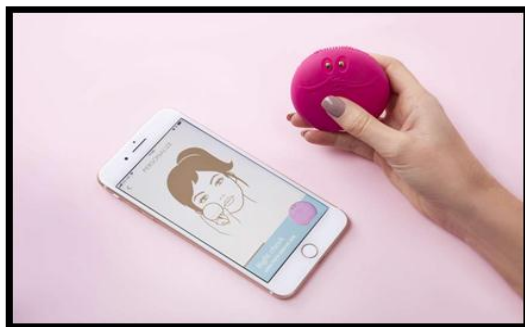


Fig. 3: FOREO LUNA Fofo.^[17]

2) Modiface Virtual Make Up

“ModiFace” by L'Oréal, launched in 2018 that virtually apply the product onto ones face as if we are actually wearing it, something that now works in real time. Over the past few years, technology has been improving rapidly. Everyone working with augmented reality organize a ways to go to enhance accuracy, realism, and maintaining focus when virtual makeup is being applied to your face, but ModiFace is perhaps doing it the foremost effective right now.^[18]



Fig. 4 Virtual makeup application.^[18]

3) HelloAva

“HelloAva” an AI powered personal skincare consultant that customizes a routine of curated products that was launched in 2018 by Siqi Mou, the cofounder and CEO of HelloAva.

The application “HelloAva” functions as an advisor by serving the customers and helps them to find the correct products for developing a personalized skincare regimen. Customers start the method by filling out a questionnaire about their skin and sending a selfie to the company's chatbot which is a software application used to conduct an on-line chat conversation via text or text-to-speech, providing direct contact with a live human agent on Facebook Messenger, text message, or a personal computer. The system also asks customers which products they are curious about and any problems they require to handle, like wrinkles

or dark spots. The algorithm of “HelloAva” selects an array of products, and then licensed aesthetician confirms the options for products before sending the customer to the checkout page. Customers are generally given 2 choices for each skin care class they choose, along with moisturizer, eye cream, toner, and face wash. Users can even chat with aestheticians if they have any questions on the recommendations.^[19]

4) Modiface Virtual Hair coloring tool

“Virtual Shade Selector” tool by Garnier is making it easier to settle on the precise shade of hair dye you need, thanks to a new collaboration with augmented reality platform “Modiface” in 2019. The duo have disclosed a AR tool that uses personalized technology to recommend totally different shades to customers in mere one minute and may be used each in-store or on-line, via smartphone or laptop.

The concept revolves around a one-minute assay, additionally to giving users the prospect to virtually check out a variety of the brand's recommended hair color shades. The results are calculated by taking under consideration every user's current hair color, level of grey, and desired finished look.^[20]

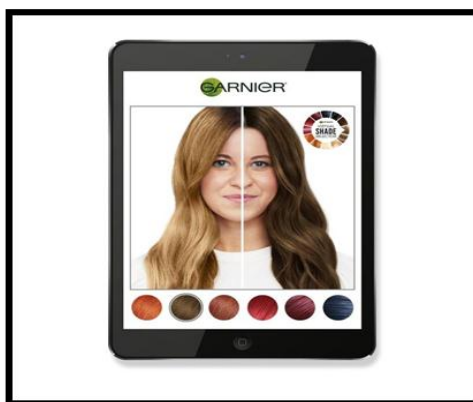


Fig. 5: Hair color trial application.^[20]

5) Printed Make Up

The “Opte wand” from Proctor and Gamble (P&G), founded by James Gamble and William Procter is a make-up printer unveiled at consumer electronics show in Las Vegas, 2019. A device that may discover the color and pigmentation of one's skin, spot blemishes, and exactly apply little jets of the precise right color makeup to those blemishes, without touching the remainder of the skin at all.

Its tiny built-in camera takes two hundred frames per second, whereas a microprocessor analyses this data to differentiate between light and dark areas. A small printer then applies the foundation to the skin.

“The wand” is basically a really fancy, handheld thermal inkjet printer with one hundred twenty nozzles, and a camera that captures two hundred photos of skin every second, that deposits one billionth of a liter of makeup on every skin spot it detects.^[21,22]

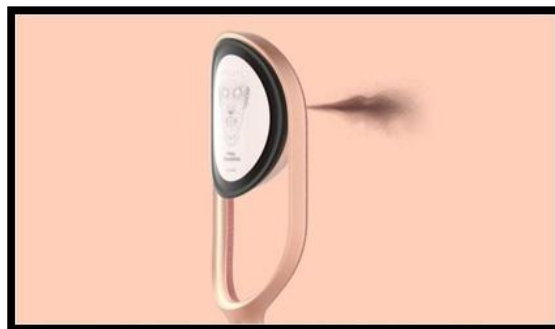


Fig. 6: Make up Printer.^[21]

6) Augmented Reality Mirror

“An Augmented Reality (AR) mirror” at the new Seoul Flagship Boutique of cosmetics, Korea in 2020 makes easy work of virtually trying different makeup brands or shades of lipsticks even if we are wearing a face mask. The AR mirror captures the snap of the customers face and analyses it, recommending products based on skin texture, and addressing any blemishes, spots, wrinkles and dark circles. Customers can then see a computer generated image of how they would look like wearing wide range of foundations, blush, eye products and lipstick. Due to corona virus trying different cosmetic after someone had already tried them is difficult. The technology enables to try different makeup looks without touching the face.^[23]



Fig. 7: Augmented Reality Mirror.^[23]

CONCLUSION

In cosmetics, beauty and wellness, we are witnessing AI in exciting way. The trend of AI & AR is rapidly picking up pace and beauty conscious customers are not shying away from AI personal stylist or chatbots to answer their queries related to personalized beauty care. AI-powered algorithm are guiding customers with buying recommendations that enhance their looks thereby pushing the sales growth of beauty brands to new heights. The rise of the personalization trend leads to the use of AI and AR in skin care. Artificial intelligence supports the reinvention of the beauty experience. It saves time and money and makes sure that we are investing in the right product direction. It also avoids mistakes and human errors. With the threat of a high communicable bacteria and virus customers are afraid of going to salons and parlors also. Even after the pandemic lockdown ends the main concern will be to avoid crowded place, cross contamination and to maintain social distancing. AI can help in the detection of skin disorders and enable the beauty industry to develop personalized products for their customers. This will ensure safety and prevent the spread of diseases in cosmetics and beauty business post covid activities.

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